



# **ICEIRD**

# **2011**

*Ohrid  
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PROCEEDINGS OF  
4<sup>th</sup> INTERNATIONAL CONFERENCE  
FOR ENTREPRENEURSHIP,  
INNOVATION AND REGIONAL  
DEVELOPMENT



5<sup>th</sup> - 7<sup>th</sup> May 2011  
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# ICEIRD 4<sup>th</sup> INTERNATIONAL CONFERENCE FOR ENTREPRENEURSHIP, INNOVATION AND REGIONAL DEVELOPMENT

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## 4<sup>th</sup> International Conference for Entrepreneurship, Innovation and Regional Development



H.E. Dr. Gjorge Ivanov  
President of the Republic of Macedonia

**Dear participants,**

It is my great pleasure to welcome you in the Macedonian and Balkan pearl, our spiritual and cultural centre, the city of Ohrid.

I am pleased that the regional initiative started in 2008 in Macedonia as an International Conference for Entrepreneurship, Innovation and Regional Development continuously confirms its international character. The success of this venture is further affirmed by this 4<sup>th</sup> Conference which offers an excellent opportunity to participants from more than 30 countries to share best practices and experiences, to gain insight in the cutting-edge knowledge and to learn the latest achievements.

At a time when the world still recovers from the global economic and financial crises, it is more than obvious that the only manner in which we can successfully overcome the crisis and create sustainable economy based on free market, competitiveness and quality, is to encourage the successful work of small and medium enterprises (SMEs), which are the driver of economic development of every prosperous country. The promotion of innovations and the

dedication to entrepreneurship are the prerequisites for creation, development and promotion of the SME sector. Hence, I believe that the business environment encourages the exchange of knowledge and experience and is essential for the success of every national economy, while opening the doors to regional collaboration and development.

The 4<sup>th</sup> International Conference for Entrepreneurship, Innovation and Regional Development represents a platform for such exchange and triggers the synergy among the scientists, the policy-makers and the business practitioners, on national and regional levels. It also encourages innovation as one of the most profitable investments. These efforts surely contribute to the fulfilment of the vision of Innovation Europe and symbolize the dedication of the Republic of Macedonia to the European and Euro-Atlantic integrations.

Therefore, I wish the participants of this important international conference successful work and fruitful cooperation.

**Dr. Gjorge Ivanov**



## 4<sup>th</sup> International Conference for Entrepreneurship, Innovation and Regional Development



**Dear ICEIRD 2011 participants,**

It is my privilege and honour to welcome you to the historic town of Ohrid, Macedonia for the 4<sup>th</sup> International Conference for Entrepreneurship, Innovations and Regional Development.

ICEIRD network was initiated in 2008 in Macedonia, together with our Greek partners and a few enthusiasts from Serbia and Bulgaria, with the aim of showing that, through the cultivation and growth of innovation and entrepreneurship, we can foster regional collaboration and bridge any political dilemmas in a peaceful and productive manner. The second conference was held in Thessaloniki, Greece. ICEIRD 2010 was in Novi Sad, Serbia. ICEIRD 2012 will be in Sofia, Bulgaria.

The primary objectives of ICEIRD conferences are to bring together the decision makers, (government, ministries and state agencies), innovation experts (universities, research and development centres, technology transfer centres, and business start-up centres), and practitioners (business incubators, business support organisations, small and medium size enterprises/SMEs), and then generate discussions in which these highly-intelligent and creative people can exchange ideas that work to promote entrepreneurship and increase the levels of innovation, with the overall aim of seeing enterprises compete and succeed nationally and regionally.

ICEIRD 2011 draws together more than 350 authors and participants from 42 countries.

The organising committee would like to express its sincere gratitude to His Excellency Prof. Dr. Gorge Ivanov, the President of the Republic of Macedonia, for his willingness to support and participate in ICEIRD2011.

Special appreciation also goes out to the conference patrons:

- European Academy of Sciences and Arts,
- Macedonian Academy of Sciences and Arts, and
- European Council for Small Business and Entrepreneurship.

The National Center for Development of Innovation and Entrepreneurial Learning in the last several years was supported financially by the Austrian Development Agency ([www.adv.gv.at](http://www.adv.gv.at)), and this agency also supported ICEIRD 2011. The organising committee would like to express its deepest gratitude for this continued support!

The Central European Initiative ([www.ceinet.org](http://www.ceinet.org)) also gave financial support to the conference and the ICEIRD team would like to express their gratitude and appreciation for this important support.

# 4<sup>th</sup> International Conference for Entrepreneurship, Innovation and Regional Development



Many other domestic and international institutions also supported the conference and to all of them we express our genuine and heartfelt thanks:

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I wish all the participants and guests a successful conference and pleasant stay in Ohrid and Macedonia.

Sincerely yours,

A handwritten signature in blue ink, appearing to read 'Radmil Polenakovik'.

Prof. dr Radmil Polenakovik

ICEIRD 2011 President



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# Ownership, innovation activities and firm performance - Evidence from Macedonian Privatized Firms

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The aim of this paper is to investigate the evolution of ownership, innovation activities and productivity using the Privatization and post-Privatization Enterprise Survey firm-level data of Macedonian Privatized Firms, in 2010. Studies that have considered the issue of privatisation are usually restricted to the ownership – performance relationship, whereas the novelty of this paper is based on the idea of studying the evolution of ownership and its impact on performance so that we can express the adjustments that arise from ownership change on innovation activities.

Empirical evidence of the relationship between ownership, innovation and performance is given. Further some economic background of the country for the transition period is elaborated. Various statistical measures are implemented on the original survey to test whether the change in ownership has lead to more innovative activities. Studies that investigate the relationship between the ownership and innovation undertaken by firm (Munari and Sobrero, 2002[1]; Munari and Oriani, 2002[2]; Domadenik et al., 2003[3]) emphasise that the amount of shares being sold to private shareholders, the level of technological opportunities and the degree of market competition of the industry seem to affect significantly innovation activities within privatized companies.

Based on the survey we find evidence that companies introduced new or improved goods (71.79%) and services (52.38%) since privatization. They developed these innovations mainly by the entity itself (80%) or together with other enterprises and institutes in the sector (16%). These innovative goods and services were new to their enterprise and to the domestic market. In addition, the enterprises introduced new methods of manufacturing and producing (65.71%), new or significantly improved logistics (61.76%), delivery or distribution methods for the inputs, goods or services (73.53 %), and new or significantly improved supporting activities for the processes (73.53%).

## Keywords

Innovation Activities and R&D, Ownership Evolution, Performance, Privatised Enterprises

## 1. Introduction

In today's world, the role of innovation is attracting massive attention. It is evidenced in the literature that US as a leader in innovation activities experiences higher labour productivity. European Union significantly lags behind US in both innovation activities and productivity. Therefore, EU has implemented an ambitious target of increasing R&D expenditures to 3 per cent of GDP by 2010 in order to move into the "knowledge-based economy" and to catch up with US.

Far behind on the list of innovative regions are the transition countries. Having in mind their historical background and transformation from socialist system to market economy, it is expected that these

countries will face a time gap prior to involve in innovation activities. There are several empirical and theoretical literature that have attempted to identify factors that prevent south-east European countries from catching up with more developed ones. Many studies show that changes in ownership from state to private have improved performance. However, some research has found differences in performance among different types of private firms. On the other hand, the transition countries in the last two decades seem to be an attractive place for the foreign investors. First the ownership change followed by the privatisation process and then the evolution of ownership to foreign owners accompanied with the innovation activities is expected to further improve firm performance in TEs.

The process of privatisation of state-owned enterprises started in Great Britain, in 1979 and it was transferred to other European governments and later to a number of developing countries as well. By the end of 1980s privatisation was spread to the former socialist countries. Being part of the SFR Yugoslavia the privatisation in the Republic of Macedonia was initially introduced in 1989 with the Law on Social Capital of the Former Yugoslav Federation. This Law was based on the concept of privatisation through which internal shares were issued to all employees of socially owned enterprises. Immediately after proclaiming the independence of the Republic of Macedonia, the Parliament rejected the Law on Social Capital and expressed its intention to enact new, Macedonian Law on Privatisation. The process was intensified in 90s after the Macedonian Law on Transformation of Enterprises with Social Capital has been enacted in June 1993.

This paper is structured as follows: after the introductory part and the section on theoretical framework we continue with empirical evidence on the relationship between ownership evolution, innovation activities and firm performance. Then what follows is some background information of the Macedonian economy and its privatisation process. Further the statistical analysis based on the enterprise survey data 2010 is elaborated. Finally we give the conclusions of the study.

## 2. Theoretical Framework and Empirical Evidence

### 2.1 Theoretical Framework on ownership and innovation

While under social ownership the incentive for innovation and dynamism was absent, private ownership, together with competitive pressure, are expected to generate strong incentives for innovation and technical change. The theoretical framework is crucial for understanding the debate on the public versus private sector performance.

Martin and Parker (1997)[4] consider the principal-agent relationship in the public sector as more complex, because the ultimate owners of state assets, the principals, are the public, and between them and the managers of the assets exist layers of other agency relationships, which provide more scope for 'noise' to distort the information flow. An immediate consequence of privatisation will be a shift in the objectives of principals thus it is expected that a change in ownership involves a new principal-agent relationship with new forms of information and incentive regimes, which bind agents to the principals' goals, in a world of incomplete contracts (Martin & Parker, 1997, p. 6[4]; Vickers, J. and Yarrow, G., 1988, p. 7[5]). When incomplete contracts are introduced, ownership and governance structure are shown to matter more, as they dramatically alter incentives with important consequences for company performance (Bortolotti, 2004[6]).

According to the property rights theory, private ownership is superior to public ownership because it provides effective managerial incentives and more effective monitoring schemes, (Vickers & Yarrow, 1988: p.44[5]). Based on the property rights tradition one can conclude that self-interested owners of capital have more incentives to aim for profit maximization and at the same time undertake innovation activities. The public choice theory, because of differences in their objectives and constrains state owned and privately owned firms will differ in actual behaviour and performance (Martin & Parker, 1997: p 10[4]). The Austrian school of economics in the presence of market discipline stresses the role of the entrepreneurial factor in the market, and relaxation of barriers to entry is believed to improve the entrepreneurs' performance.

The last theory can be related with the Schumpeterian view. After the first view about the relation between market structure and dynamic market performance, Schumpeter Mark I of *The Theory of economic Development*, according to which it was the new (often small) firm that carry out innovation, comes the second fundamentally different view, the Schumpeter Mark II of *Capitalism, Socialism, and Democracy*, according to which it is the established (large) firm that generates technological progress. In relation to this he notes that large firms are more responsible and have to do with creating the standard of living and to innovate rather than the ones that work under conditions of competition. The

well known economist Schumpeter (1939, 1942)[7][8] developed the ideas on which most of the theoretical and empirical analysis of the economics of innovation and research and development are based.

When analysing innovation and their effect on firm performance, it is a primary objective of the empirical studies to find appropriate measures of innovation activities and its role to technological progress. A good starting point is the definition and the taxonomy of innovations following Joseph Schumpeter, who defined innovation in a broad sense, saying (1934, p.66): *“the carrying out of new combinations” that include “the introduction of new goods (...), new methods of production (...), the opening of new markets (...), the conquest of new sources of supply (...) and the carrying out of a new organization of any industry”*.

Having discussed the theories such as the principal agent, the property right and public choice, and the Austrian school of economics which are all giving supporting arguments for better performance of private ownership, and further the Schumpeterian theories on innovation, we will now look at the empirical work done on the relationship between ownership structure, innovation and performance to support the theoretical argument.

## **2.2 Empirical evidence on ownership structure, innovation activities and firm performance**

There is a large body of literature on the effects of changes in ownership structure in TEs but the evidence is rather inconclusive. Megginson and Netters' (2001)[9], Djankov and Murrells' (2002)[10] and the latest Estrin et al.s' (2009)[11] review of the empirical literature done on privatisation in TEs leads them to diverse results, either within different countries or on the effect of different factors. Megginson and Netter (2001)[9] summarize the cross-sectional and time series evidence on the relative efficiency of public and private ownership. They conclude that performance of firms under private ownership in TEs is better than continued state ownership. According to them most studies document that if firms are privatised to new managers (outside owners) then the performance improves more than when the original managers (inside owners) are retained. Their general conclusion is that that privatisation around the world tends to improve firm performance. Djankov and Murrell (2002)[10] conclude that the impact of privatisation on company performance has been positive and significant, though not in all circumstances. For example in the CIS countries the effect of privatisation is statistically insignificant. More specifically privatisation to outsiders is found to have the largest positive effects on enterprise restructuring, both in Eastern Europe and in the CIS. Increased competition is associated with positive results in Eastern Europe but not in the CIS. The most recent empirical survey realized on transition economies for the effects of privatisation and ownership is Estrin et al.'s (2009)[11]. They conclude that the performance effect of privatisation to domestic owners has been less impressive than privatisation to foreign owners which results in considerably improved performance of firms. Furthermore, they conclude that concentrated (especially foreign) private ownership has a stronger positive effect on performance than dispersed ownership in CEE and CIS.

Foreign investments are also shown as important vehicle for the transfer of technology. The transition countries in the last two decades seem to be an attractive place for the foreign investors. The Transition Report 2005 confirms that apart from the business environment ownership and management decisions have a significant influence on the performance of firms and their competitiveness in international markets. Foreign-owned firms, which usually acquire better performing firms and can draw on the technical and management know-how of their parent companies, tend to be more efficient than domestic. Furthermore, according to this report the most important factor that impact firms' performance is the extent of competition, which it prompts firms to improve their levels of efficiency more quickly but it does not have an impact on the overall efficiency.

There are few studies that investigate the relationship between the ownership change and innovation activities undertaken by firm (Munari and Sobrero, 2002[1]; Munari and Oriani, 2002[2]; Domadenik et al., 2003[3], Brown et al., 2009[12]) emphasising that the amount of shares being sold to private shareholders, the level of technological opportunities and the degree of market competition of the industry seem to affect significantly R&D commitment within privatized companies. Ownership structure is shown to influence productivity both directly and indirectly, through innovation activities (Hill and Snell, 1989[13]). Carlin et al. (2001)[14] find significant effect of privatisation on new product restructuring. Moreover new product directly increases sales and productivity growth, implying an indirect effect of ownership on enterprise growth. On the other hand, Dachs and Ebersberger

(2009)[15] study for Austria, testing if foreign ownership influences the innovative behaviour and performance, find that this relationship appears neutral.

The number of studies that have studied the ownership changes in Macedonia is numerous, but there are very few studies that have related the change in ownership with the innovation activities and firm performance. Studies written on the 2000s are characterised with empirical evidence on the effects of privatisation, such as: Prasnikař et al. (2002)[16], Domadenik et al. (2003)[3], Zaludendo (2003)[17], Koman and Markovska (2007)[18]. Their major finding is that foreign ownership improve performance. Koman and Markovska (2007)[18] find evidence that internally-owned firms (where majority owners are insiders) chose defensive restructuring, meaning that they created the same revenue by substantially reducing the employment; whereas externally-owned firms (where majority owners are outsiders) chose strategic restructuring, where the revenues increased with a modest reduction in employment.

### 3. Economic Background

The Republic of Macedonia is a small country in Europe situated in the midst of the Balkan Peninsula and covers 25,713 square km. It is inhabited by approximately 2 million people and the 2002 census showed that ethnic Macedonians constituted 64% of the population and ethnic Albanians 25% whilst Turks, Roma and 3 other sub-groups constituted a further 10% of the population. On the 8th of September 2010 Macedonia celebrated its 19th anniversary of her independence, that also correspond to the years in which the transition from planned to a liberal market economy has taken place. The differences among the former Yugoslav republics before their independence are shown in Table 1.

**Table 1** GDP per capita of the former Yugoslav republics in 1987

Republics	GDP per capita – Index*
<b>SFR Yugoslavia</b>	<b>100</b>
Slovenia	226.2
Croatia	128.2
Serbia	87.5
Montenegro	73.9
Bosnia and Herzegovina	70.5
Macedonia	62.4
Kosovo	49.3

*Source: Statistical Yearbook of Yugoslavia, 1987*

\*The index measurement is given as a relation of the GDP of the republics to the GDP of the federation as a whole.

As it can be seen from Table 1, before its independence Macedonia was one of the least developed parts of Yugoslavia, thus after 1991 the reform process started in a very unfriendly environment. Apart from belonging to a region impacted by wars, Macedonia inherited from the former Yugoslavia a considerable external debt and an economic structure that needed urgent restructuring.

Table 2 shows some economic indicators, which give a clear picture of the unfavourable economic trends followed immediately after the independence such as negative GDP growth, high inflation, high unemployment, low levels of export, etc.

**Table 2** Economic indicators of Macedonia from 1991 – 2009

Economic Indicators	GDP growth (annual %)	GDP per capita growth (annual %)	Inflation, GDP deflator (annual %)	Unemployment	Net Export-Import (% of GDP)	FDI, net inflows (% of GDP)	External debt stocks (% of GNI)
<b>1991</b>	-6.17	-6.82	93.73		-2.97		
<b>1992</b>	-6.56	-7.11	1,271.77		0.99		
<b>1993</b>	-7.47	-7.94	442.15		-7.94		41.78
<b>1994</b>	-1.76	-2.24	151.89		-10.22	0.71	33.10
<b>1995</b>	-1.11	-1.61	17.09		-9.76	0.21	28.96
<b>1996</b>	1.18	0.66	2.87		-10.34	0.25	41.60
<b>1997</b>	1.44	0.91	3.93	36.00	-13.54	0.42	33.53

Economic Indicators	GDP growth (annual %)	GDP per capita growth (annual %)	Inflation, GDP deflator (annual %)	Unemployment	Net Export-Import (% of GDP)	FDI, net inflows (% of GDP)	External debt stocks (% of GNI)
1998	3.38	2.85	1.39	34.50	-14.88	4.21	42.27
1999	4.34	3.86	2.74	32.40	-9.98	2.41	39.31
2000	4.55	4.13	8.18	32.20	-14.89	6.00	41.49
2001	-4.53	-4.84	3.61	30.50	-13.92	13.01	43.81
2002	0.85	0.58	3.45	31.90	-20.13	2.78	44.79
2003	2.82	2.59	0.26	36.70	-16.95	2.54	40.87
2004	4.09	3.89	1.34	37.20	-20.73	6.02	52.84
2005	4.10	3.94	3.80	37.30	-17.34	1.67	51.61
2006	3.95	3.82	4.35	36.00	-18.62	6.66	51.65
2007	5.90	5.80	7.61	34.90	-18.85	8.83	53.43
2008	4.80	4.72	7.31	33.80	-26.02	6.17	49.74
2009	-0.70	-0.76	2.77		-22.97	2.69	62.17

Source: World Bank Development Indicators

In the early years of transition the economic situation was not very favourable, thus economic reforms were needed. After implementing the reforms the situation improved (GDP started to rise, inflation dropped to 2.87% in 1996) except for the unemployment which continued to remain high throughout the transition period. Privatisation of the Macedonian economy was one of the reforms that needed to be undertaken.

In June 1993, two-years after Macedonia's independence a new law, The Law on Transformation of Enterprises with Social Capital.. The Government chose the 'case by case' method of privatisation, the principle privatisation for revenues (Klusev et al., 2002)[19]. As referred to article 6 of this law: *"The privatisation of state capital of enterprises is decided upon by the Government of the Republic of Macedonia, on a case by case basis. Privatisation is undertaken in accordance with a Program, which shall be adopted by the Government of the Republic of Macedonia for a period of 6 months"*. They believed that this method will foster the privatisation process, which would bring to an end the difficulties that the enterprises were facing. The drawbacks of the chosen method were that it did not help develop the capital market and the participation of the Albanian population in the privatisation process became limited. However, it was a strategic decision of Macedonian Government not to use a mass privatisation scheme, because it was believed that such a privatisation method would only postpone the main objective of the privatisation, which is the appearance of real and effective owners – who would have the incentive and means to increase the efficiency of enterprises.

There is no such a study that has analysed the privatised enterprises from the innovation aspect. With the questionnaire survey conducted in 47 companies in Macedonia in 2010 we came up to some findings that might change the belief that has been circulating with the literature during the last two decades. The following section elaborates the methodology and the results of the enterprise survey 2010.

#### 4. Enterprise Survey 2010

The enterprise survey 2010 was conducted in Macedonian privatised firms through a questionnaire constructed by the authors, in order to get primary data to determine whether privatised firms have gone through changes in ownership during the transition period and weather the changes have significant role in the performance of these firms. A total of 50 privatised firms in Macedonia were randomly selected to comprise the sample. The managers of the selected firms answered a survey questionnaire with a face-to-face interview. The data gathered from this research instrument present information on a wide range of firms' characteristics and are computed for interpretation. The questionnaire consisted on 7 parts covering the following segments of the company's performance: the ownership structure and governance, production and investments, labour force, production management, marketing and competition, innovations of products and processes, and financial performance. Having in mind the cautiousness that we had for surveying the top management (general directors, managers or owners) of the firms, one can be ensured on the credibility of the data. In addition to this, the dataset is unique, since there is no available firm-level data for the privatisation process, especially not for such a long period. In the next section we continue with the statistical analysis of the data to explain the relationship between ownership structure, innovation activities and firm performance.

## 4.1 Findings

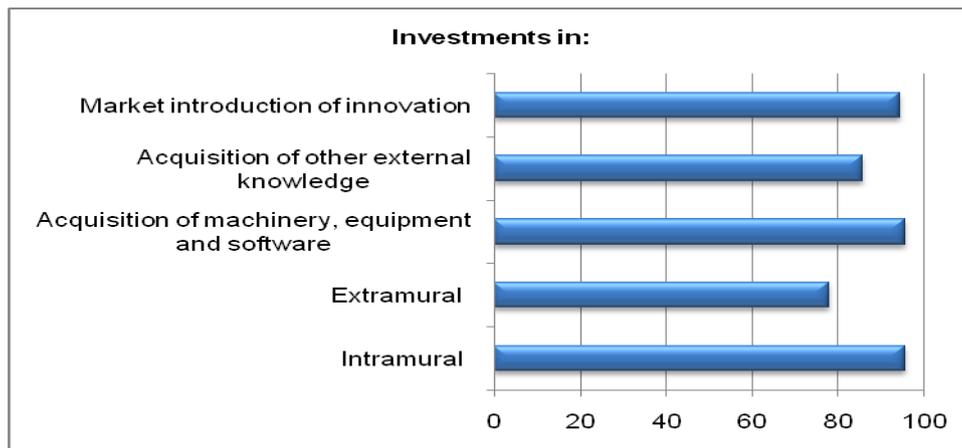
The survey results show that the biggest part of the surveyed companies that were privatized during the process of transformation of the economy are transformed as shareholding companies whose shares are now traded in the stock market (46.81%). There is unfavourable representation of female considering the leading positions in the privatized companies, since the survey results show that only 8.5% of females are in the highest management structure of the companies. The educational distribution of the general managers shows that 41% are engineers, 26% graduate economists, and 17% lawyers, just 2% of them have secondary education. There is also a significant change in the ethnical affiliation structure of the owners from the moment of privatization till today. The distribution is as follows: Macedonian – 50% in the moment of privatisation, 30% today; Albanian 10% in the moment of privatisation, 30% today, Mixed 30% in the moment of privatisation, 20% today; and Foreign – 0 in the moment of privatisation, 20% today. Considering the production and investments, the majority of the surveyed companies reported that they do not have a production sector outside the headquarters (location) of the company.

The majority of the companies stated that they are / were seeking cooperation with foreign investors; because they have great opportunities for increased capital (46.15%) and they have access to new technology (23.08%), as well as access to export markets (23.08%). This is in line with the government policy for attracting foreign investments to Macedonian market and taking measures to reduce the administrative barriers and improve the judicial sector, in order to help investors to invest their capital in Macedonian companies.

What is in the particular interest of this paper is the development of human capital in Macedonian companies that passed the process of transition, since it is one of the major factors for introducing innovations. Considering the labour force policy of surveyed companies, the results show that after the huge release of workers, which was a common practice after the process of privatization (81.8% of them reported that they have released employees during these decades), the labour regulation and inadequately educated workforce are still barriers to their current operations. It seems that not just the physical, but also the human capital development are still not over-passed obstacles and influence on their successful performance today. If we relate the data for the labour force characteristics and marketing and innovation activities, we can see that the level of development of the Macedonian privatized companies even 20 years after privatization is not enviable – just 15.56% of employees advanced their qualifications, 5.7% advanced their educational level, 27.87% use computer and internet, 17.58% followed training. In the era of knowledge economy and lifelong learning, just 67% of the surveyed companies offer trainings for their employees.

Even that the human factor was stressed as one of the main obstacles for development and improved performance of the companies, in the era of globalization and increased competition, the data concerning innovation activities are mainly significant and positive. The surveyed companies introduced new or improved goods (71.79%) and services (52.38%) since privatization. They developed these innovations mainly by the entity itself (80%) or together with other enterprises and institutes in the sector (16%). These innovative goods and services were new to their enterprise and to the domestic market. In addition, the enterprises introduced new methods of manufacturing and producing (65.71%), new or significantly improved logistics (61.76%), delivery or distribution methods for the inputs, goods or services (73.53%), and new or significantly improved supporting activities for the processes (73.53%), such as maintenance systems or operations for purchasing, accounting, or computing. The companies reported that 36.36% of them have innovation activities to develop product or process that were abandoned by these years or still ongoing by the end of 2009.

The investments in innovations are influenced by many factors, such as highly noticeable economic risks, high direct innovation costs, financial costs and availability of finance, organizational limitations, lack of qualified personnel, lack of information for technologies, lack of information for markets, lack of responsibility of the customers for new products and services, impact of regulations and standards, increased assortment of goods and services, etc. As the following figure shows, after the process of privatisation, the significant part of the surveyed companies invested in innovation activities.



**Figure 1** Investments in innovation activities

## 5. Conclusions

Even though the economical background, as discussed in section 3, gives evidence of not very favourable conditions for the Macedonian economy, the results of enterprise survey that we conducted in a representative sample of privatise firms proved the opposite. 80% of the companies developed innovation activities by the entity itself. 71.79% introduced new or improved goods since privatization. This shows that the during the transition period, with the ownership change and the reforms undertaken in the Macedonian economy, there are high performing firm that face the competition and thus fight with it by developing new products or processes.

The undertaken activities with respect to the introduced new methods of manufacturing and producing (65.71%), show that these firms have introduced also new machinery and technology, which is highly related with the improvement of their performance. Also companies have positively reported for being engaged in the new or significantly improved logistics, delivery or distribution methods for the inputs, goods or services, and new or significantly improved supporting activities for the processes, such as maintenance systems or operations for purchasing, accounting, or computing.

The results might seem as opposite to the common belief of the people for the performance of the privatised enterprises. But one should notice that we came to evidence that is in accordance with the theory, that ownership change, competitive markets and foreign owners improve the performance of the enterprises and are positively related with the innovation activities of the firms.

Finally, one can say that the trends of the economic reforms should continue so that they can enforce increased competition, a larger flow of foreign investments and enabling the companies to cope with the foreign markets. The visa liberalisation to EU and further steps to became EU members should be one of the advantages that the Macedonian economy should make use of in the following years to come. There still some space for the future research, to tackle the issue of de-novo enterprises by getting a broader sample of firms, so that their trend for innovation activities is followed, or compared to the old existing ones

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# How to get out of crises:

## Crises management and Change management

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**Successful change management could help to avoid crises. Crises management is needed if change management efforts fail. There are the common features of crises management and change management and there are the differences as well. At the same time different elements should be emphasised during these two processes. In this article the triangular model of crises is compared with triangular model of organizational changes. Implications for managers are developed.**

### Keywords

Change, crises, organization

## 1. Introduction

Organizational change is planned movement from stage A to stage B. Crisis is a low probability, high consequence event that is capable of threatening organizational legitimacy, profitability and viability [1]. At the same time, crisis could be taken as the first step in the organizational change management process: 'establishing the need for change' according to Galpin [2]. At the same time crisis-driven changes tend not to last [3]. The research question here is how to make such changes last. The Estonian economy has been in a transition process since 1991 [4]. There are several studies of organizational change in Estonia [5], and of crisis management in Estonian companies [6]. This paper aims to compare change management and of crises management.

## 2. Change Management Theories

Dopson and Neumann [7] have perceived change as a necessary evil for survival in the context of uncertainty. In this article an organization is defined as a complex system that produces outputs in the context of an environment, an available set of resources and a history [8]. Armenakis and Bedeian [9] have divided research on organizational change into (1) content research, (2) contextual research, (3) process research and (4) criterion research. Nutt [10] combines structure and process. The author of this article refers to the first component as 'types of change' and the second component as the 'process of change'. Every organization has forces for change and forces for stability [11]. There is also a third crucial factor – a readiness to change in the particular organization. Struckman and Yammarino [12] combine types of change with the readiness to change, but they do not take process into account. Author connected these four types - content research, process research, contextual research and readiness research – into triangular model of organizational change.

### 2.1 Types of changes

Changes are most often classified according to scope and the way the changes are initiated. Also the duration of change is important in understanding change. **Types of change in terms of scope.** In content research most theorists divide change into two types according to scope: change taking place within the given system and change aiming to modify the system itself. First order change provides a method for managing stability. It helps one to manage current strategy more effectively and efficiently [13]. A first order change cannot produce transformation because it lacks the creativity to discover new

strategic ideas [14]. Second order change calls for innovation in order to lead the change. Second order change is difficult to carry out because information gathering in an organization will tend to reify the rules, culture, strategy and core processes that make up its current paradigm [15]. Ackerman [16] has described three types of organisational change: (1) developmental change, (2) transitional change, and (3) transformational change. Burke and Litwin [17] have developed a model for making a distinction between transactional and transformational change. **Type of change in terms of initiative.** Unplanned change is usually spontaneous and random [18]. It can be beneficial or disruptive, but, more often than not, unplanned changes are disruptive. Planned change is a rationally controlled, orderly process [19]. It is usually triggered by the failure of people to create continuously adaptive change [20]. The need for planned change can come from external or internal sources or both. Dirks, Cummings, and Pierce [21] have made a difference between self-initiated and imposed changes. A self-initiated change means that the individual makes a change as a result of her own initiative and volition. An imposed change is change initiated by others so that the individual is forced to act. Management-driven change is typically executed by managers. Participatory change is based on the premise that there is a genuine sharing of power and responsibility for change between employees and management [22]. **Duration of change.** In a change event categorization scheme, Struckman and Yammarino [12] differentiate between short-term and long-term change, where both could provide radical or continuous improvement.

## 2.2 Process of change

Descriptive research that only assesses the structure may fail to see underlying causes, whereas analyzing the dynamics of the process appears to provide powerful prescriptive insights [10]. Depending on the context there exist at least ten different definitions for the word process [23]. The process of change could be seen as an individual activity or connected activities or sub processes bringing about the processing of a task [23]; or as a sequence of dependent events [24]; or a logical, related, sequential (connected) set of activities [25]. Pettigrew and Whipp [26] have viewed change management as an analytical, educational (learning) and political process. The basic model developed by Lewin [27] consists of three steps: unfreezing, moving, and refreezing. Lewin's model is often quoted, but sometimes without the warning that freezing at the new level should be a deliberate planned objective. Merely reaching a new level is no guarantee of its permanency, even in the short term [28]. As change management has been considered as a business process like any other that a company carries out [29], the author applies process management using a triangular model. The author points out the reason for the change as the trigger event, which gives an impulse to start the process of change. The steps and activities during implementation are divided into core processes and support processes.

**Trigger events.** It is usually changes in the external environment that trigger a process to start. Events represent the changing state of the world [30]. A trigger event is an event whose occurrence starts a task or a workflow [23]. **Core process.** A major process is a process that usually involves more than one function within the organizational structure and its operation has a significant impact on the way the organization functions [25]. Core processes are strategically important business processes [31]. These processes form the sequential steps — the steps have some order — one should be started before the next. For example, before vision creation the need for change should be determined. **Support processes** take place during almost the whole change process and are inevitable for the implementation process as a whole. Support processes provide inputs that allow the core activities to take place. For example, in order to implement changes successfully, several support processes are needed to identify resistance as an obstacle to overcome [9]. Three elements – information, communication and training – have been pointed out as part of a definition of change management by [32]. People have to be informed about changes, then their feedback is required and intense communication starts. Finally, people have to be trained to be successful in the new business process environment [33]. The change drivers are activities or behaviors facilitating the implementation of change – leadership and participation [34]. As changes in organizational structures bring with them a redistribution of power and influence in regard to decision making, groups and individuals that are negatively affected by a reorganization, in the sense that their impact on decision making is reduced, typically are opposed to the change [35]. Handling power issues helps to remove obstacles in the implementation process. By mobilizing, the dynamic for change is created; by catalyzing, the structure of the project is created and run; by steering, actions are kept on course [36].

## 2.3 Readiness to change

When analyzing employee behavior in organizations implementing change, three factors should be taken into consideration – employee attitudes towards change, organizational culture, and organizational learning.

**Employee attitudes.** Attitudes are considered an indicator of the future success of an organization [14]. Attitude strength depends on the extent to which these attitudes are related to each person's own deeply held philosophical and political values and are of concern to the person's social group [38].

**Organizational culture.** Cameron and Quinn [38] stated that to sustain success, firms have less to do with market forces than with company values. Schein [39] sees organizational culture as a deep-rooted phenomenon, which cannot be changed easily — a pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration. In a stable environment, it is safe to be completely task oriented, but in a turbulent environment with high interdependence, relationships need to be valued in order to achieve the level of trust and communication that will make joint problem solving and solution implementation possible [39].

**Organizational learning.** Learning, both institutional and individual, and the ensuing corporate changes are seen as a prerequisite for the success and survival of organizations irrespective of their size and sector [40]. A learning organization is the antithesis of the traditional bureaucratic organization [41]. The barriers to learning may stem from the culture of the organization [42] or from the past organizational experiences of the members of the organization. Organizational learning emphasizes a socially constructed process, which proceeds through sharing interpretations of events and through reflection on these interpretations [43]. Creating lasting organizational change is inextricably linked with culture change [44], which includes attitude change. Author connected 4 main elements and 9 sub-elements into one model – the triangular model of organizational change.

## 3. Crisis management theories

Crisis is a low probability, high consequence event that is capable of threatening organizational legitimacy, profitability and viability [1]. Most similar to crisis is transformational change. The consequences of crises are more serious than consequences of organizational change effort. Therefore consequences should be one element of the crises 'types' triangle. The other two elements of 'types' triangle are source of crises and scope of crises (Table 1).

**Table 1** Types of change and types of crises

Type of change	Type of crises
Initiator of change	Source of crisis
Scope of change	Scope of impact
Duration of change	Character of crisis

In order to handle consequences external help is needed. This gives special importance to shareholders. As in crises situation quick actions are required, rules should be established beforehand. Primary and secondary shareholders should form one triangle together with values and ethical principles. This triangle could be called 'partnership' triangle and this could replace 'readiness' triangle in triangular model for crises management (Table 2).

**Table 2** Readiness to change and partnership during crises

Readiness to change	Partnership during crises
Employee attitudes	Key partners
Organizational culture	Shared values and ethics
Organizational learning	Network

Readiness to crises should be viewed as the part of 'process' triangle. This triangle includes crises management strategy, with strong emphasis on pre-crisis activities. Two support processes – leadership and communication – have crucial importance during crises. These should be other two elements of 'process' triangle (Table 3).

**Table 3** Processes of change and crises management

<b>Process of change</b>	<b>Process of crises</b>
The trigger event	Strategy
Core process	Leadership
Support processes	Communication

To conclude, there are common elements in change and crises management. At the same time different elements should be emphasised during these two processes. Therefore there are also differences in conceptual models of crises and change management. Therefore the basic triangle consists of three main elements that characterize every crisis: crisis type, process, and partnership.

### **3.1 Types of crisis**

Crisis management scholars have turned a lot of attention to developing classification systems of crisis types. These systems help to reduce uncertainty when crises occurs [45]. Crises differ according to **scope of impact**. Some crises affect community as a whole, others directly threaten only a few people [46]. The crises have different **character**: Hwang and Lichtenthal [47] distinguish between abrupt and cumulative crisis. An abrupt crisis strikes suddenly and catches the management off-guard; the latter accumulates stressors and eventually erupts. Crises are **triggered** in variety of ways: by natural forces and by the deliberate acts of 'others' inside or outside that society [46]. Perrow [48] in his disasters research makes difference between natural, industrial and terrorist disasters. Lewis [49] distinguishes between the crises made by single person or group of people on one hand and natural disasters and infrastructure disruption on the other hand. He considers also organizational transition as crisis. Therefore the crises could be classified according to **sources of crises**. Coombs [50] first points out attacks on organizations, which harm organizations reputationally and financially. There are also differences in causes of public crises: mismanaged crises are characterised by failures within governmental machines and agenda setting crises expose wider social vulnerabilities and fears [51]. To summarize, the crises differ according to scope, impact and character. These are the main elements of type of crises triangle.

### **3.2. Partnership**

Stakeholders are internal or external groups that can have an impact on the organization [45]. Stakeholders can also be segmented as dependent, impacted, unknown, supporting and intractable stakeholders [53]. The partnership triangle consists of relationships with key partners and the whole network. It is important to determine who may be helpful during different types of crises and in different phases of the crisis management process. Resources are always limited; therefore, few **key partners** should be pointed out. But all parties involved should be identified and included in the **network**. Relationships rely on values and ethics. As was seen from the analysis section of this paper, developing values and principles is not enough on its own – **shared values and ethics** are also needed.

### **3.3 The process**

Crisis may begin with something very simple such as a crudely written flyer in high school or the much more complex multilevel disaster such as Hurricane Katrina in 2005 [54]. In the crisis management process, Curtin [53] suggest taking three areas into consideration: people, physical assets and systems. People may have low morale, physical assets may be damaged and systems may cause a communications breakdown. The implementation of change in a crisis situation often fails because senior executives abdicate their responsibility for the tough decisions to nonperforming employees or 'sacred cows' that are paralyzing the organization [3]. The crisis management process could be divided into 3 stages: pre-crisis period, the crisis itself and post-crisis. The processes of crisis management described by different authors are summarized in Table 4.

**Table 4** Theories about the process of crisis management

<b>Author</b>	<b>Pre-crisis</b>	<b>Crisis</b>	<b>Post-crisis</b>
Mitroff [52]	1. Signal detection 2. Preparation and prevention	3. Damage containment	4. Business recovery 5. No-fault learning 6. Redesign
Penrose, Rasberry and Myers [55]	1. Hidden crisis 2. Pre-crisis	1. Full crisis	1. Post crisis
Turner [56]	1. Normal operations 2. Crisis incubation 3. Precipitating event	1. Onset of crisis	1. Rescue and salvage 2. Readjustment of belief system
Aba-Bulgu and Islam [57]			1. Assessment of incident 2. Crisis management planning 3. Temporary resumption of operations 4. Replacement and reconstruction of tangible assets 5. Marketing and promotion 6. Permanent resumption of operations
Rike [58]			1. Assess the damage 2. Stabilize the environment 3. Activate the in-house recovery team 4. Restore the area

To summarize the table, the first three theories could be considered proactive or preventive, because these also include elements in the period before the actual crisis. The last three are reactive since the crisis management process only starts after the damage has been done. As prevention can save lives, money and reputations [59], the first three models could be considered more advanced. There are different **leadership** styles during crisis. Connection has been found between leadership style and leaders power needs: leaders with high power need practice personal involvement and control and rarely delegate important decision tasks [60]. Decision-making during crises is also impacted by leader's general sensitivity to context and need for information: sensitive leaders gather more information and are also more willing to hear bad information [61]. The leadership style during preventive crisis management is more consultative and involves more people in the decision-making stage than the leadership style during a crisis. During a real crisis, the leader is more directive and there is less time to consult people. Also, the **communication** style before and during a crisis is normally different. During a crisis, because of the lack of information everyone is listening to announcements very carefully, trying to get more information than is actually being provided. Also, people try to read something from the behaviour of their managers; they try to read their thoughts. Therefore, their tone of voice, facial expressions, the way they carry themselves and so on are all of critical importance. In Table 5 author compares main elements of change management triangle and crisis management triangle.

**Table 5** Triangles of change, crisis and innovation management

<b>Success of Change</b>	<b>Crisis Management</b>	<b>Innovation management</b>
Type of change	Type of crisis	Type of innovation
Process of change	Process of crisis	Process of innovation
Readiness to change	Partnership	Innovation climate

The whole triangular model of crisis management has been constructed by connecting all the previous triangles. The model for crisis management in organizations consists of 4 main elements and 9 sub-elements.

## 5. Conclusions

Comparison indicates similarities and differences in change and crisis management. Following part summarizes shortly the main differences. The consequences of crises are more serious than consequences of organizational change effort. Therefore consequences should be one element of the crises 'types' triangle. The other two elements of 'types' triangle are source of crises and scope of crises. Most similar to crisis is transformational change. In order to handle consequences external help is needed. This gives special importance to shareholders. As in crises situation quick actions are required, rules should be established beforehand. Primary and secondary shareholders should form one triangle together with values and ethical principles. This triangle could be called 'partnership' triangle and this could replace 'readiness' triangle in triangular model for crises management. Readiness to crises should be viewed as the part of 'strategy' triangle. This triangle replaces 'process' triangle in change management model. 'Strategy' triangle includes crises management process, with strong emphasis on pre-crisis activities. Two support processes – leadership and communication – have crucial importance during crises.

To conclude, there are common elements in change management and crises management. At the same time different elements should be emphasised during these processes. Successful change management could help to avoid crises.

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# Entrepreneurship in Developing Countries: Opportunities and Challenges: The Case of Jordan

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The main purpose of the present research was to identify the obstacles that small firms encounter in a developing country, Jordan. It also aimed at exploring whether people in charge of small firms get any kind of entrepreneurial training before they start their businesses and the skills they would like to acquire.

The research is based on review of the literature about the topic. In addition, a survey was designed to collect data from people in charge of small firms. Results indicate that one quarter of the small firms are less than 5 years, which point out to the importance of providing support to these firms as the first years of any project life are for critical for success or failure. The most important challenges that face small firms are lack of financing, raw materials prices and inflation respectively. Only 10% of the entrepreneurs received training before starting their businesses. As for the skills that entrepreneurs wish to acquire, financing came on the top of the list followed by marketing and building their business plans respectively. Finally some recommendations were made based on the results of the study.

## Keywords:

Entrepreneurs, Jordan, obstacles, opportunities, social and economic development

## 1. Introduction

Entrepreneurs play a pivotal role in the world economy. The prominent economist Schumpeter has long recognized how entrepreneurs create what he calls creative destruction by coming up with new business ideas and changing the nature of the demand. Therefore, revitalizing the economy and giving more impetus to innovation, growth and economic development.

Entrepreneurial firms provide employment opportunities for a wide array of people, and support big firms by providing services to customers that big firms may not be able or willing to provide. Therefore, boosting the economic and social welfare of societies in which they operate.

Promotion of small and entrepreneurial firms has increasingly been recognized by many governments and economic and social development scholars as one of the means by which the dual problem of poverty and unemployment can be alleviated. As for Jordan, which is the main concern of this study rates of unemployment are much higher than many other countries. The formal statistics of unemployment in Jordan was estimated at 12.9% in 2009. The informal statistics claim that the real figures are much higher and they may go up to 25% or even higher. As for poverty level, statistics show that the percentage of people below poverty line was 14.2% in 2009 [1].

## 2. Why entrepreneurship and small businesses

In line with the drive for globalization and liberalization of economic policies Jordan has been concerned more than ever before about liberalization of its economic policies and promoting the role of the private sector in the economic development of the country. Therefore, entrepreneurship is emphasized. Many scholars argue that it is entrepreneurs not politicians, or economists who make the difference. The leading scholar of entrepreneurship and innovation, McClelland concurs by saying

“There is no best way to give momentum to economic development in any society better than increasing and promoting entrepreneurs” [2].

In line with the above argument, Gibb stresses that small and micro firms has the most important role in the development and economic growth of China which has been achieving impressive rates of growth over the past two decades[3]. The author of the present research is of the view that if small firms are to be supported and developed in order to contribute to the country economic and social development, understanding the reality of these firms, their features, and the challenges they face become extremely important issues to investigate.

### **3. Objectives of the research**

This study aims at answering the following questions:

1. What are the main features of small firms in Jordan?
2. What obstacles do these firms face?
3. Do entrepreneurs have training before they start their businesses?
4. What skills do entrepreneurs in Jordan wish to acquire?
5. How small firms in Jordan can be supported?

### **4. Small business defined**

At the outset it must be stated that there is no universal definition for small business. The definition may vary from one country to another. Also more than one definition may be adopted in the same country. Some of the criteria used to define small business are capital, volume of sales, technology, and number of employees. Probably number of employees is the most popular one. However, no consensus about the cutoff point regarding number of employees as an indicator of size. This can be attributed to different factors such as size of the economy, purpose of the definition, and nature of the business. For instance, in the USA small business is defined as the one that hires 100 employees or less [4].

As for Jordan there is also no consensus about the definition of small business. However, some attempts are made by organizations that are concerned about small businesses. For instance, the Ministry of Trade and Commerce suggests that firms that have 19 employees or less to be the cutoff point between small and medium firms. The present study will adopt this definition.

### **5. Previous studies**

This part of the research sheds light on the previous studies. It is worth mentioning that most previous studies address small and entrepreneurial firms as one topic. This study will follow the same approach.

Alshaikh [5] in a study aimed at identifying the obstacles that face small businesses in Jordan based on a survey conducted on small industrial firms in 1995 indicated that the most important problems arranged in order of their intensity are high taxes, high interest rates, high prices of raw materials, government regulations and economic conditions. In another study by Alshaikh [6] about factors that cause small business failures in developing countries with particular reference to Jordan it was found that the most important factors are: poor planning, lack of finance, poor management, competition from big firms, and lack of experience.

Alsahlawi [7] shed light on the impact of some factors on the spread of small and medium enterprises in Saudi Arabia and found a positive relationship between spread of these firms and availability of finance.

Haddad and Alkhateeb [8] study surveyed previous studies and publications about small and medium enterprises. They classified the difficulties that face these firms into financial, managerial, marketing, and organizational difficulties.

Mahrouq and Magableh [9] also shed light on the problems that face small and medium enterprises in Jordan based on review of previous studies. They concluded that the most important problems are: high cost of capital, inflation, competition from large firms, financing difficulties due to lack of warranties, government procedures and bureaucracies, high taxes and scarcity of raw materials.

Another stream of research emphasized the role of entrepreneurial and small firms in economic and social development. Kroon et al [10] emphasized the vitality of coordination between educational institutions and business firms. They stressed the importance of incorporating entrepreneurship in the curriculum of schools in South Africa. They also highlighted the importance of being aware about entrepreneurship and self-employment which is likely to have positive impact on the economic development of the country.

Gibb [11] also addressed the role of small firms in alleviating poverty and unemployment and leveraging the economic development. He refers to China to support his argument. He compared between the level of economic development that China achieved over the past years and level of development in the Tigers countries. Gibb also elaborated on this point by emphasizing that China did not use the Western countries model but it used a model that suits the Chinese culture. According to Gibb, this policy not only helped improving the economic well-being of Chinese people but was also successful to stabilize population in rural areas which represent 70% of the population of China.

Djankov et al [12] attempted to identify the differences between Chinese entrepreneurs and nonentrepreneurs. A sample of 414 entrepreneurs and 561 nonentrepreneurs was selected. The main findings of the study are (1) entrepreneurs are more motivated and work is central thing in their lives more than nonentrepreneurs (2) most entrepreneurs have three times more entrepreneurs in their families than nonentrepreneurs.

Edminston [13] highlighted the contribution of small firms compared to large firms in economic development with special reference to the case of the United States of America. He stressed the idea that small firms are more innovative than large firms in some industries such as the small computer industry. He also emphasized the role that small firms play in employment.

Venkataraman [14] emphasizes the importance of what he calls the intangible infrastructure for promoting entrepreneurship. He believes that this type of infrastructure is overlooked. Venkataraman provide some examples about the intangible infrastructure that should be promoted. Chief among these are: generating ideas that are relevant to the region as some ideas generated in some regions may not necessarily be relevant for other regions, promotion of informal entrepreneurship forums, providing encouragement for entrepreneurs who try new ideas even if they fail. This can be done as seen by Venkatarmaran by providing jobs.

Tambunan (2007) distinguishes between 3 types of problems that face entrepreneurial firms in Indonesia which she believes to be universal problems. She classifies these problems into three main types: infrastructure problems, problems related to availability of agencies/organizations that support entrepreneurial firms and economic problems.

Joshi and Ganapathi [16] highlighted the importance of changing attitudes and future orientations of people in South and Southeast Asia towards social and economic problems. They consider this change to be the key for development and economic growth in this part of the world.

Is entrepreneurship born or can be acquired through training? Laxmana and Eshwara [17] tried to answer this question. They followed up training programs that were conducted for potential entrepreneurs in India. They found that 77% of the trainees established their own businesses after completing the training. Women were even more motivated to start their own businesses than men. 80% of women trainees launched businesses after the training programs.

A careful reading of the above literature can lead to the following conclusions: 1. There is consensus among scholars and agents interested in small and entrepreneurial firms about the vitality of these firms and their significant influence on economic and social development 2. If small businesses are to be effective and successful support must be provided to these firms. This support should not be restricted only to the public sector but other sectors should also be involved 3. More emphasis is needed to be put on rural areas to boost its development and social welfare 4. Some of the studies reviewed above depended mainly on statistics and previous studies to reach to conclusions. In other words, they relied on the use of secondary data rather than primary data.

## 6. Methodology

Based on the census by the Department of Statistics in Jordan the vast majority of firms in Jordan are small firms. The firms that hire 19 workers or less represent 98% of the total firms. Most of these firms are concentrated in three governorates: Amman, Zarka and Irbid. Business firms in these three governorates represent 78% of all firms in Jordan [18].

Unfortunately, there is no list that contains all small firms in Jordan or in any governorate. Therefore, this study depended on a convenient sample of firms. Sixty small firms were contacted and requested to fill the questionnaire designed for data collection. The achieved sample was 50 responses. Three of the returned questionnaire were unusable and were excluded.

The questionnaire was designed by the researcher based on review of previous studies and experience and observation of the researcher about obstacles that face small firms. The questionnaire was piloted on 10 business owners who were not included in the analysis. Based on the piloted sample some modifications were made in the phrasing and structure of the questionnaire.

## 7. Results

First of all it is worth providing an idea about ages of small businesses. It can be seen that ages of these firms ranges between 1 and 19 years. Twenty six percent of the firms are below 5 years old. Firms between 5 and less than 10 years represent 22%, whereas those that are 10 years to less than 15 years were 34% of the sample. Finally, small firms that are more than 15 years represented 18%. It can be seen from these results that ages of small firms is relatively low. One fourth of the sample (25%) is less than 5 years. This category of firms especially the ones that have been established recently need more support. Studies indicate that newly established firms tend to be more vulnerable to failure and problems than older firms.

**Table 1** Age of Small Firms

Age Category	Number	Percentage %
Less than 5 years	12	25
5-less than 10	10	22
10-less than 15	17	36
15 and above	8	17
Total	47	100

**Table 2** Challenges Facing Small Firms\*

Lack of finance	4.13
Raw materials prices	3.82
Inflation	3.81
High Oil prices	3.73
Currency fluctuations	3.69
Lack of qualified employees	3.21
High wages	3.20
High interest rate	3.10
Product poor quality	1.71
Lack of political stability	1.65

The higher the mean the more serious is the challenge

Table 2 shows the main Challenges that face small firms. These obstacles were measured on a scale from one to five. The higher the score the higher would be the challenge that face these firms. Lack of finance is the most important challenge with a mean score of 4.13 followed by high prices of raw materials with an average mean of 3.82. Inflation, high oil prices, currency fluctuations followed with means of 3.81, 3.73, and 3.59 respectively. As for the least important obstacles, poor quality of product and lack of political stability were the last obstacles on the list with means of 1.65 and 1.71 respectively.

Respondents were asked about whether they have received any kind of training related to entrepreneurship and small businesses before starting their businesses. Table 3 indicates that the vast majority responded in the negative. Therefore, owners or those in charge of small firms started their businesses without any kind of training. The author is inclined to raise a question here: had those entrepreneurs taken any kind of training would that make them less vulnerable to problems? Unfortunately, it would be difficult to address this question without empirical evidence. However, common sense as well as studies in other countries suggest that training has significant influence not only on improving management of the firm but also on increasing motivation of the trainees to start their own businesses [19].

**Table 3** Level of Training

<b>Did you have training?</b>	<b>Number</b>	<b>Percentage %</b>
Yes	5	10
No	42	40

As for the skills that the respondents want to obtain, finance-related skills were the most important. Almost half of the sample (45%) as can be seen from table 4 stressed their need to develop these skills. The desire to develop marketing skills came next (26%) followed by the desire to acquire how business plans are built and human resource management skills with 17% and 12% respectively. These results are consistent with previous results which show that financing problems is on the top of the list of problems that small firms face in Jordan.

**Table 4** Skills Needed by the Respondents

<b>Type of skill</b>	<b>Number</b>	<b>Percentage %</b>
Finance	21	45
Marketing	12	26
Building business plans	8	17
Human resource management	6	12
Total	47	100

How small firms can be supported? Twenty nine percent of the respondents believe that this can be achieved by providing government support to domestic industries. Reducing taxes was considered by 21% of the sample as an effective means to support small firms. Providing subsidies in the startup process were highlighted by 14% of the sample. Finally, 7% of the respondents stress the need to reduce bureaucracy and government procedures and avoid concentrating new projects only in some areas such as Amman. Doing so will reduce pressures on Amman (the capital of Jordan) public

services and encourage residents of small cities and rural areas to stay where they are, therefore, enhancing the economic and social welfare of rural areas.

**Table 5** How small firms can be supported?

Means of support	Number	Percentage %
Support local industry	14	29
Reducing taxes	10	21
Support startup firms	7	14
Don't concentrate projects in some areas only	3	7
Reduce bureaucracy and procedures	3	7
Other means	10	22

Table 5 shows that a substantial percentage of the respondents urge the government to take actions in the form of providing support for domestic industries and reducing taxes. Such results trigger a question related to the willingness of the government to take actions like these. In other words, are these suggestions realistic given the fact that the government in Jordan has been less involved in the economic activities?

## 8. Recommendations

Based on the results, the following recommendations can be made:

1. Training of entrepreneurs and small business owners is extremely important. The results show that only 10% of the respondents had training before starting their new firms. Special emphasis should be placed on financing and marketing skills. Government agencies, universities, civil societies, and nongovernment sectors can pull their efforts together in that direction.
2. Improve awareness of small business owners and potential entrepreneurs about financing resources. The researcher was able to conclude based on the interviews with the respondents that some of them don't have sufficient knowledge about sources of financing.
3. Improve awareness of those in charge of small firms about the significant role that can be played by small firms-supporting organizations. Chief among these are chambers of industry and trade, nongovernment organizations, and universities.
4. Urge small and entrepreneurial firms-supporting organizations to put more efforts to develop and support small firms.
5. Revise curricula of educational institutions by incorporating entrepreneurship, initiative and creative thinking as important skills that should be instilled in students attending these institutions.

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# Transferability of entrepreneurship educational programmes: Finland, Sweden and Norway

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**This paper compares conditions for and manifestations of entrepreneurship in Finland, Sweden and Norway. It does so as educational programs and syllabuses often are transferred between countries and implemented without a theoretically based framework for considerations regarding local adjustments. This paper then discusses the need for such adjustments and proposes a framework for local adjustments. The paper presents an outline of antecedent, process and output when discussing conditions and perceptions leading to entrepreneurial behaviour. The paper utilizes data from the Global Entrepreneurship Monitor research program in order to compare the conditions the potential entrepreneur faces, the actions of entrepreneurs and the outcome of these entrepreneurial actions. The paper then discusses how entrepreneurship programs at university level have to be adjusted to the different settings for entrepreneurship in the local countries as the entrepreneurs' experience it to be, and the entrepreneurs corresponding entrepreneurial actions.**

## **Keywords**

Entrepreneurship conditions, entrepreneurial results, transferability of entrepreneurship education programs, university level entrepreneurship programs.

## **1. Introduction**

Entrepreneurship is considered to be an important mechanism for economic development through employment, innovation and welfare effect [1:2]. This understanding has led to a growing appreciation of the relevance of entrepreneurship education as a tool to gain such benefits [3]. In the search for educational programs serving the students' needs for entrepreneurship skills and the societies' need for entrepreneurs, universities look for best practice in entrepreneurship education at other universities to copy from. The presumption of translating good practice is that what works for one is working for the other. It is well known in innovation research that there is always a bit of invention in the adoption of innovations [4]. An innovation has to be adjusted to the local situation in order to be successful, and the more insightful this adjustment is done, the better results the adoption delivers. When an innovation, as an educational program in entrepreneurship, is to be copied by an institution, some adjustments have to be done. The adjustments needed depend on the purpose of the adoption, the complexity of the innovation, the complexity of the adopting organization and how the environment differs for the copied and the copying institution.

The study presents an antecedent, process and output outline when discussing conditions and perceptions leading to entrepreneurial behaviour. Antecedents consist of the environment as the entrepreneur faces it, the process represents the tools that the government has in hand and how they utilize it and the outcome is the entrepreneurial result. This paper addresses the need for adjustments in educational programs regarding entrepreneurship when universities inspire each other. The paper investigates the conditions for entrepreneurship in Finland, Sweden and Norway. It also reveals differences between the countries in entrepreneurship activity and their corresponding entrepreneurial results. The paper links to current research streams when it discusses how these differences influence the need for entrepreneurship education and how this entrepreneurship education should be shaped to fit the unique challenges the three countries face [5].

## **2. Theoretical perspectives**

### ***2.1 Antecedents to entrepreneurship***

At the individual level, people act upon cues from the environment as they perceive these to be [6]. Furthermore, Aizen [6] models that the individual take into consideration both how others value the action, how one self value the action and if the individual believes to master the tasks needed for fulfilling the action, when deciding on undertaking an action. This implies that the potential entrepreneur consider how other values entrepreneurship, if entrepreneurship is suitable for him/herself, and how capable he/her is to succeed as an entrepreneur when deciding to or not respond to a perceived business opportunity [7]. In addition to this, an individual does a cost/benefit analysis of an innovation before adopting the innovation [4]. With regard to entrepreneurship, the individual will then evaluate the potential business in order to judge if acting upon the perceived business opportunity is beneficial or not. Such a decision to act could be regarded as an intention to act. Concerning entrepreneurship as a complex and time consuming task, the intention to act may differ from the actual experienced action, this as the individual has to show persistency over a lengthy time for to fulfil its entrepreneurial intentions. During this time the individual interacts with the institutional structures and other actors and may change its intention as a result of this influence [8].

### ***2.2 The entrepreneurial process***

Business opportunities have to be perceived before one could act upon it. The business opportunity exists in the nexus of the individual and the environment [9]. Research evidences that different institutional structures influence entrepreneurial differently across countries [10]. Structuration theory provides further cues on how the environment of the entrepreneurial action influences the actors. Sarason et al. [11] offers structuration theory as a lens to comprehend the nexus of opportunities and individuals. Structuration theory puts forward that the actor and the social system co-evolve in an environment where social structures both constrain and enable entrepreneurial activity [12]. The actor is viewed as a reflexive agent engaging in purposeful action. In structuration theory, the agent is viewed as having the ability to chose whether to / not to intervene in the world, and the agent usually has a full range of resources in hand to pursue his/her goal. Structuration theory has led to considerations concerning how cues from the environment may influence the entrepreneur's action and how he/she wants to represent these actions. Furthermore, the entrepreneur with its human capital is both enabled and constrained by the socio-economic context. This as the structural properties of a social system consists of the habitual arrangements and the means that guides people's everyday life [13]. This implies that entrepreneurship education has to fit to the cultural and industry context [5].

### ***2.3 The outcome of entrepreneurship***

Entrepreneurship is a socio-economic phenomenon. The Global Entrepreneurship Monitor model [14] links the individual's perception of the opportunity, the conditions for entrepreneurship as provided by the societal structures, the established business structure with the entrepreneurial action. The GEM model assumes that institutional characteristics, demography, entrepreneurial culture, and the degree of economic welfare all shape a country's entrepreneurial landscape. Entrepreneurial activity rates may differ across countries for cultural, institutional, economic and demographic reasons [15]. This study discusses how the social, cultural and political context influences entrepreneurship education and how the entrepreneurial education again influences entrepreneurship activity, attitudes and aspirations. The GEM model allows each country to have its own growth trajectory regarding entrepreneurship. The trajectory depends upon its starting point and how the actors in sum chose to interpret and act upon these cues. Differences in entrepreneurial activity levels may be specific to regional economic, demographic and cultural contexts and may be composed of entrepreneurs who may vary in type and aspiration [14]. The Global Entrepreneurship Monitor defines entrepreneurship as 'Any attempt to create a new business enterprise or to expand an existing business by an individual, a team of individuals, or an established business' [16].

### 3. The methodology

The Global Entrepreneurship Monitor (GEM) project utilizes three different data sources for its analysis. This is the Adult Population Survey data, (APS), the National Expert Survey (NES) data and third part indicator data. The data used in this paper consists of APS data from 2007, NES data from 2004 and indicator data from 2008. This is the latest data sources available that contains comparable data from Finland, Sweden and Norway. Finland and Norway has conducted APS and NES each year since they joined the research project. Sweden participated last time in GEM in 2007 and the last time NES data was collected in Sweden was in 2004.

The Adult Population Survey (APS) addresses minimum 2000 randomly selected respondents in each country. The APS addresses the adult population aged 18 to 64 and investigates the respondent's relationship to entrepreneurship. Besides asking how the individual perceives the conditions for entrepreneurship to be, GEM asks the respondent if they currently try to start a business, or have started a business during the last 42 months. It also asks whether the respondent owns a business. GEM measures entrepreneurship by different means. A nascent entrepreneur is an individual who is actively in starting a business, owns part of or all of the business, but the business has not yet paid wages to the founder(s). Baby businesses are established businesses that have paid wages to their owners for a shorter period than 3.5 years. Early phase entrepreneurs (TEA) consists of nascent and baby businesses. Established businesses have paid wages to their owners for more than 3.5 years. The APS data from Finland represents 2005 adults aged between 18 and 64; in Sweden it represents 1712 while the Norwegian data represents 1541 adults.

The National Expert Survey (NES) addresses 36-50 experts in entrepreneurship asking them to state how they perceive conditions for entrepreneurship in their country to be. The national experts were asked to give their opinion on a multitude of subjects related to conditions for entrepreneurship. The items were represented by a 5-point Likert scale with the additional option of "don't know" or "don't apply/refuse to answer". Based upon all NES data from all GEM countries, GEM provides a Principal Component Analysis (PCA) combining the items in variables describing certain aspects of the national conditions for entrepreneurship. The numbers in the tables in this study then represent a PCA of the expert's responses to multiple items addressing each entrepreneurial condition. The higher the value on the PCA, the more agree the expert is that the conditions are favourable for entrepreneurship in their home country. Further information on the GEM research project and the methodology could be found in Reynolds et al. [17]. We were able to retrieve the full APS and NES datasets from Finland and Norway. Hence we could compare the values for the Finnish and the Norwegian items using independent samples T-tests. For the Swedish data we were only able to obtain the mean value for the items. This implied a one-sample T-test where we compared the Swedish mean for the given variable with the values from the Finnish or the Norwegian full dataset. The third data source GEM uses is indicators at a national level gathered from multiple official sources. Examples of such could be GDP or demographical data. The data in the tables in this study then represents actual numbers or actual occurrence of a phenomenon per 1000 inhabitants. The data from third data sources are all actual numbers representing the full population. This implies no variation, hence all differences are statistically significant. Whether the difference is meaningful rests on the arguments in the discussion.

### 4. Findings

The institutional structures represent the national environment for entrepreneurship. The structural factor influencing entrepreneurial activity is among others the size of internal markets in a country. In the long run the government is able to shape some of the structure for entrepreneurship. It could improve its institutional structures for entrepreneurship by put into effect programs supporting entrepreneurship, i.e. finance, infrastructure or education. Another antecedent to entrepreneurship is how suitable the population finds entrepreneurship as a tool for themselves in improving their living conditions or realizing other personal goals. The institutional structure for entrepreneurship manifests itself in conditions for entrepreneurship, as perceived by the potential entrepreneur.

#### 4.1 Antecedents to entrepreneurship

Table 1 describes the antecedents to entrepreneurial activity. The table shows that in the experts' opinion, the governmental emphasis on improving conditions for entrepreneurship is higher in Finland and Norway than in Sweden and that these conditions are evaluated to be most supportive in Finland.

The figures in table 1 based upon APS data informs that there is a bigger share of the population in Finland and Sweden that perceive it to be better conditions to start a business in the area where they live, then in Norway. Likewise, the data indicate that the Swedes are more confident that they possess the necessary knowledge and skills for starting a business than does the Norwegians. Even so, Norwegians and Finns agree more often that entrepreneurship is a good career choice than does Swedes.

**Table 1** The antecedents for entrepreneurship in Finland, Sweden and Norway

Entrepreneurial antecedents	FINLAND	SWEDEN	NORWAY	Finland vs Sweden	Finland vs Norway	Sweden vs Norway
<b>Expert data</b>						
Governmental emphasis on improving conditions for entrepreneurship	3.17	1.84	2.15	***	***	n.s.
<b>Adult population survey</b>						
YES: Good conditions to start business next 6 months in area I live, % of population aged 18-64	52.96	50.33	46.29	n.s.	**	**
YES: Has the required knowledge/skills to start business, % of population aged 18-64	39.73	41.65	36.23	n.s.	n.s.	***
YES: People consider starting business as good career choice, % of population aged 18-64	37.48	52.38	54.95	***	***	n.s.

Note: Level of statistical significance: \*\*\* indicates  $p < 0.01$ , \*\* indicates  $p < 0.05$ , \* indicates  $p < 0.10$ , n.s. indicates not significant, n.a. indicates significance not applicable.

## 4.2 The entrepreneurial process

The entrepreneurial process is an enactment of the institutional structures for entrepreneurship. The motivation and the capacity for entrepreneurial deeds among the population is also a sign of how the institutional structures are converted to entrepreneurial activity. The conditions for entrepreneurship are interpreted and acted upon at the individual level. This perception is then translated to motivation and intentions toward entrepreneurship. As there are different conditions for entrepreneurship across countries, the entrepreneurial process are then different. These differences in entrepreneurial action reveals itself as differences in start-up aspirations, number of owners necessary for handling the complexity in the institutional structures, and in purpose and motivation for the entrepreneurial action. Table 2 displays some of the processes the government is in control of and that influence the entrepreneurial climate in a country. Table 2 indicates that in the eye of the experts, the Finnish population is more capable and motivated to engage in entrepreneurial opportunities than are the Norwegian and the Swedish population. The Swedes are less motivated to engage in entrepreneurship. Table 2 further reveals some of the entrepreneurial processes of individuals in Finland, Sweden and Norway. The table shows that 10.4% of the Swedish population expects to start a new business within the next 3 years, and that this interest is lower in Norway (8.9 %) and Finland (8.65 %). Further, the number of expected owners per business start-up is higher in Norway and Sweden than in Finland. Norway has the highest number of owners per start up (2.39), Sweden the second highest (2.26) while Finland has the lowest (1.89). The purpose of establishing the business is also influencing on the survival and growth trajectory of the firm. The Finnish entrepreneurs have more serious intentions with their business than do the Swedish and the Norwegian entrepreneurs, we see that on the percentage of the entrepreneurs that intend to work full time in their business. Moreover, the table displays that the Finnish entrepreneurs start their business because they want more independence more often than do the Swedish and Norwegian counterpart.

**Table 2** Entrepreneurship processes in Finland, Sweden and Norway

Entrepreneurship processes	FINLAND	SWEDEN	NORWAY	Finland vs Sweden	Finland vs Norway	Sweden vs Norway
<b>Expert data</b>						
The entrepreneurial capacity of the population	2.85	1.91	2.46	***	**	***
How motivated the population is to engage in entrepreneurial opportunities	3.11	2.49	2.99	***	n.s.	***
<b>Adult population survey</b>						
YES: Expects to start a new business in the next 3 years, in % of the population aged 18-64	8.65	10.36	8.9	***	n.s.	*
Average number of expected owners in the new firm	1.87	2.26	2.39	***	*	***
Among those in process of starting a business or owning a business younger than 3.5 years: Full time involved	58.36	45.8	44.32	***	***	n.s.
Among those in process of starting a business or owning a business younger than 3.5 years: Opportunity Type: Independence	59.66	51.01	43.5	*	**	n.s.

Note: Level of statistical significance: \*\*\* indicates  $p < 0.01$ , \*\* indicates  $p < 0.05$ , \* indicates  $p < 0.10$ , n.s. indicates not significant, n.a. indicates significance not applicable

### 4.3 The outcome of entrepreneurship

The entrepreneurial process provides results both nationally and for the entrepreneur himself. The research and development process may result in patents and a successful patent may lead to royalties. Another entrepreneurial output is the share of the population starting up a new business, owning a business or supporting others businesses. Likewise, the entrepreneurial output in a country is hallmarked by which production process and products the entrepreneur addresses their selected markets with. These entrepreneurial outputs are a result of how the entrepreneur judges the structural arrangements supporting entrepreneurship and his human capital. Table 3 reveals some national level output from entrepreneurial activity among inhabitants in the country. Such an innovative behaviour could be manifest in patents securing the commercial value of the innovation. The table reveals that the inhabitants in Finland are the ones filing most patents in their home country. The early phase entrepreneurial activity (TEA) measure consists of persons that are either nascent or baby business owners. The table tells that there is more early-phase entrepreneurship in Finland and Norway than in Sweden. The TEA rate in Finland is 6.9, Sweden 4.2 and Norway is 6.5 for 2007. TEA is early phase entrepreneurial activity and measures those presently giving effort to starting a new business including those owing a new business not older than 42 months old. The Finnish and the Norwegian entrepreneurs expect more often that the business they start will hire employees during the next five years than does the Swedes. Even so, high growth entrepreneurs as measured as intent to have 20 or more employees in 5 years from start-up are more common in Norway and Sweden than in Finland. The entrepreneurs in Finland, Sweden and Norway are addressing markets differently. The Swedish entrepreneurs in general more often offer products that are new to all costumers, than do entrepreneurs from Finland and Norway. Norwegian entrepreneurs rarely reports to offer products new to the intended customer. Even so, Norwegian entrepreneurs tend to use newer technology than do entrepreneurs in Finland and Sweden. Norwegian entrepreneurs and business owners more often address foreign markets than do Swedes and Finns. The data might indicate that there are more business angles per capita in Norway than in Sweden and Finland. Business angels are those investing in other persons firms.

**Table 3** Entrepreneurial output in Finland, Sweden and Norway compared

Entrepreneurial output	FINLAND	SWEDEN	NORWAY	Finland vs Sweden	Finland vs Norway	Sweden vs Norway
<b>National characteristics</b>						
Patent applications filed by residents in 2005, per million aged 18-64.	552,6	452,2	395,8	n.a.	n.a.	n.a.
<b>Adult population survey</b>						
TEA involvement: setting up firm or owner of young firm (SU or BB) , in % of the population aged 18-64	6.91	4.15	6.47	***	n.s.	***
TEA - any jobs now or in 5 years	4.7	3.34	4.32	*	n.s.	*
TEA - expects more than 19 jobs in 5 years	0.41	0.74	0.77	**	**	n.s.
Product new to all customers, in % of those within TEA	12.19	15.57	7.62	n.s.	***	***
Uses very latest technology (only available since last year) , in % of those within TEA	14.17	8.68	25.27	*	**	***
% within TEA, no customers outside country	67.73	65.23	50.9	n.s.	**	***
YES: Provided funds for new business in past 3 years exclusive stocks & funds, in % of the population aged 18-64	3.31	3.74	3.87	n.s.	n.s.	n.s.

Note: Level of statistical significance: \*\*\* indicates  $p < 0.01$ , \*\* indicates  $p < 0.05$ , \* indicates  $p < 0.10$ , n.s. indicates not significant, n.a. indicates significance not applicable

## 5. Conclusions and discussions

The paper presents antecedent, process and output of entrepreneurship and compares institutional structures and individual perceptions leading to entrepreneurial behaviour in Finland, Sweden and Norway. As indicated by previous research [5] and suggested by GEM data, there are differences regarding antecedents to -, the process of -, and the output of entrepreneurship between the three countries; Finland Sweden and Norway. Antecedents much consists of the environment as the entrepreneur face it, the process is the tools that the government has in hand and how they utilize it and the outcome is the entrepreneurial result. As indicated by the data, there are institutional structures regarding antecedents of entrepreneurship that differ between Finland, Sweden and Norway. These differences are influencing how suitable the inhabitants find entrepreneurship as a tool for themselves. According to the national experts are the Finnish government more engaged in improving the conditions for entrepreneurs than are the Norwegian and the Swedish government. Sweden has the largest part of its population agreeing that they feel confident that their knowledge and training is sufficient for starting a firm, while Finns less often believe that entrepreneurship is a suitable career path for them. There are more perceived business opportunities in Finland per capita than in Norway and Sweden. Looking at the entrepreneurship process indicators, Sweden are more focused on research and technology development than are Finland and Norway. Even so, both entrepreneurship motivation and capacity is stronger in Finland than in Norway and Sweden. The data also informs that there are comparatively more Swedes expecting to start a business in the next three years, while the Finnish are more determined to start a full time business than are Swedes and Norwegians. There are remarkable differences in entrepreneurship motivation among the three countries as well. The Finnish are more concerned for achieving independence. Likewise, there are important differences in entrepreneurial outcomes as well. The Swedes and the Finnish are more eager to formalize their research achievements into commercial commodities than do their Norwegian counterparts. The entrepreneurial output differs in several other ways across the three countries as well. The Swedes are less engaged in entrepreneurship than are Norwegians and Finnish. Norwegians are more convinced that their start up effort will result in a big company with many

employees, and the start-up teams are bigger than in the Sweden and the Finland. The Norwegians start up is based upon more recent technology than are the Finnish and the Swedish. Even so the Norwegians are not to the same extent introducing new products to the market, as are the Swedish and the Finnish. The Norwegians are more export oriented than are the Finnish and the Swedes.

## 6. Implications for entrepreneurship education

In order to be inspired from good practice, good practice has to be recognized as such. A good practice is regarded as a success measured along the goals of the activity. Regarding entrepreneurship education at universities, this implies a discussion of the goals of entrepreneurship education at the specified universities. An educational institution has to relate to the present situation and can only to a certain extent try to change the direction of the established industry. This as the industry is founded upon a growth trajectory based on and evolved out of the local adjustments to the local resource base and the global requirements. Good practice in entrepreneurship education is then serving the needs of the industry while aligning with the institutional structures shaping the entrepreneurial opportunity.

There are many entrepreneurs in Finland, they tend to start full time firms, and they tend to start their firms to achieve independence. Even so, entrepreneurship is not recognised as a good career choice in Finland. Finns does not to the same extent invest in others businesses as business angles. Finns start their firms alone more often than in Sweden and Norway. The GEM data indicate that Finnish entrepreneurs that start in teams, more often than those starting alone succeeds as a business owner. The high TEA rate in Finland indicates a high level of entrepreneurship in Finland. Even so, the data points to some challenges for Finnish entrepreneurs. They tend to start firms with low growth ambitions and they tend to involve fewer people in the start up process. Involving more people in the start up process allows diversity in human capital, such a multitude of human capital could induce higher growth ambitions. Finns tend to see entrepreneurial opportunities but do not trust on their own entrepreneurial capabilities [18]. Finnish universities offering entrepreneurship programs could respond to this challenge in order to ensure more successful entrepreneurs.

In Sweden, the entrepreneurs are fewer than in Norway and Finland. This even as the Swedes perceive there to be good business opportunities and they have adequate skills for responding to these opportunities. There is an untapped potential for entrepreneurship in Sweden, this is evidenced by the GEM data. There are more Swedes expecting to start a firm in the next three years than in Norway and Finland. Even so, the entrepreneurial capacity is lower in Sweden. The Swedish government does not focus on entrepreneurship to the same extent as does the Finnish and the Norwegian government. Even though Swedes see themselves as entrepreneurs, they do not act as entrepreneurs. From the data, it seems like the Swedish challenge is to release the entrepreneurial potential. Entrepreneurship education in Sweden could be directed toward motivating the students to start their own business, and it could be directed toward understanding how the government could strengthen the institutional framework for entrepreneurship in Sweden.

The entrepreneurs in Norway tend to start firms with high growth ambitions using new technology addressing foreign markets with well known products. The challenges for Norwegian entrepreneurs are related to improving their business idea in such a way that the growth ambition is fulfilled. Securing that the circumstances around the new technology is taken in consideration in such a way that the implementation and use of it is successful and at the same time that their well known products are welcomed by the market. Securing the property rights to their technological inventions is also a problem in Norway. Entrepreneurship education in Norway could be directed toward strengthening the business plan process by focusing on the commercialization of technology and market knowledge.

The differences present between Finland, Sweden and Norway regarding entrepreneurship does imply that care has to be taken when copying entrepreneurship education programmes. When searching for educational programs, syllabuses or educational elements to take home from other universities, considerations on the purpose of the education should be made. The suggestions condensed from this research is then for the universities translating good practice within entrepreneurship education to investigate which needs this good practice serves, and compare this needs with the needs the copying university is to serve. When the needs are similar, the chances are that the provided solutions will work also for the copying university. It is also useful to have in mind that different needs may require different projected aims for different audience with different pedagogical matters and forms [5].

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# Barriers for industry-academia collaboration in Bulgaria

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Research and innovation have gained special attention world-wide in the last decade. Their impact on economic and societal development, as well as on competitiveness and growth of businesses, is widely acknowledged. Highly-skilled people often referred to as ‘knowledge workers’, are in the centre of several studies and policy actions. The role of researchers as generators of new knowledge and innovative ideas, and agents for knowledge sharing and transfer has essentially grown. The necessary support for their professional career development and mobility has been in the centre of several fora and actions at European and national level. However, results of a recent survey carried out in Bulgaria under the FP7 I-SEEMob project highlight that there are still a number of problems related to intersectoral mobility of researchers, and the collaboration between industry and academic community. A recent study on national environment in Bulgaria provides the remaining barriers for linking industry and universities for joint research and innovation.

## Keywords

researchers’ career, industry-academia collaboration, innovation

## 1. Introduction

Research, innovation and lifelong learning have gained special attention in the last decade as critical factors in the knowledge economy. Their impact on economic and societal development, as well as on competitiveness and growth of businesses, is widely acknowledged. Highly-skilled people, often referred to as ‘knowledge workers’, are in the centre of several studies and policy actions. The role of researchers as generators of new knowledge and innovative ideas, and agents for knowledge sharing and transfer has essentially grown. Subsequently, several researchers pointed out the importance of mobile people as transmitters of technology and tacit knowledge [1], [2], [3], [4]. For companies, in particular, incoming researchers influence strongly their innovation performance through access to high-value knowledge, and thus provide higher competitive advantages [5].

How to convert knowledge into socio-economic benefits, how to facilitate knowledge transfer, and how to enhance European excellence in research and technology development (RTD) – all these issues are discussed at several fora in Europe. In the last few years a number of initiatives have been launched by the EU in order to boost research, innovation and technology uptake in Europe, and to facilitate the career and mobility of researchers [6]. In particular, in its recent Innovation Union flagship initiative[1], EU emphasises the need for:

- ensuring excellence in education and skills development
- overcoming the fragmentation in the European Research Area (ERA)
- supporting the movement towards a ‘fifth freedom’
- supporting open innovation and creativity
- enhancing regional cohesion.

In accordance with ERA objectives and priorities, the main goal of the FP7 funded project I-SEEMob is to contribute to the enhancement of the career development of researchers in ERA by examining the existing legal and research policy gaps hampering the intersectoral mobility of researchers in the South-Eastern European (SEE) Countries participating in the consortium and, accordingly, provide recommendations and guidelines to the respective governments so as to raise the remaining obstacles and to promote intersectoral mobility. Subsequently, some of the project activities focus on mapping the current state of industrial representation on RTD sector in SEE and its respective needs, as well as investigating legislation barriers linked to career development of researchers in SEE with a special focus on industry-academia collaboration.

This paper summarizes the results of the work carried out within the I-SEEMob project in Bulgaria. First, it provides an overview of the research and innovation environment in Bulgaria, present trends, and remaining challenges. Second, the results of a survey carried out recently within the project are presented as.

## 2. Environment for research and innovation in Bulgaria

A quick look at the position of Bulgarian research and innovation system in Europe provides the European Innovation Scoreboard 2009 (Fig. 1).

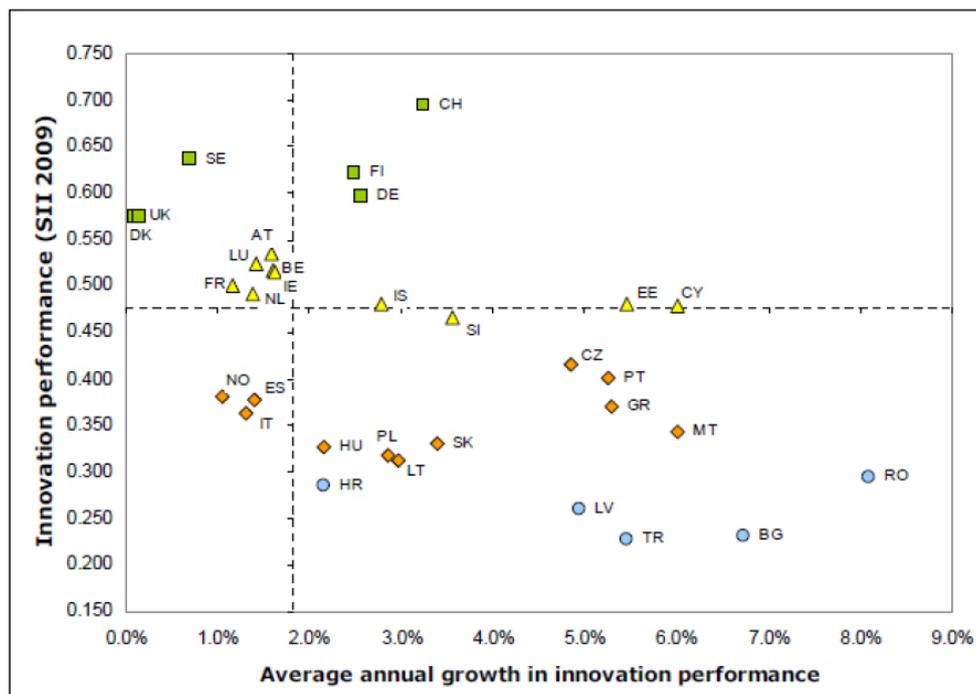


Figure 1 Innovativeness of European countries, source [6]

Bulgaria is among the catching up countries and takes the last place according the overall innovation indicators considered (29 indicators in total). This group includes also Romania, Latvia, Croatia, Serbia and Turkey, and it is characterised by a growth trend and catching up of more advanced countries. In fact, all data available show that only Romania is growing at higher rate then Bulgaria. It is interesting to note that Bulgaria shows relatively high growth in production investments, which are unfortunately not giving the expected high economic effects. Namely, the economic effectiveness of innovations and the relationships within the whole system of research, innovation and technology development (RTDI) are placing Bulgaria at one of the last positions in Europe. At the same time, it should be taken into account that the data were taken in the first years of EU membership of the country, and before Bulgaria was severely hit by the global financial crises, and the following sharp decrease of state investments in research and innovation. The European Innovation Scoreboard data further highlight the low increase of human resources in research, where Bulgaria still preserves quite good position in Europe, again severely hit in the last few years by the funding policy of the government [6].

In general, the RTDI system shows serious weaknesses [7], [8].

- First, there is a lack of vision for the development of the system as a whole, and long-term national priorities are missing which link the need of economy and society with the available research results and opportunities. The National Strategy for Scientific Research is in consultation process, while the new law on the academic development staff was stopped in the end of 2010 and next steps for reaching consensus between the Minister of research, Council of Rectors and all other parties concerned are not envisaged.
- Second, the lack of sufficient coordination and collaboration among institutions in charge of RTDI development in Bulgaria reflects not only the horizontal links within the system, but reflects also on its funding opportunities. For example, the Operational programmes available for Bulgaria under the Structural funds support some needs of the RTDI system, however, this is done unstructured, partially and without a clear strategy. Moreover, the state funding of research and higher education continues not to be linked to real merits of the funded organisations, e.g. the created scientific products and new knowledge, as well as does not consider what kind of demands for highly skilled specialists exist on the labour market.

Although these weaknesses are pointed out in several reports in Bulgaria and in Europe, there are no real actions to overcome them [6], [8], [9]. The institutions building the 'knowledge triangle' continue to be separated. The trend for separating research from higher education activities is still dominating the system – the institutes of the Bulgarian Academy of Sciences (BAS) are funded for doing research, while state universities get funding only according to the number of students they are preparing at bachelor and masters level. However, the introduction in the last 2-3 years of a special funding mechanism for support of research projects at the state universities via the National Research Fund could be considered as a positive sign.

It should be pointed out that an effort was made towards the improvement of the research infrastructure in Bulgaria so that to be created poles of excellence in emerging fields of science and also in areas of strategic importance for the country and the region. A Roadmap on the research infrastructures was adopted by the Council of Ministers in 2010. In the same time, Bulgaria still has no defined priorities and reformed public research system.

Considering what has been changed after the accession of Bulgaria into the European Union, emphasis was put on the implementation of several new funding mechanisms for improving the national research system towards more competitive and contemporary environment, adoption of national programmes for doctoral students (PhD) and young researchers and increasing funding under bilateral cooperation. It should be also pointed out that the trends towards integration into the ERA influenced a decision for increasing the percentage of public investments in research up to 1, 5 % from the GDP, however, due to the finances crisis in 2010 the "push" from the integration process was lost. Meanwhile, the work of the Bulgarian Innovation Fund was also blocked due to the lack of enough funding. Subsequently, the private sector which was very hard persuaded to start investing in universities or academia partnerships has been discouraged. Due to these facts, combined with the lack of efficiency and lack of instrument for research-industry collaboration under the Structural Funds, Bulgaria really lost its capacity for supporting innovations and creating an environment for the business investment in competitive research. It should be taken into account also the fact that due to the Innovation Union flagship initiative and the Europe 2020 Strategy, the government started in 2011 some new actions towards increasing the quality of primary and secondary education and improving the children competencies in entrepreneurialship. Calls for set up technology parks and technology transfer offices were also launched recently which could provide eventually new impetus to industry-academia collaboration.

### 3. I-SEEMob survey results

In the context of changing situation in the SEE countries and the preparation of many of them for joining the EU, the I-SEEMob partners agree that a methodology for elaboration of national reports analyses on industry-academia collaboration and particular for the mobility of researchers between both sectors should be created. In fact, the legal frameworks and national regulations in research and innovation are quite different in each country. The lack of common legal framework for the whole Europe seems to be one of the crucial points for the next programme period and the realisation of the Innovation Europe.

From this point of view, the team of Sofia University embedded almost all relevant factors for independent analysis on the industry-academia collaboration environment starting from the overall characterisation of the research environment in the countries, prioritisation in science and

governmental policy as research and innovation strategies, laws and regulations to the management of RTDI and the necessary management bodies/structures. Important part of the methodology is devoted to the industry working environment for researchers – good practices but also barriers for this collaboration as lack of incentives, transfer of projects and contracts, government support for recruitment of researchers within industry sectors and so on.

The research methodology, proposed for legislation gap analysis related to the inter-sectoral mobility of researchers in SEE, includes a survey among Bulgarian researchers and business organizations. The survey was performed by distributing an on-line questionnaire for collecting data, developed by the Bulgarian university team. The questionnaire comprises 20 questions, some of them open-ended and others multiple-choice questions, focused on various aspects of the existing research environment, the collaboration between academia and industry, and the available opportunities and barriers to inter-sectoral mobility of researchers. The first survey results, presented in this paper, are based on the responses received in December 2010 and January 2011, from about 60 representatives of the academic community, business organisation, NGOs, public administration and media.

The first group of questions is focused on the perception of the research environment in Bulgaria by researchers and business organizations (Fig. 2). In general, the survey shows not very positive assessment of the Bulgarian research environment. The majority of the respondents consider that it is not favourable for competitive development and attracting best researchers in Bulgaria. Besides, for most of the respondents the policy environment for research does not comply to the general European requirements. About 60-70% of them point out that the research infrastructure is usually insufficient, inadequate (not world-class), or not easily accessible. That fact could be almost acceptable for people who are not working in research in Bulgaria, but it could be highlighted that there is comparatively contemporary research infrastructure in almost all important fields of science. Under FP6 and FP7 and with the funding ensured by the National Research Fund (NRF) more than 30 research excellence centres have been supported. Therefore, the percentage of people who believe that there is no favourable infrastructure and/or equipment is pretty confusing. However, these results could be explained by the lack of transparency and proper regulation for providing access to the available infrastructures.

Almost the same percentage of the respondents (60-70%) considers that there is a lack of effective public-private cooperation and partnerships, effective knowledge-sharing between public research and business organisations and the general public, and of well-coordinated research programs and priorities including significant co-planned investments in the public research system. In fact, the prioritization of research turns to be one of the most important factors for industry-driven research as the available funding is usually dispersed into different small projects and initiatives. Moreover, the evaluation of the effectiveness of those funded research actions could hardly lead to any adequate recommendations. The reason is that the fragmentation of the sector can not provide relevant picture of national industry and society needs. Within the National Strategy for Scientific Research is made an attempt for such a prioritisation, but the lack of consensus within the academic society once more diminishes the effect of this attempt. Perhaps the SEE countries, including Bulgaria, have to find out in the context of the Innovation Union which are the priority areas of the economy and society. Otherwise, they will lag behind the modern societies development trying to satisfy all/different interest of researchers, industry, politicians forgetting about the needs of the next generation.

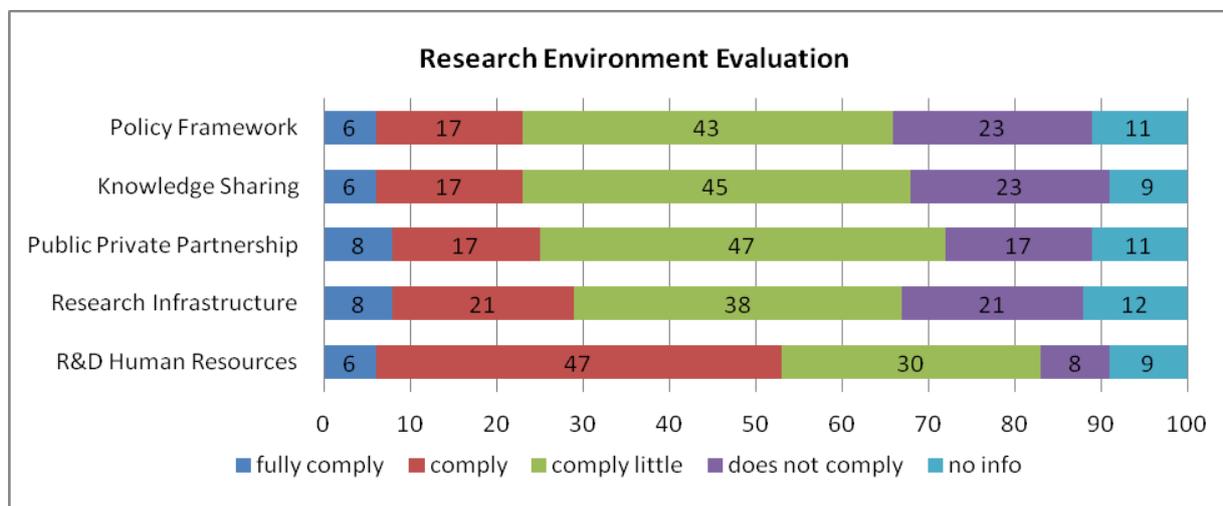


Figure 2 Research Environment Evaluation

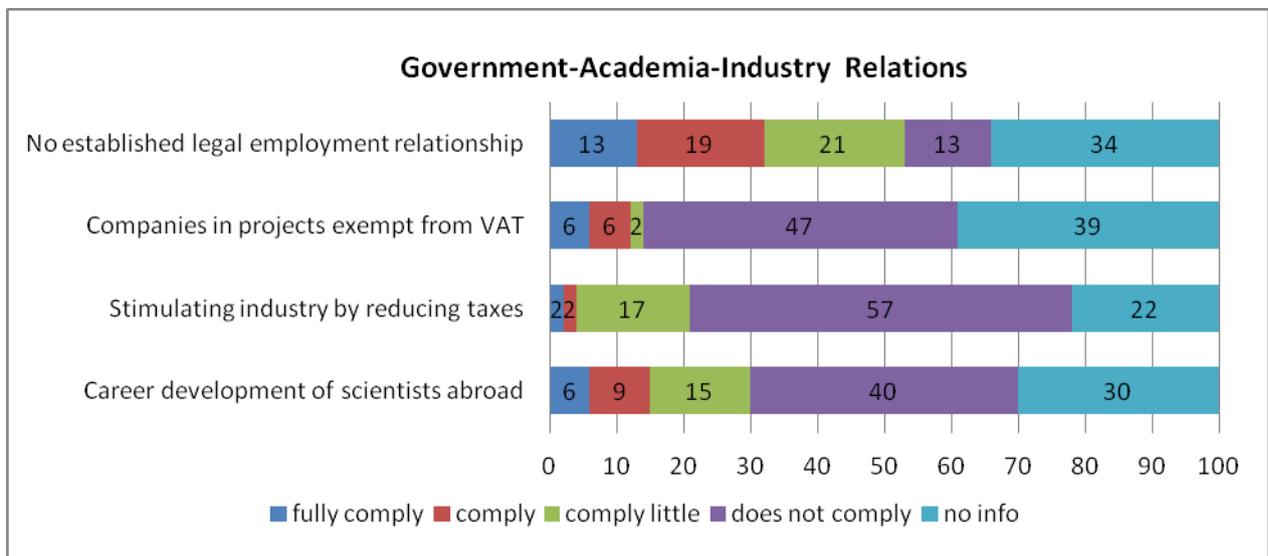
The only aspect that is relatively positively evaluated by the survey respondents concerns the competence of researchers. Almost half of them believe that there is an adequate flow of competent researchers in Bulgaria. It could be concluded, therefore, that most of the problems in the Bulgarian research system are due to factors different from the human factor. Despite the severe decline of researchers (due to ageing mostly) in many public research organizations in the last few years, e.g. in BAS, the Agrarian Academy, and several universities, and the overall drop off of the traditional for Eastern Europe excellent research capacity in engineering and natural sciences, the RTDI system is still producing researchers with adequate knowledge and skills. There is a relatively high number of excellent experienced researchers, and a quite high inflow of qualified young researchers. The survey results show that the inflow of competent researches is most intensive in the fields of Mathematics and Informatics (according to 51% of the respondents), and Biology and Medicine (51%). Competent researchers are also available in the areas of Natural Sciences (42%) and Engineering Sciences (30%). The lowest result is achieved for the Social Sciences/Humanities field (4%). These results are easily predictable taking into account the overall misbalance between the society needs and the number of students trained. Moreover, many researchers working in the field of social sciences have not been able to adequately adapt during the last twenty years of economic and societal changes, in order to fit into the European science trends and needs. The general problem is, however, that many young researchers are leaving the Bulgarian RTDI system towards better paid and promising jobs. The unfavourable conditions offered to potential PhD candidates, and the ageing teaching staff, leading to the lack of well trained and motivated young teachers and lecturers (especially in engineering studies, physics, biology, etc.) could further lead to lack of enough PhD students.

Another group of questions focuses on the relations between research and industry. More than half of the survey participants (55%) consider appropriate for industry-academia partnership all tools listed in the questionnaire, e.g. providing internships and/or grants for graduate students and researchers in companies and industry; participation of representatives of industry and other non-government organizations in the research organisations or university management; collaborating in joint research programs and projects; industry realization of intellectual products and services created by academic institutions. A preference is given to the collaboration in research projects and programs (26% of the respondents), which is not surprising because that tool is becoming more popular and proves to be effective in the Bulgarian research environment. Unfortunately, most of the survey participants (75%) think that there are no favourable conditions in Bulgaria for transferring academic knowledge to industry and for practical application of the tools mentioned above for the successful achievement of industry-academia partnerships. The negative view on that partnership is also evident in the subsequent responses. Asked to share a specific example of their practice where industry members are actively involved in research projects, only 19% of the respondents point out the National Science Fund as an institution working to improve the academia-industry collaboration. Enhancement of research infrastructure, Doctoral fellowships between research organization and SMEs, and Grant schemes within the NSF are pointed out as good practices towards establishment of industry-academia partnership. About three thirds of the respondents (74%) did not provide an answer to that question which can be interpreted as a difficulty for giving examples of good practice under national funding instruments at all. According to the survey results, the scientific areas that are mostly supported by the business sector are Engineering Sciences (44%), Mathematics and Informatics (26%), and Economy and Business (20%). The group of respondents thinking that no scientific field is supported by the business sector is also quite large (12%).

The survey reveals that industry is also not prepared to enhance the collaboration with academic institutions or to foster mobility of personnel between both sectors. Half of the respondents (50%) did not reply to the question related to sharing a concrete example of good practice for career development of researchers in the industry, more than third (36%) think that "The industry in Bulgaria doesn't really care about science", and 25% announce that "There are no good practices in Bulgaria at all". One of the most important conditions for successful implementation of inter-sectoral mobility is good management and transfer of knowledge and intellectual property. The Bulgarian Academy of Sciences is the institution pointed out to be the best in coping with this role, stated by 21% of the survey participants in one of the open questions. However, 92% of the respondents have not answered the question, which could be due to low activity and lack of information about this issue, or could be related to the above mentioned difficulty to provide examples of good practice.

The government is expected to play an important role for encouraging the inter-sectoral mobility of researchers providing financial and other stimuli, and setting the general scene. However, its role in Bulgaria is not positively assessed by most of the respondents, both for stimulating a dialogue and collaboration among all stakeholders, as well as the development of diversified research career

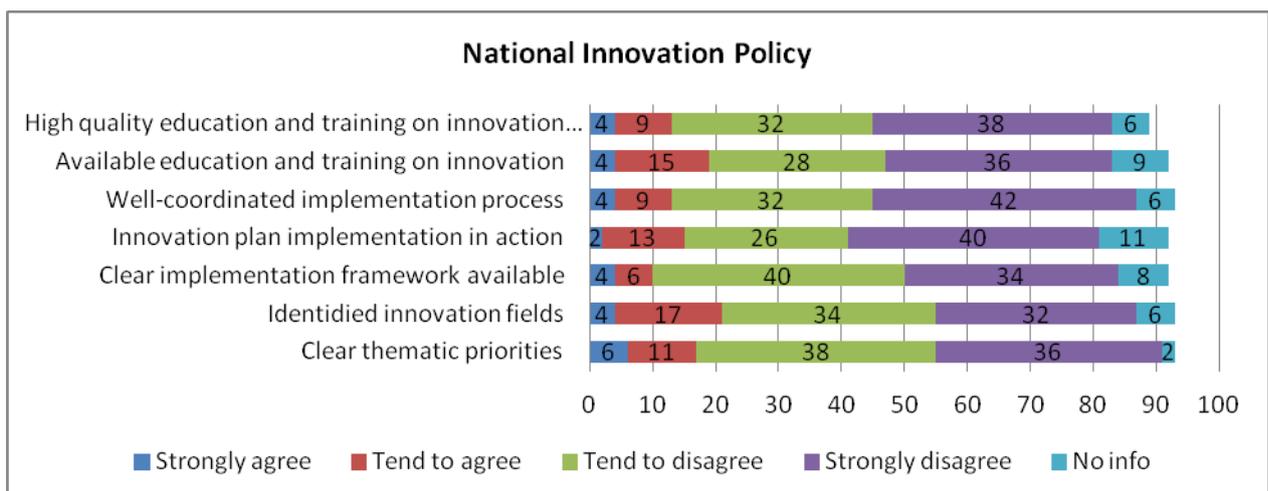
(Figure 3). The evaluation by the respondents of various aspects influencing the development of strong relations between government, academia and industry, reveals that there is a lack of trust in the governmental policy and funding framework for implementation of the ERA in the country, as well as not enough incentives are in place for attracting private investments in research (Fig. 3).



**Figure 3** Government-Academia-Industry Relations

About two thirds of the respondents (60%) expect industry to be directly involved in the development of technology and innovation, and not to rely on support from the state. The other third (32%) prefer the business organizations to contribute indirectly ( in relationship with the government: through the creation of lobbies, sponsorship, scholarships, etc.).

Another important focus of the survey is the availability of programs and practices for encouraging and supporting the academia-industry collaboration. The most important instruments that are implemented in Bulgarian organizations are creating academic centres (30%), encouraging students to apply for funding for various programs related to innovation and new technologies (30%), national projects for training of additional skills (communication skills, awareness on IPR, research management, etc.) (23%). Creating student companies is still not so popular instrument in Bulgaria (4%).



**Figure 4** National Innovation Policy

The final group of questions is directed at the National Innovation Policy (Fig. 4). They reveal that most of the respondents (66-74%) do not believe that the national innovation policy sets clearly thematic priorities in accordance with the national demand. Besides, the most important innovation fields/technologies are identified according to the scientific areas in which the domestic science must

be developed. The respondents are also not confident of the availability of a clear framework for the policy implementation (74%). For the majority of them, the innovation implementation plan is not launched in practice using specific actions (66%), and the implementation process is not well coordinated among all relevant actors (74%). About two thirds of the respondents (64%) do not agree that plenty of training and education programs are available and help improving the knowledge on innovation. Almost the same percentage (70%) stresses that the quality of the available education and training is not high enough.

### 3. Conclusions

The enhancement of industry-academia cooperation in terms of research training, career development and knowledge, skills and services sharing, taking into account the protection of intellectual property rights, have to be further promoted, encouraged and also understand especially on national level. Of course the politicians have the major burden to integrated specific measures within the National Development Plans and National Strategic Reference Frameworks in correspondence with the Operational Programmes of the Structural Funds. But university and industry partners have to invest efforts as well especially towards involvement of young people, modernization of educational agendas, cultural and ethical adaptation of new global trends, etc.

The statistics and sociology analyses show that the year 2010 was one of the most difficult for the national industry in Europe and particularly SMEs. This reflected also on the RTD funding and policies, decreasing the level of financial support. Therefore, there is a clear need of boosting investments in innovations in such periods of economic fall-down and promoting under the European Economy Recovery Plan “the need to direct action to “smart” investment” and especially further research development at the manufacturing and business sectors.

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# Relative Efficiency of Higher Education in Slovenia and Croatia: Inter-country Non-Parametric Approach

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The article measures the relative efficiency of government spending on higher education in selected CEE (with special focus on Croatia and Slovenia) in comparison to selected OECD countries. The article applies a non-parametric approach, i.e. data envelopment analysis (DEA), to assess the relative technical efficiency of higher education across selected countries. When estimating the efficiency frontier we focus on measures of quantities outputs/outcomes. The results show that the relatively high public expenditure per student in Croatia should have resulted in a better performance regarding the outputs/outcomes, i.e. a higher rate of higher education school enrolment, a greater rate of labor force with a higher education and a lower rate of the unemployed who have tertiary education. On the other hand, regardless of the input-output/outcome mix, the higher education system in Slovenia is shown to have a much higher level of efficiency compared to both Croatia and many other comparable CEE and OECD countries.

## Keywords

Higher education, funding, efficiency, DEA, Croatia, Slovenia, EU, OECD

## 1. Introduction

Education influences economic growth; Denison (1985) estimates that typically a quarter of the growth of output per person arises from increases in educational attainment. Higher education plays vital role in driving economic growth and social cohesion. Greater investment in universities increases the quality and quantity of highly educated graduates. The commonly held perception of universities as merely institutions of higher learning is gradually giving way to the view that universities are important engines of economic growth and development. Universities not only generate new knowledge through primary research, they also provide technical support and specialised expertise and facilities for on-going firm-based research and development (R&D) activities (Farrell et al., 2006, p. 8). Academic research and development is now seen as one of the key drivers of economic growth. Countries that have academic institutions performing large amounts of R&D are more able to attract and grow technology oriented companies.

The HE sector, however, has characteristics which make it difficult to measure efficiency: it is non-profit making; there is an absence of output and input prices; and HEIs produce multiple outputs from multiple inputs (Johnes, 2006, p. 273). This article tries to assess the relative efficiency of government spending on higher education in selected CEE and OECD countries, with special focus on Croatia and Slovenia. In this respect, the efficiency of higher education systems is computed using the non-parametric approach of data envelopment analysis (DEA) to capture the different dimensions of those systems and to measure their relative efficiency. The performance of higher education is measured by how well it transforms inputs into outputs. This is the first time DEA estimations have been used to measure the performance of HE systems in these two countries on the macroeconomic level by using a wide range of inputs and outputs/outcomes.

The article is divided into four main parts. After introductory part, first part analysis higher education systems, their expenditures and outcomes in selected CEE and OECD countries. The second part explicate methodology of data envelopment analysis for measuring higher education achievements.

Research results of efficiency effects of higher education attainment in selected countries are presented in the third part of the research. Conclusions regarding the efficiency of the Croatian and Slovenian higher education in comparison to CEE and OECD countries are drawn in final section.

## 2. Descriptive Analysis

Croatian GDP per capita has been relatively low compared to Slovenian or other European countries. One of the many explanations of this difference could be the effectiveness and efficiency of the country's education system. From this perspective, universities generate spill-over effects from their academic research and teaching, thereby stimulating economic growth (Audretsch and Lehmann and Warning, 2003). Indeed, the close nexus between the university system and economic growth has seen significant attention being paid to the efficiency and quality of Croatian universities. The majority of Croatian and Slovenian universities are government-owned and largely funded by the Ministry of Education and Science[1]. Universities are autonomous bodies established by legislation allowing considerable freedom in their activities. The next section describes the Croatian and Slovenian tertiary systems in more detail.

### 2.1 The Higher Education Systems of Croatia and Slovenia and Its Expenditure

Higher education (HE) institutions in Croatia encompass universities, polytechnics and schools of professional higher education. Universities may include faculties and academies of arts as legal entities, and may establish a number of other constituent units (departments, institutes etc.). In contrast, polytechnics and professional higher education schools may not establish other HE institutions (MoSES, 2007, p. 33). There are seven public universities and two private universities and 16 private two-, three- or four-year colleges, polytechnics, or academic programs. The central government funds public higher education, although management is fully decentralized to the level of individual institutions (WB, 2008a, pp. 107-109). On the other hand, the higher education system in Slovenia is currently based on four universities with 49 faculties, three art academies or professional colleges, and 30 individual higher education institutions generally established as private institutions. The funds for financing academic activity are allocated from the national budget as aggregate funds for a university or an independent higher education institution (integral financing) and take into consideration the field of study and the numbers of enrolled students and graduates from regular first- or second-degree studies (MHEST, 2010a).

The major inputs for education and higher education in EU and OECD countries come from public expenditures. Public expenditures for higher education in Croatia are less than those in the EU-27, selected CEE countries, OECD countries and Slovenia, which are nearly the same. Private spending on education in Croatia accounts for around 0.75% of GDP compared with ratios of around 0.4% in the EU-15 and EU-25. Despite the relatively high private spending on education there are very few private schools, although there is a growing number of private pre-school providers. School enrolment at the higher education level in Croatia is almost half that seen in Slovenia, but relatively close to the selected CEE average. Although the completion rates are low, in 2008 the number of higher education graduates in Croatia was higher than in Slovenia (see Table 1). While the number of graduates is rising, there is still a mismatch between skills demanded by the market and the skills produced by the education system (World Bank, 2008a, p. 104).

Overall public expenditure on education as a share of GDP in both countries is comparable with the EU average. Slovenian government expenditure on higher education has shown a positive trend in recent years, with nominal expenditures tending to increase faster than the inflation rate. The total amount of government expenditure rose by 5.9% in 2005 and 7.2% in 2006, while the amount of funds for educational purposes went up by 6.4% and 8.4%, respectively, in the same years (Tajnikar and Debevec, 2008, p. 290). By contrast, expenditure at the higher education level in Croatia is far behind that in the selected CEE and OECD countries. The Croatian higher education system currently has too little by way of assured financial funds compared to European standards. The amount of outlays on tertiary education as a percentage of GDP in 2007 was 0.81%, namely, much lower than the EU average (1.3%).

**Table 1** Higher Education Indicators – Expenditure, Output and Outcomes in Croatia, Slovenia, CEE and OECD in 2007

	Total Public spending on education (% of GDP)	Public Expenditure on Higher Education (% of GDP)	School Enrolment Tertiary (% gross)	Graduates of Tertiary Education (25 to 29)	Population with tertiary education (ISCED 5-6) aged 25-39
Croatia	4.1	0.8	44.1	20.7	18.2
Slovenia	5.2	1.0	88.0	20.1	21.0
EU-27	5.0	1.1	67.0	38.2	23.2*
OECD average	5.2	1.0	72.0	38.0	26.1*
Selected CEE average**	5.1	1.1***	51.1	43.3***	24.5

Note: \* Figure for 1999-2007 average. \*\* Selected CEE countries - Czech Republic, Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia.

\*\*\* Selected CEE countries – Czech Republic, Estonia, Hungary, Poland, Slovakia.

Sources: Eurostat (2010b); OECD (2009a), OECD (2010), UNESCO (2010); World Bank (2010).

The main characteristics of Croatian education financing are: chronic under-funding, a lack of equity and transparency in budgetary allocation, an unbalanced structure of the education budget in terms of categories of expenditure and source of funds, and a lack of synergy (legislative, professional and institutional) for system change. The 4.1% of GDP share of total education expenditure in 2007 is well below the European average (5.0%), and the current level of funding is insufficient to support the reform process. Physical conditions vary widely from institution to institution, but facilities are often inadequate (OECD, 2001).

Conversely, the main objective of financing higher education institutions in Slovenia is to implement the goals of the national higher education program, along with respecting these institutions' autonomy in terms of the independent formulation of their institutional strategy and how they define the ways to achieve the set goals. The mechanisms of financing using public funds should enable higher education institutions to independently adopt decisions on expenditure and sustainable asset management. An important mechanism for ensuring the financial autonomy of higher education institutions is the integral (lump sum) financing of their academic activity. In the future, an internationally comparable share of GDP will have to be appropriated for the higher education and scientific and research activity of higher education institutions in Slovenia, meaning that the total funds allocated to higher education activity will have to rise (MHEST, 2010b). In this context, at least 1.3% of GDP from the budget and 0.3% of GDP from other sources is planned to be provided for higher education in Slovenia by 2015, and a total of 2.5% of GDP by 2020, of which 2.0% of GDP would come from the budget. At the same time, a new system of financing higher education would be introduced, consisting of a basic and a development pillar as of 2011.

## 2.2. Outcomes of higher education system

The basic assumption is that higher education systems are multi-product organizations which "produce" at least two different outputs – research and teaching – using multiple inputs. Generally accepted outputs of the higher education production process are the number of graduates of tertiary teaching as a proxy for teaching and the number of publications as a proxy for research (Warning, 2004, p. 396). Number of higher education graduates by universities and single higher education institutions by ISCED 5 and 6 levels in some selected EU countries, Croatia and Slovenia is visible in Table 1. In last ten years there was a significant increase in the number of enrolled and graduates students in Croatia compared to Slovenia, as also the number of student programmes. In Croatia, almost three-quarters of young people who successfully complete secondary school enter tertiary education. These changes correlate to the enlargement and re-organization of HE institutions, primarily establishment of polytechnics and schools of professional higher education (MoSES, 2007, p. 72). In such way, gross enrolment rates for tertiary level has been improving steadily over the past few years in Croatia, but they are still significantly lagging behind the Slovenian's. Gross enrolment at the tertiary level stood at 47.01 in 2007 compared to 85.47% in Slovenia.

Regarding outcomes in tertiary education, for example, although gross enrolment was about 46 percent in 2006 compared to around 53 percent in the EU-10 (Jafarov and Gunnarsson, 2008, p. 11),

the proportion of graduates in Croatia is not high enough. Further, only one-third of students at the tertiary level reportedly complete their programs, with an average completion rate of 6.7 years for four-year programs (World Bank, 2008b). Non-completion rates in tertiary education were also very high, with the Ministry estimating that only one-third of all those enrolled were completing their courses of study. The serious internal inefficiencies at the tertiary level do not seem to have diminished in recent years (World Bank, 2008a, p. 114). The number of graduates in TE over the last 10 years has been rising constantly. A vast majority of students has finished their undergraduate programs (on average 92.3%), whereas 7.7% of students finished postgraduate studies (5.3% a Master of Science degree and 2.4% a doctoral degree). The average share of graduates in the natural sciences was only 4% and has been falling constantly since 1997 (from 4.9% to 2.9% in 2003) (MoSES, 2007, p. 73). A similar situation can be found in Slovenia where the majority of graduates come from the social sciences, business sciences and law, accounting for nearly one-half of graduates at the tertiary education level; as many as 70% of them were women. The smallest number of graduates was recorded in the fields of science, mathematics and computer science as well as agriculture and veterinary medicine – just 1,255 (slightly less than 7% of all) graduates. An observation over time of the trend in graduate numbers at the tertiary education level in Slovenia reveals that this number oscillated around 6,000 in the 1980s and at the start of the 1990s, and then started soaring after 1994. Twelve years ago it exceeded the 10,000 limit. By 2009 the number of all graduates had doubled compared to 1996 and even tripled compared to the period before 1990 (SORS, 2010).

### 3. Methodology

This research measures the relative (technical) efficiency of higher education in Croatia and Slovenia, as well as in comparison with other selected CEE and OECD countries. Yet the characteristics of the higher education sector make it difficult to measure efficiency: it does not make a profit; there is an absence of output and input prices; and higher education institutions (HEIs) produce multiple outputs from multiple inputs (Johnes, 2006, p. 273). Therefore, a performance evaluation of higher education is based on multiple inputs and outputs and thus regressions based on only one output are unsuitable. To be precise, a non-parametric frontier analysis, namely data envelopment analysis (DEA), is the most recent methodology that is commonly used to examine the problems of measuring the performance of HE institutions (Athanasopoulos and Shale, p. 1997). Therefore, this research uses data envelopment analysis as a methodological tool.

DEA is a non-statistical and non-parametric approach which makes no assumptions regarding the distribution of inefficiencies or the functional form of the production function (although it does impose some technical restrictions such as monotonicity and convexity). Instead, it uses the input and output data themselves to compute, employing linear programming methods, the production possibility frontier. The efficiency[2] of each unit is measured as the ratio of weighted output to weighted input, where the weights used are not assigned *a priori* but are calculated by the technique itself so as to reflect the unit at its most efficient *relative to* all others in the dataset. In a multi-output, multi-input production context, DEA provides estimates of the distance function which is a generalization of the single output production function (Johnes, 2006, p. 274).

In the first step, the frontier is drawn up by the efficient units. In the second step, hypothetical units are generated on the frontier to serve as reference units for inefficient higher education systems. These reference units are constructed as linear combinations of the most efficient units on the frontier. All inefficient units are enveloped by the frontier. On the basis of the empirical production function, in terms of best practice, DEA reveals those HE systems that are on the efficient frontier. It indicates the level of inefficiency of each system compared to the efficient systems[3].

The DEA method is essentially a linear program which can be expressed as follows:

$$\max h_k = \frac{\sum_{r=1}^s u_{rk} Y_{rk}}{\sum_{i=1}^m v_{ik} X_{ik}} \quad (1)$$

subject to

$$\frac{\sum_{r=1}^s u_{rk} Y_{rj}}{\sum_{i=1}^m v_{ik} X_{ij}} < 1; j = 1, \dots, n. \quad \text{All } u_{rk} > 0, \quad v_{ik} > 0 \quad (2)$$

where  $Y$  is a vector of outputs;  $X$  a vector of inputs;  $i$  inputs ( $m$  inputs);  $r$  outputs ( $s$  outputs);  $n$  is the number of decision-making units (DMUs), or the unit of observation in a DEA study.

The data set in this research includes input data, i.e. expenditure per student, tertiary (% of GDP per capita) and output/outcome data, i.e. school enrolment, tertiary (% gross), labor force with a tertiary education (% of total) and the unemployed with a tertiary education (% of total unemployment) in thirty-seven countries are included in the analysis (selected CEE, and OECD countries). In order to assess different inputs and outputs/outcome relative to technical efficiency, two models have been tested. Model 1 is based on expenditure per student, tertiary (% of GDP per capita, 1999-2007 averages) (as input) and school enrolment, tertiary (% gross), labor force with a tertiary education (% of total, 1999-2007 averages) and the unemployed with a tertiary education (% of total unemployment, 1999-2007 averages) (as output/outcome). Relative efficiency scores for Model 2 are based on expenditure per student, tertiary (% of GDP per capita, 1999-2007 averages) (as input) and school enrolment, tertiary (% gross) and labor force with a tertiary education (% of total, 1999-2007 averages) (as output/outcome). The program used for calculating the technical efficiencies is the *DEA Frontier* software. The data are provided by Eurostat, the IMF, the OECD, UNESCO, and the World Bank's World Development Indicators database.

## 2. Research Results

When looking at the results[4], by using Model 1 and applying the DEA efficiency frontier technique within a selected group of CEE/OECD countries to measure efficiency of higher education, Canada, Czech Republic, Finland, the Republic of Korea, Latvia, Lithuania, Poland, Russia, Slovakia and even Slovenia are seen as efficient. Here, the average expenditure per student, tertiary (% of GDP per capita) in the 1999-2007 period measures the input and as the output/outcome we use school enrolment, tertiary (% gross), labor force with a tertiary education (% of total, 1999-2007 averages) and the unemployed with a tertiary education (% of total unemployment, 1999-2007 averages). One can see that some countries come very close to the frontier (e.g. Hungary and Romania), while the other countries are further away and therefore less efficient (e.g. Cyprus and France) (see Table 2).

**Table 2** The Relative Efficiency of selected CEE and OECD Countries in Tertiary Education – Model 1 (Distribution by quartiles of the ranking of efficiency scores)

<i>I. quartile</i>	<i>II. quartile</i>	<i>III. quartile</i>	<i>IV. quartile</i>
Canada	Italy	Norway	Cyprus
Czech R.	Ireland	<i>Croatia</i>	Mexico
Finland	Austria	New Zealand	Denmark
Korea	Australia	Japan	France
Latvia	Bulgaria	Sweden	Netherlands
Lithuania	Romania	United Kingdom	Spain
Poland	Hungary	Estonia	Switzerland
Russia		Portugal	Iceland
Slovakia		Greece	Turkey
<i>Slovenia</i>			Belgium
United States			

Sources: World Bank, 2010; UNESCO, 2010; Eurostat, 2010a; OECD, 2010; own calculations

The results of the DEA analysis (Model 1) also suggest a relatively high level of inefficiency in higher education in Croatia and, correspondingly, significant room to rationalize public spending without sacrificing, while also potentially improving, higher education outputs and outcomes (see Table 2). Indeed, Croatia is ranked in the third quartile and in terms of the efficiency scores for public spending, Croatia ranks in the 69th percentile among the 37 countries. With respect to individual output/outcome indicators, Croatia's ranking is in the last quartile for higher education school enrolment, the third quartile for labor force with a tertiary education and the second quartile for the unemployed with a tertiary education. In order to become an efficient country, Croatia should significantly reduce its average expenditures on higher education per student by around 10 percentage points (to around 29% of GDP per capita), to bring it near to the OECD average level.

Further empirical analysis, now focusing on Model 2, suggests even worse relative efficiency results for Croatia. When using only two outputs/outcomes, Croatia's ranking is only 32 (out of 37). Similar to the results for Model 1, in order to become efficient Croatia should cut its average expenditures on

higher education per student by 6.3 percentage points. In terms of the efficiency scores, the efficiency benchmark is represented by Canada, Finland, the Republic of Korea and the USA. In contrast, some CEE countries lag well behind (e.g. Slovakia, Romania and the Czech Republic), especially due to relatively poor output/outcome results (relatively low school enrolment and labor force with a tertiary education). Slovenia is ranked in 13<sup>th</sup> position and would improve its efficiency score by significantly expanding its labor force with a tertiary education (by around 8.5 percentage points) (see Table 3). According to our descriptive and empirical analysis, it is obvious that the higher education systems in Croatia and Slovenia suffer from relatively high technical inefficiencies (in particular in Croatia). To improve each system's efficiency, performance-based funding models for higher education should be developed and further emphasis should be placed on quality assurance in higher education and the integration of the facilities. Moreover, curricula in universities should also be reformed to better reflect the needs of the economy, whereas dialogue and cooperation between the private sector and universities should be greatly increased. Indeed, trade unions and employers should be actively involved in education reform. That is especially important in the area of vocational higher education programmes in order to reduce labour market mismatches. Improvement of the education system should be a top priority of tripartite dialogue.

**Table 3** The Relative Efficiency of selected CEE and OECD Countries in Tertiary Education (Model 1 and Model 2)

<i>Country</i>	<i>Model 1</i>		<i>Model 2</i>	
	<i>Output-Oriented VRS Efficiency</i>	<i>Rank</i>	<i>Output-Oriented VRS Efficiency</i>	<i>Rank</i>
Cyprus	1.18366	37	1.67953	27
Czech R.	1.00000	1	2.22684	33
Estonia	1.04146	21	1.30988	16
Finland	1.00000	1	1.00000	1
Hungary	1.00243	12	1.68296	28
Lithuania	1.00000	1	1.24196	12
Poland	1.00000	1	1.48874	22
Republic of Korea	1.00000	1	1.00000	1
Romania	1.00460	13	2.31993	35
Slovakia	1.00000	1	2.32826	36
USA	1.00000	1	1.00000	1
<i>Croatia</i>	<i>1.06280</i>	<i>26</i>	<i>2.21438</i>	<i>32</i>
<i>Slovenia</i>	<i>1.00000</i>	<i>1</i>	<i>1.25579</i>	<i>13</i>

Sources: World Bank, 2010; UNESCO, 2010; Eurostat, 2010a; OECD, 2010; own calculations.

## 4. Conclusions

Expenditures on higher education systems made an important role in improving economic growth and development. At the same time, they signify an important tax burden on taxpayers. The efficiency with which inputs produce the desired outputs is thus an important public policy issue. In this research, an attempt was made to measure the relative efficiency of higher education across selected OECD and CEE countries, in particular in Croatia and Slovenia, using data envelopment analysis (DEA) in a VRS framework. The research results suggest the significant inefficiency of higher education spending in Croatia and therefore the considerable potential to reduce government expenditure and/or to increase the higher education output/outcome. Conversely, regardless of the input-output/outcome mix, the higher education system in Slovenia is shown to have a much higher level of efficiency compared to Croatia as well as many other comparable CEE and selected OECD countries. The results also

indicate that some developed nations (e.g. Korea, the USA and Finland) can serve as benchmarks for their efficient use of higher education resources.

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- 2 Efficiency is defined as the relationship between inputs and outputs (outcomes), wherein monetary inputs are considered. Inputs (educational expenditure, students etc.) are “transformed” into outputs/outcomes (number of graduates, their knowledge etc.) through the “production” (pedagogic) process (Bevc and Uršič, 2008, p. 234).
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# Is it necessary to outsource innovation? Creation and innovation face obstruction.

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Financial restraints, the lack of talent, knowledge and professionalism, combined with serious time shortage, are all well-known obstructions that innovation has to face on daily basis. Though all related to a conventional way of thinking, they can still provide us guidance when it comes to prioritizing solutions.

The obstructions we speak of are : limited budget/resources for investing in innovation, the incoherent innovation strategy and the huge time and resource consumption for securing information, as well as the fact that information security never lines up to business targets.

The internal structure of every individual or group of people has its own laws of evolution. It is how this world has been created. The important thing is that, as we reach personal or/and collective maturity, we instantly grow aware of some natural laws, which automatically apply, whether we like it or not, whether we know about them or not.

According to one of those laws, everything evolves and suffers constant changes. Therefore, each entity goes through an infinite number of innovations, regarding all its aspects.

When life bombs us with obstacles, it also comes up with solutions. Due to those obstacles, we can grow up, under constant development, sharing new experiences, living under a new banner, the banner of innovation, which allows us to become whatever we would like to be.

Prioritizing things is highly connected to the very essence of life. It's not a question of choosing between "good" and "bad", but between "good" and "better".

Time, resilience to chance, low budgets and resources, the fear for failure and lack of stimulation, inaction, management culture, leadership, lack of communication, the feeling that nobody is listening to us, reluctance towards risk, too much ego when discussing ideas, refusing to approach active thinkers, economy stagnation, the legal context, fear of rejection, valid models of thinking, career consequences, lethargy, lack of ideas, lack of strategic thought, personal interest, organization structures etc, those are all solid obstacles in the mighty path of innovation. But, can they also become reasons of outsourcing innovation?

## Keywords

Barriers of Innovation, outsource innovation

## 1 Introduction

The OECD's *Oslo Manual* defines innovation as: "The implementation of a new or significantly improved [to the user] product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations". This definition captures both the meaning of innovation as a *process* (implementation) and as a new *artifact or practice* (product, process, method, etc.). A rather more elaborate definition comes from The Oxford

Handbook of Innovation (2004) where Fagerberg notes that: “An important distinction is normally made between invention and innovation. Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice. Sometimes, invention and innovation are closely linked, to the extent that it is hard to distinguish one from another... In many cases, however, there is a considerable time lag between the two.... Such lags reflect the different requirements for working out ideas and implementing them. While inventions may be carried out anywhere, for example in universities, innovations occur mostly in firms, though they may also occur in other types of organizations, such as public hospitals. To be able to turn an invention into an innovation, a firm normally needs to combine several different types of knowledge, capabilities, skills, knowledge, skills and facilities, market knowledge, a well functioning distribution system, sufficient financial resources, and so on....”

Definitions of innovation often stress “the *successful* exploitation of new ideas” – this particular formulation is from the UK’s DBERR (formerly DTI), but echoes the emphasis on success often found in the management literature. But note that “success” is ambiguous – a technical success may be a commercial disaster!

These definitions, and the wider discussions they are set in, indicate that there are different types of innovation and innovation process, varying for instance in terms of:

- types of idea and underpinning knowledge (e.g. technological ideas are emphasized to the exclusion of cultural or organizational ones),
- ways of generating ideas (e.g. research and development is not prioritized as compared to innovations developed in practice or on the job),
- forms of success (e.g. economic return or social benefit and/or acclaim).
- levels of novelty, since some “new ideas” are groundbreaking while others are minor changes in established ways of doing things – there is a classic distinction between incremental and radical innovation that reflects this, and many related concepts have been introduced such as “revolutionary innovations”, “architectural innovations” “configuration innovations”. In innovation is new to the firm, the industry, or the world.

**Four** main classes of innovation that are discussed in the current literature are now used in the Community Innovation Survey:

- **product innovation** (usually technological), where innovation involves the development of equipment, components, software (or novel assemblages of these);
- **process innovation**, involving new systems or routines of production, again with an emphasis on the tools and equipment and software used in the processes;
- **organizational innovation**, involving where innovation relates to changing management practices or workflow structures;
- **marketing innovation**, involving new ways of relating to customers and potential customers (including new ways of promoting products) - this is closely related to the idea of **delivery innovations**, targeted at transforming the ways in which products or services reach their consumers.

Additionally, there are many types of **Innovation Process** (this is not the same as “process innovation”!) Much discussion centers on Research and Development (R&D) as the way in which innovations are generated. In practice, however, innovations often come from work on the shop floor or front-office, and R&D departments are, anyway, rare outside of high-tech manufacturing (and a few high-tech services) companies. Often, major innovations are organized through project development teams. In some firms and sectors the main influences on innovation are the introduction of new machinery and software from suppliers of such tools; in some, professional associations and industry associations provide an important source of knowledge; in some the clients are a major stimulus for innovative ideas; and so on.

Finally, we should note that the innovation process is itself something that changes over time, from the first development of an idea (invention), through its development into a new product or process, the roll-out of the idea in the innovating organization, and then the diffusion and implementation of this by further users (diffusion); at any of these stages further new ideas may be introduced, the design of the innovation may be adapted in the light of feedback as to user requirements or technical problems, and so on. Two important ideas are the “product life cycle” and the “industry life cycle”. Each refers to a stylized path of development. In the **product life cycle** the picture refers to the development of an innovation from being expensive and hard to use, to being cheap and available for low-skill users (and often mass markets). The focus of innovative effort evolves from one on getting the product to work and to be well-adapted to users, to one of mass-producing it easily and cheaply.

The **industry life cycle** points to the parallel phenomenon, where firms rise and decline and production may be moved from highly knowledge intensive locations to ones characterized by cheap and less skilled labor.

These “life cycles” are useful frameworks for thinking labor product and industrial change, but there are many cases where the patterns describe above are not followed with any precision.

## 2. Open innovation and barriers in innovation

Research on innovations and barriers to innovation has for a long time been concentrated on trying to find those mechanisms that would help in designing innovation-supporting policies at European, national and company level. Often these studies have, however, been looking at only one of the levels at a time, which has led to oversimplifications and misleading policy implications.

The innovation process is seen as a cycle involving trial and error, where problems at some stages of development lead to a need to re-evaluate earlier stages in the innovation process. The barriers to innovation are not, however, the same for each firm; barriers may be expected to differ, for example, according to the size of the firm, the line of industry, and the degree of innovativeness of the firm.

Business cannot avoid the influence of the recent change in the operating environment: competition has become intensified, knowledge diffusion is becoming increasingly broad and fast, amounts of R&D investments growth rapidly and at the same time the life-cycles of products and technologies are shortening. In order to optimize product development and fit it into shortened time frames, the firms need to be able to utilize multiple knowledge sources, and apply new approaches to management of intangible assets. (Miller and Langdon, 1999)

The concept of open innovation suggests, among other things, that firms can enhance their innovative performance by acquiring knowledge from external sources, as well as benefit financially by using external paths to market for internally generated technologies that do not fit the current business model (Chesbrough, 2003; Gassmann and Enkel, 2004). An open innovation model also emphasizes that innovations emerge increasingly as a result of inter organizational cooperation, which means that the concept is relevant not only at a company level, but also at the regional and country levels. When examining implementation of open innovation in a regional context, however, it is important to notice that economic systems and institutions in different regions and countries differ in their support for open innovation practices (Nelson 1993). For example, the strength of IPR protection varies between countries, which may significantly affect firms’ desire to buy, sell or collaboratively create new knowledge. Moreover, countries differ in various structural and cultural issues that may affect firms’ willingness to use open innovation practices. It is therefore of great interest to identify which factors have the most significant effect on knowledge flows between organizations within a given region or country.

Hence, we view the barriers and motivators to adoption of open innovation practices from three different levels of analysis: (1) internal factors of the firm, such as e.g. R&D intensity and availability of surplus technologies; (2) innovation system level as for instance influence of innovation policies and public funding on firm’s involvement into open innovation processes and (3) cultural level, i.e. certain features of national and organizational culture creating an attitude towards the use of open innovation practices within the company.

## 3. Theoretical Background on Open Innovation

The notion of “open innovation” was first proposed by Chesbrough (2003 a, b) and has quickly gained the interest of both researchers and practitioners. The model stands for the way of innovation management when company provide internally generated knowledge for the market and external knowledge to flow in for maximizing the benefit of the company. It is also described as “both a set of practices for profiting from innovation and a cognitive model for creating, interpreting and researching those practices” (West et al, 2006, p. 286).

Open innovation can be described in terms of combination of two differently directed processes: inbound and outbound. Inbound process stands for in-sourcing external knowledge through licensing in, spinning in, acquisition (in order to get valuable technology, personnel etc.) and collaboration alongside value chain. The latter can be illustrated at the example of Procter & Gamble, who cooperate with customers, suppliers, competitors and other institutions to pursue ideas, which can be utilized in the process of new product development (Huston and Sakkab, 2006). Outbound process

stands for external utilization of internal knowledge. The 'surplus' of research, not fitting to current business model, used to sit on the shelf within close innovation model (Chesbrough, 2003).

This means that the company had to fiercely protect this surplus by intellectual property rights in order not to lose it (as even the employees of the company could utilize the surplus for establishing own business with venture money).

Open innovation approach states that the surplus can be used for realizing some potential value through selling it away to the other company, which could utilize it better within its resource base and business model.

As described by Chesbrough (2003a,b) the opportunities for sourcing the external knowledge have increased significantly and the outside-in process, or more specifically knowledge acquisition has been widely studied in the academia (Granstrand et al. 1992; Kurokawa 1997; Veuglers and Cassiman 1999), as well as practiced by the business (e.g. Procter & Gamble's Connect and Develop case (see Chesbrough et al. 2006). While the acquisition of external technologies is nowadays commonplace, the exploitation of technologies and intellectual property (IP) outside the company (outbound open innovation as defined by Chesbrough (2003) and Gassmann and Enkel (2004)) is still observed infrequently (Athreye and Cantwell 2007; Mendi 2007).

According to open innovation model, innovations emerge increasingly as a result of inter organizational cooperation; hence, the environment of this cooperation attracts attention to the national and regional systems of innovation. The national system of innovation (NSI) refers to a framework that aims to explain the differences in innovation performance of nations through differences in their institutional support for such innovation (Lundvall, 1992; Nelson, 1993). The NSI framework stresses the idea that the flow of knowledge (and technologies) between individuals and organizational actors is key to the innovative process. While there are numerous factors that affect these knowledge flows, among the most important is the existence of various "institutions". These include, for instance, a nation's intellectual property (IP) policy, which by determining the formal approach of innovations (through patenting and other laws) has a significant effect on the development and diffusion of knowledge. The set of institutions also provides the framework within which innovation policies (concerning, e.g., public funding of research and development) are formed and implemented (Metcalfe, 1995).

While formal institutions to a considerable degree shape the external relationships among key actors (firms, universities, public research institutes, etc.) in the NSI, there are also structural factors that affect the flows of knowledge between firms. In particular, the industry/market structure affects, and is dependent upon, firms' rent appropriation strategies (e.g., the use of patents and technology licensing; Arora, 1997) and therefore also the knowledge flows between them. Indeed, diverse industries may represent distinct "systems" of innovation even within a nation (Nelson and Rosenberg, 1993). In the cross-country comparisons of NSIs, it is therefore important to take industry specific factors into account as well.

One of the key determinants of Open Innovation practices is the investments made by companies in research and development (R&D) activities, as well as the environmental conditions that foster the development of capabilities and on a regional and national level (Porter and Stern, 2001).

On one hand, firms need to invest into R&D for development of new products and offering them to market faster than competitors. Additionally, creating knowledge assets by intensive R&D often results in surplus technologies available for sale to gain additional profit to reinvest in R&D which in its turn bring to producing new portion of surplus technologies. Active R&D activities of the company would also foster the development of high absorptive capacity (Cohen and Levinthal 1990) and hence the ability of firm to in source the external knowledge would be higher. On the other hand, intensive R&D, as it used to be in the closed innovation model, would supply companies with a lot of product ideas and new technologies, and the need for acquiring the external knowledge would decrease. For two of very first cases of open innovation – IBM and P&G studied by Chesbrough (2003) the adoption of open innovation practices came as a consequence of layoffs in R&D departments and the need to find new sources of product ideas and technologies.

Hence, the intensive R&D investments may create a barrier to company openness:

### **3.1 Firms with high level of R&D intensity are less eager to embrace inbound open innovation.**

### **3.2 Firms with high level of R&D intensity tend to produce more surplus technologies**

Companies that operate in open innovation environment do not have to rely only on internal funding for R&D, and since firms do exist in regional systems the open innovation benefits are best achieved in regional clusters.

This fact was explained yet by economists (Romer 1987; Krugman 1991) pointing out the benefits of geographical proximity and regional concentration of network partners due to reduced production and transport costs and lower costs of accessing information locally. Hence, the role of regional systems for fostering innovation activation and open innovation interactions of the firms is increasingly high, especially for small and middle-sized companies.

The regional innovation system is enabled by knowledge exchanges among different actors of regional network, including governmental institutions. The nature of such knowledge exchange is in large scale defined by national policies enabling the creation and incorporation of innovation within a national economy. The studies on national innovation systems (NIS) focus on the role of nation-state in supporting the innovation activities of local enterprises and to large extent on the government sponsored research. Such state-financed research creates benefits for both the direct recipient and related firms through the spillover effects (Nelson 1993; Bresnahan and Malerba 1999). Additionally, researchers have examined the additional effects of public funding (Buisseret et al.)

(1995; Davenport et al., 1998) meaning that public funding motivates company to invest more of its own fund into R&D (since the prerequisite to obtaining the public finance is a certain amount of own capital input to the project). As we have already claimed the increase in amount of R&D funding has a positive effect on the amount of surplus technologies produced by the company. Hence:

### **3.3 Public funding increases R&D output and amount of surplus technologies**

However, alongside with public finding certain restrictions come in act. The national policies on innovation differ from country to country, however the general feature of every additional funding is the concern of who owns the result. A general intellectual property rights (IPR) system and particularly strong, established rules for the protection of intellectual property are referred as appropriate regime in Teece's, 1986. While a reasonable assumption is that under a weak appropriate regime firms are encouraged to protect their innovations, and are thus less inclined to share their internally generated knowledge with others, even the strong appropriate regime cannot endure the ownership of the technology made with the public finance.

The national policies on innovation are the ones regulating the matters of ownership of research results (Braczyk et al., 1998); however, if the ownership of direct research results can be insured by strong appropriate regimes, the ownership of research surplus which emerged from publicly funded research is still undefined issue for most innovation policies. This leads to the contradictory to 2a assumption that:

### **3.4 Firms are less inclined to sell intellectual property and technologies that result from publicly funded research projects**

Another barrier arising from IPR area relates to the costs of IP protection and the procedure of claiming intellectual property. Strong IPR protection encourages disclosure and promotes efficient trade on markets for technology (Chesbrough et al. 2006). Weak appropriateness implies widespread existence of knowledge externalities (Malerba and Orsenigo 1993). Consequently, within weak appropriate regime, each individual firm will have less incentive to conduct in-house R&D; hence the amount of research surplus would decrease as well. Weak IPR protection in the end may lead to the overall rate of private sector R&D decreasing below the levels needed to sustain long-term private returns from innovation, and may therefore necessitate public support for in-house R&D.

Hence, avoiding the above mentioned externalities through strong protection of formal IP is supposed to increase the willingness of companies to develop own in house technologies.

A tight IP regime does mean that it is easier for firms to acquire technologies in the marketplace; and similarly easier to sell or license own technology. IP creates a platform for "co -modification" and transfer of technology (Graham and Mowery 2004) and hence for collaboration within open innovation

model. Hence, the involvement of companies into open innovation may depend on the strength of IPR protection and associated with it costs and formal arrangement:

### ***3.5 The greater the complexity and cost of IPR protection, the less likely firms will engage in open innovation.***

The third level of analysis of barriers to open innovation deals with national and organizational cultures. Some researchers (e.g. Takada and Jain, 1991; Straub, 1994; Dwyer et al, 2005) suggest culture has an influence on the diffusion of innovations. The five dimension index scores of culture offered by Hofstede (1991, 2001) explains behavior of individuals and organizations by their cultural peculiarities, measured through collectivism versus individualism, level of power distance, uncertainty avoidance, masculinity or femininity and long- or short term orientation.

### ***3.6 The high cultural long-term orientation other firms causes strong Not Sold Here syndrome and decreases the tendency to utilize outbound open innovation.***

This paradigm may be a step in innovation outsourcing. Now that innovative companies are open to product and technologies transfer, the phrase „Not Sold Here” has been replaced with „Open for Collaboration”, this way unlocking the path towards externalizing innovation.

## **3. Conclusions**

1. Our research indicates that economic systems and institutions (in particular the protection of IPRs) may have large effects on the behavior of firms with respect to their engagement in open innovation practices. On the other hand, since our results also suggest that the importance of appropriate regime may differ in the buy and sell sides of knowledge, the effects of property rights protection and its relationship to other structural issues ought to be more fully explored in future research. IPR protection can promote innovation and economic development, through attracting FDI and strengthening incentives to innovate by domestic firms. The coherence between IPR and other policies and among the various entities involved in development and implementation of IPR policies is important.
2. The companies that do not belong to the manufacturing sector seem to be more likely to engage in both inbound and outbound open innovation. Moreover, while a firm’s size does not seem to influence its utilization of external technologies, the smaller companies are more likely to have surplus technologies and/or develop technologies for other organizations. This finding is quite consistent with the assumption that small firms rarely possess all the needed complementary assets to commercialize an innovation and therefore must license or sell their technologies to larger companies.
3. The changing of organizational culture, globalization and open innovation are factors which determine the crossing of innovation barriers, through externalization.

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# The importance of mobility for innovation

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From the beginning of the 21st century the European Union (EU) has been investing efforts into the development of its research and innovation systems, faced with statistics which have brought into question its place on the global market next to competitors from the United States of America and the Far East. In early 2000 the EU started creating the European Research Area, ERA, and has subsequently issued a number of documents and measures in order to advance and improve it. The main purpose of the European Research Area is to create a transnational research community, which would allow for free movement across states as well as knowledge sharing and knowledge transfer. The expected outcome is that this unity in research, along with the transfer of knowledge and technology, will be the impetus needed for the advancement of the innovation system. Today ERA encompasses all EU Member States, as well as the countries associated with the Seventh Framework Programme (FP7) – 39 countries in total, and is still developing. This paper examines the creation and development of the ERA on the basis of communications issued by the bodies of the EU, and the effect this initiative has had on researchers' mobility and innovation.

## Keywords

European policies on researchers' mobility and innovation

## 1. Introduction

At the turn of the century the European Commission was concerned about the competitiveness of the European Union (EU). The statistics showed that the research sector, while active, was not developing at the same rate as it did in the Far East and the United States of America (USA), nor was the research sector translating its scientific advances into innovative products as well as its competitors. The situation, identified as the so-called "European paradox" in 1995 [1], became a discussion issue in the last decade of the 20<sup>th</sup> century. The "European paradox" refers to the perceived inferiority of EU in terms of transforming the results of technological research and skills into innovations and competitive advantages. In particular, the following facts were cause for concern [2]:

- The average investment in research in Member States at the end of the 20th century amounted to 1.8% of the European GDP (with significant variations among the states), while in the USA it was at 2.8% and in Japan 2.9%. Moreover, this discrepancy was increasing throughout the 1990s.
- According to employment records, in the EU 2.5 of 1,000 employed persons were researchers, whereas in the USA this proportion was 6.7‰ and in Japan it was 6‰.
- During the 1990s the trade balance in technology products in the EU showed a deficit of €20 billion.
- There were twice as many postgraduate European students in the USA than postgraduate American students in the EU, and 50% of the Europeans who did their PhD degree in the USA remained there for a long time, often forever.

In spite of all this, the EU was producing a third of the world's knowledge in science. The desire to keep and support the potential of European science, as well as to once again create a better public

image of science, gave the impetus for creating the European Research Area, with a unified labour market, open also to third-country nationals.

## 2. Creating the European Research Area

The creation of the European Research Area, ERA, was introduced by the European Commission with the document *Towards a European Research Area* [2] in January 2000. This remains the most important document on this topic. The EU accepted the initiative at the Lisbon conference in March of the same year.

According to the definition to be found in the above mentioned document, the European Research Area should encompass:

- Networking of existing centres of excellence in Europe and creation of virtual centres using new interactive communication tools.
- A common approach to the needs and financing possibilities of large research institutions in Europe.
- A more consistent application of national and European research activities and closer relations between scientific and technological cooperation organisations in Europe.
- A better application of tools and means for encouraging investment into research and innovation.
- More abundant and more mobile human resources.
- Greater European unity in research, based on best practices of knowledge transfer on regional and local levels.
- Integration of scientific communities, industries and researchers of western and eastern Europe.
- Making Europe attractive to researchers from the rest of the world.
- Promoting a shared vision of the ethical issues of science and technology.

In October 2000 the European Commission issued the communication *Making a reality of the European Research Area: Guidelines for EU research activities (2002-2006)* [3], which announced measures to be suggested for each of the fields listed above, and brings guidelines for the changes in research-based Framework programmes, in order to provide a better support for the development of the ERA. Once again an accent was placed on interregional and international cooperation, not only within the ERA, but also beyond, intending to use the dynamic and potential of individual countries and regions by interlocking their possibilities and activities related to research, innovation and technology transfer. Innovation and research capabilities on all levels, with special emphasis on small and medium enterprises, were to be enticed by “collective research”, researchers' networking and mobility, a better exchange of ideas and knowledge.

On this basis the European Commission published a communication in June 2001 named *A Mobility Strategy for the European Research Area* [4]. The Strategy's aim is the creation of an environment conducive to mobility within the ERA, in order to develop, attract and retain appropriate human resources in research and promote innovation. An emphasis was placed on intersectoral and interregional mobility. The document also addresses the possibility of access of researchers from candidate countries and third countries.

The Strategy sets researchers' mobility as a priority, not as an end goal but as a means to optimize research efforts and innovative development. It invokes the communication *Innovation in a knowledge-driven economy* [5], where EU Member States are encouraged to use concrete measures to entice researchers' mobility in order to intensify collaboration between the various actors: research centres, universities, groups of enterprises and individual companies.

## 3. Reinforcing the European Research Area

In December 2001 the Council of the European Union brought the *Council Resolution concerning the reinforcement of the mobility strategy within the European Research Area (ERA)* [6] which established the creation of an internet portal and the network of mobility centres. Furthermore, the Resolution accentuates the need for the EU candidate countries to be involved in the implementation of the Strategy with a coordinated approach.

In March 2002 at the meeting in Barcelona, the Council of the European Union reached among others the conclusion that the investment into research, development and innovation should by 2010 reach approximately the amount of 3% GDP. Based on this conclusion in September 2002 the European Commission published the document *More Research for Europe – Towards 3% of GDP* [7]. Since the

Council held that two thirds of those investments should come from the private sector, the document "More Research for Europe" [7] cites the development and improvement of framework conditions as a first step. Aiming to make the research sector more attractive to investment, the document states that the development of highly qualified human resources in adequate numbers is a prerequisite for the fulfilment of the plan. It lists the following targets:

- Encouraging more women to enter science & technology careers.
- Encouraging further the development and visibility of poles and networks of excellence for higher education and the research & development sector, competitive with non-European alternatives.
- Encouraging the development and visibility of careers in science & technology in Europe, both in enterprises and in the public sector, by paying greater attention to financial conditions, career paths for young scientists, research equipment and availability of funds for research.
- Facilitating life-long learning, transfer of knowledge and career development through the mobility of researchers within Europe as well as the entry of third country researchers, primarily by removing national obstacles and providing adequate information and assistance at all levels.

Other fields where improvements were suggested include: linking entrepreneurship with research and development, measures to support spin-offs, creating a public research database with improved industry links, adjusting and using the system of intellectual property rights, creating a competitive environment and supportive competition rules, as well as improving financial tools.

Based on the "More Research for Europe" [7] document, in June 2003 the European Commission published *Investing in research: an action plan for Europe* [8], which defined specific actions for reaching the 3%-goal. Since the primary objective was to increase investments from the private sector, the action plan proposed measures to create a dynamic and active research area, attractive to investors and distinguished by excellent researchers, while not bound by restrictive national legislation.

Moreover, counting on the fact that increased investment would lead to new jobs in research, it was considered that by 2010, to reach the 3%-goal, 700,000 additional researchers would be necessary. This gave another dimension to the increase of Europe's attractiveness for educating, inviting and keeping researchers. The action plan cites existing activities, such as implementing the "Mobility strategy for the European Research Area" [4], especially the creation of informational tools and harmonization of social security systems. New proposed actions for the development of human resources encompass:

- Facilitating the opening of national systems for the recruitment, evaluation and further career development of researchers at European and international levels, including the need for a specific regulatory framework.
- Examining the case for further European or concerted measures to substantially enhance the conditions for researchers in the EU, in the framework of the open process of co-ordination.
- Adopting and implementing the foreseen proposals for an action plan and a directive on the conditions of entry and stay of third-country nationals for the purpose of research in the EU.

The next step of the European Commission came in July 2003 with the document *Researchers in the ERA: One profession, multiple careers* [9]. This communication addressed to the Council of the European Union and the European Parliament examines various elements pertaining to researchers' careers on the European level: role and format of research education, differences in recruitment methods, contractual and financial dimensions as well as evaluation mechanisms and career advancement perspectives. This communication revealed structural weaknesses as well as marked differences concerning each of these elements, according to the sectors in which researchers operate or the geographical, legal, administrative and cultural environments in which they work. Furthermore, the communication proposed the launch of specific actions on a voluntary basis aimed at providing a better overall coordination of efforts in favour of the recognition of the researcher's profession, as well as to establish a real European labour market based on the potential capacities of all actors, independently of their geographical location, the sector they are working in or their gender.

With the communication "Researchers in the ERA: One profession, multiple careers" [9], the European Commission commits itself to:

- continue implementing the "Mobility Strategy for the European Research Area" [4];
- create a "European charter for researchers" and a "Code of conduct for the recruitment of researchers";
- develop means to enable income comparisons within the research community, including social security and taxation, among countries, disciplines, sectors and between male and female researchers.

The Commission also suggested several actions to Member States and other stakeholders, among others to set up - in close co-operation with the Researcher's Mobility Portal and the European network of mobility centres - specific researchers' guidance centres at local, regional and national level in all European countries in order to advise on new opportunities for multiple careers in research & development and on the necessary requirements to engage in them.

## 4. Opening the European Research Area

Keeping in mind the increase of the number of researchers needed to accomplish the Barcelona objectives, and taking into account the fact that the European Community's Sixth Framework Programmes was already opened to researchers from outside the European Union in 2002, in October 2005 the Council of the European Union issued the *Directive 2005/71/EC on a specific procedure for admitting third-country nationals for the purpose of scientific research* [10]. This directive facilitates the regulation of stay for third-country nationals, who come to a Member State for the purpose of scientific research for a period longer than 3 months. It encourages the development of a system based on hosting agreements and the abolishment of work permits for researchers.

In March 2005 the European Commission adopted the *European Charter for Researchers* [11] and the *Code of Conduct for the Recruitment of Researchers* [12], and issued the recommendation for their use [13]. The principles of these two documents aim to enforce equal rights and obligations of researchers, as well as research and funding organisations, regardless of their location in Europe. The Charter [11] defines roles and responsibilities of researchers, organisations where they work and research funders, in order to ensure successful creation, transfer, sharing and dissemination of knowledge. The Code for recruitment [12] aims to improve the quality and transparency of the employment process for researchers, as well as their career advancement.

However, since by 2005 the investments into science and innovation, despite the plans based on the Barcelona objectives to which many EU Member States committed themselves, had not risen as was expected, had actually stagnated, in October 2005 the European Commission published a new action plan: *More research and innovation – Investing for Growth and Employment: A Common Approach* [14]. It once again emphasized the need for the creation of an open and competitive European labour market for researchers, in order to share competencies, knowledge and skill on a transnational level. This action plan lists 19 measures aiming to once again stimulate the investment into science and innovation, divided into four categories:

- Adjust all policies at Member State and EU level to support research and innovation wherever possible.
- Use EU funds and instruments to support research and innovation.
- Improve research and innovation conditions in the business sector.
- Encourage national initiatives and policies through international cooperation.

As one of the results of the ensuing discussion, in May 2008 a new document was published: *Better careers and more mobility: a European Partnership for Researchers* [15]. The "European Partnership for Researchers", EPR, represented a revised strategy for the improvement of researchers' mobility. Namely, despite accomplished results, the objectives set at the Lisbon conference in 2000 were slow to be reached. Not only was the growth of the number of researchers only marginal, even the renewal of existing personnel came into question. Therefore the European Commission suggested setting up partnerships with EU Member States, to devote themselves commonly to achieving significant progress in four key areas:

- systematically open recruitment;
- meeting the social security and supplementary pensions needs of mobile researchers;
- providing attractive employment and working conditions; and
- enhancing the training, skills and experience of European researchers.

For each of these key areas several priority actions were listed, to be fulfilled by the end of 2010. The Member States were moreover expected to adopt a national action plan by 2009, which would identify specific targets and actions to fulfil the objectives of the Partnership. The adoption of EPR by the Council of the European Union was followed by the re-launch of the Human Resources and Mobility Steering Group (SGHRM), composed of representatives from 39 countries (27 Member States and 12 Associated Countries), with the European Commission acting as its 40<sup>th</sup> member, and with a mandate adapted to conduct this partnership in a flexible manner [16].

## 5. Europe 2020: Development for the Future

The 2009 Report on the Implementation of the European Partnership for Researchers (EPR) by Member States and Countries Associated to FP7 [16] shows that the SGHRM held five meetings during that year and revealed that National Action Plans were nationally approved and submitted to the SGHRM by 8 countries. A mapping exercise was conducted to determine the national focus areas with regards to the 4 EPR priority areas and showed, among other, that 13 countries were implementing measures to contribute to the objective “ensuring better links between academia and industry”. In these countries the promotion of intersectoral mobility and the increased participation of private sector in research feature in governmental programmes, Research and Development and Innovation Strategies, and other policy documents. Furthermore, during 2009 four working groups were established, including a working group for “Training, Skills and Industry/Academia Relationship”. However, while progress was achieved in improving researchers’ training and skills, the 2009 report states that the aspect of industry/academia relationship needed to be addressed further in 2010.

In the meantime, the impact of the global economic crisis was affecting the research sector, although it diverged across the world regions: while unemployment and public deficits increased more sharply in the USA than in the EU, the crisis has aggravated the labour productivity gap between the EU and the USA [17]. Comparisons based on data from 2008 showed that the EU was still lagging behind the USA and Japan, with a statistically significant innovation gap [18]. Faced with the effects of the global economic crisis, the EU created a new collective strategy to alleviate those effects and create a smart, sustainable and inclusive economy. The *Europe 2020* Strategy [19], adopted by the Council of the European Union in June 2010, puts forward three priorities:

- Smart growth: developing an economy based on knowledge and innovation.
- Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

One of the headline targets proposed by the European Commission was once again that 3% of the EU’s GDP should be invested in R&D – according to Eurostat in 2009 the expenditure on R&D was at 2.1% GDP across 27 Member States [20]. At the same time, new estimates suggested that achieving the 3% objective by 2020 could create 3.7 million jobs and increase annual GDP by close to €800 billion by 2025 [21].

In order to initiate progress on the headline targets, the European Commission put forward seven flagship initiatives. Among the first to be launched was the *Innovation Union* [18], to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs. Concretely, the “Innovation Union” [18] proposed 10 actions needed to achieve the targets of “Europe 2020” [19], among them are the following:

- The EU and Member States need to continue to invest in education, R&D, innovation and ICT.
- Researchers and innovators must be able to work and cooperate across the EU as easily as within national borders. The ERA must be completed within four years.
- Cooperation between the worlds of science and the world of business must be enhanced, obstacles removed and incentives put in place.
- Remaining barriers for entrepreneurs to bring “ideas to the market” must be removed.
- European R&D programmes need to be open to international partners, while ensuring comparable conditions abroad.

The “Innovation Union” [18] commitments aim to make innovation Europe’s overarching policy objective and cover a wide range of areas and stakeholders. The commitments include:

- The Commission will support business-academia collaborations through the creation of “Knowledge Alliances” between education and business to develop new curricula addressing innovation skills gaps.
- In 2012, the Commission will propose a European Research Area framework and supporting measures to remove obstacles to mobility and cross-border cooperation.
- The Commission will design future EU research and innovation programmes to focus on Europe 2020 objectives and particularly the Innovation Union, while ensuring simple access and stronger involvement of Small and Medium Sized Enterprises (SMEs).
- By 2014, on the basis of Commission proposals, the EU should put in place financial instruments to attract a major increase in private finance.
- The Commission will facilitate effective collaborative research and knowledge transfer within the research Framework Programmes and beyond. By the end of 2011, working closely with Member

States and stakeholders, it will make proposals to develop a European knowledge market for patents and licensing.

Member States were invited to carry out self assessments and identify key challenges and critical reforms as part of their National Reform Programmes.

With the "Europe 2020" [19] strategy, the EU also launched a new ex-ante policy coordination, which started with the first *Annual Growth Survey: advancing the EU's comprehensive response to the crisis* [17]. Namely, in this new policy coordination cycle, each year the Commission will present, in the Annual Growth Survey, its assessment of the main economic challenges facing the EU and recommend priority action to address them, whereupon the Spring European Council will give guidance and the Member States will accordingly prepare their National Reform Programmes, to be submitted by mid-April. This first Annual Growth Survey includes the first progress report on "Europe 2020" [22] and examines the draft National Reform Programmes of Member States. The compilation of all provisional national targets indicated an aggregated level of 2.7 or 2.8% of GDP to be invested into research and development, which is below the expected target of 3% GDP, but which represents a significant effort, particularly in the current budgetary context. The report recommends the removal of obstacles to the growth of innovative companies, including by improving framework conditions and access to finance.

The progress report concluded that the reforms needed to address imbalances and re-start growth were insufficiently defined on national levels. However, it maintains that it is above all important to generate momentum and to give priority to growth enhancing measures within the flagship initiatives. The first National Reform Programmes will be adopted in July 2011.

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# The role of portfolio foreign investments in the development of emerging capital markets

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Because of the information real time transmission, grace to the tight connections between different financial centers, the financial globalization made possible the rapid transfer of financial instruments price volatility, through the contagion effect of markets. Starting from the premise of portfolio diversification and from the need to identify new sources of income, the portfolio investors are going to take advantage of the favorable economic conjuncture and the investment decision on new markets is going to be taken into account only if the expected profitability of the invested capitals (adjusted at a higher level of risk) is superior to the one obtained on mature markets. In this context, due to the specific characteristics of emerging markets (small number of issuers, reduced market capitalization), these markets are more sensitive to the volatility of foreign capital flows. This can create an unstable investment environment, due to the interference between different factors that have an impact upon the risks and return of a portfolio (volatility of stock prices, liquidity of the international capital market, investment cycles, asymmetrical information in the local and international environment and not in the least, portfolio investor's strategies and behavior). The present study analyzes the impact of portfolio foreign investments upon the emerging capital markets. In the analyzed period of time, there can be identified a connection between the foreign investments and the emerging capital markets dynamics and we would say that the „disturbing” effects are of a bigger amplitude in the case of sudden reductions of the volume of portfolio foreign investments in comparison with the effects generated by sudden increases in the volume of portfolio foreign investments.

## Keywords

Emerging capital markets, portfolio foreign investments, risk, volatility

## 1. Introduction

Emerging capital markets have increasingly come to the attention of investors, both those interested in developing some direct foreign investments, but particularly of those aiming at portfolio investments. Thus, starting from the assumption of diversifying the portfolio and identifying new sources of income, portfolio investors will exploit the favorable economic conjuncture and the investment decision is taken only if the expected profitability for invested capital, adjusted to a higher risk degree, is greater than that obtained on mature markets.

Foreign portfolio investment may influence capital market development, both positively, by capital inflows, as well as negatively, by shifting cash into other markets or towards other financial instruments. Due to specific characteristics (small number of issuers, small capitalization), emerging markets are more sensitive to the volatility of foreign capital flows.

According to Bakaert and Harney [1], foreign portfolio investment may lead to structural and functional changes of the capital market: (1) foreign portfolio investment exits, besides the disruptions they create on the financial system by reducing the market liquidity, lead also to negative variations of the assets' price on the market, (2) foreign portfolio investment entries determine an increase of the

securities' price fluctuations in most emerging markets that have received significant flows of foreign investment.

However, we cannot say that the volatility of emerging markets is entirely due to foreign investors' participation. The withdrawal of foreign capital generates a change in the attitude of resident investors who become aware of the changes in market trends and, as a consequence of herd behavior, they perform significant capital withdrawals. On emerging markets, as a result of the manifestation of some financial crisis foreign portfolio investment exits sent shock waves to other international capital markets [3].

The volatility of capital flows implies „a high frequency of flows' reversibility or high variability of the volume of capital inflows" [6], because capital flows are particularly sensitive to changes in domestic and international investment environment. The volatility of capital flows can create an unstable investment environment, because of the interference of various factors that may influence the risks and returns of a portfolio, such as: the volatility of exchange rates, the liquidity of international capital market, investment cycles, the "contagion" effect of capital markets, asymmetric information propagated into the domestic and international environment and, not least, the strategies and behavior of portfolio investors.

In Romania, the liberalization of financial flows associated with the capital account resulted in an increase of the capital market's sensitivity degree to factors from the international environment. In this context, the investors' decisions were increasingly based on the evolutions of the international financial markets.

In the present paper we try to analyze the impact of portfolio foreign investments on the emerging capital markets.

## 2. The experience of the emerging markets in attracting portfolio foreign investments, in times of crises

In recent years, economic activity has been characterized by a dramatic increase in the international dimensions of business operations.

But, the recent global financing crisis had a pronounced impact on net capital flows to developing countries. Net inflows fell to \$780 billion, reversing an upward trend that began in 2003 and peaked at \$1,222 billion in 2007 (table 1). Private flows (debt and equity) declined by almost 40 percent, driven by the sharp fall in the flow of short-term debt, portfolio equity, and bonds. Both short term debt and portfolio equity flows turned negative, recording outflows of \$12.7 billion and \$57.1 billion respectively. Bond flows remained positive, but the inflow in 2008 was 80 percent below the level of the prior year.

**Table 1** Net Capital Inflows to Developing Countries

	2001	2002	2003	2004	2005	2006	2007	2008
	<i>(\$ billions)</i>							
Current account balance	7.2	63.6	103.1	138.4	246.5	331.0	352.5	256.4
<i>Financed by:</i>								
Net private and official inflows	224.2	161.0	262.3	361.4	501.4	659.0	1,221.6	780.3
Net equity inflows	170.9	160.3	179.8	254.3	349.9	469.0	663.8	536.5
Net FDI inflows	164.6	151.3	154.3	215.7	281.1	363.2	528.4	593.6
Net portfolio equity inflows	6.3	9.0	25.5	38.6	68.8	105.8	135.4	—
Net debt flows	53.3	0.7	82.5	107.1	151.5	190.0	557.8	243.8

	2001	2002	2003	2004	2005	2006	2007	2008
Private creditors	26.0	—	94.9	133.1	223.3	262.9	559.8	215.8
Net medium- and long-term debt flows	3.9	5.4 3.0	29.7	71.6	137.7	168.1	315.3	228.5
Bonds	12.2	10.6	22.6	35.8	56.8	31.6	87.2	15.0
Banks and other private	—	—	7.1	35.8	80.9	136.5	228.1	213.5
Net short-term debt flows	22.1	8.4 —	65.2	61.5	85.6	94.8	244.5	— 12.7

Sources: World Bank Debtor Reporting System (DRS), International Monetary Fund (IMF), Bank for International Settlements (BIS), and Organization for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC).

The geography of the international capital market of the recent years, and the factors that lead to this geography, demonstrate that the portfolio investments tend to concentrate on the emerging markets that offer the best conditions. Emerging market economies in Europe and Central Asia and South Asia combined accounted for 55 percent of the overall decline in capital flows to developing countries in 2008, while the net inflow of capital to these two regions fell to \$313 billion and \$63 billion, respectively. Reduced short term debt flows accounted for a major share of the decline in East Asia and Pacific, Middle East and North Africa, and Europe and Central Asia. In Sub-Saharan Africa two-thirds of the decline was in portfolio equity, with the rest in bond financing.

**Table 2** Net Capital Inflows to Developing Regions, 2005–08

	(\$ billions)			
	2005	2006	2007	2008
Net private and official inflows, <i>by region</i> :	500	659	1,222	781
East Asia and Pacific	184	194	292	179
Europe and Central Asia	155	280	486	313
Latin America and the Caribbean	84	69	231	173
Middle East and North Africa	16	12	26	19
South Asia	28	61	134	63
Sub-Saharan Africa	33	42	53	34

Source: World Bank DRS.

Portfolio equity inflows turned sharply negative in 2008 as investors retreated from stock holdings in emerging markets: an outflow of \$57 billion was recorded compared to a net inflow of \$135 billion in 2007. But the impact was limited to a small number of countries: typically ten countries account for over 90 percent of all portfolio equity flows to developing countries (table 3).

**Table 3** Net Inflow of Portfolio Equity Flows— Top Ten Recipients

	(\$ billions)		
	2006	2007	2008
Brazil	7.7	26.2	— 7.6
China	42.9	18.5	8.7
India	9.5	35.0	—15.0
Indonesia	1.9	3.6	0.3
Philippines	2.5	3.2	— 1.3
Russian	6.5	18.7	—15.0
South Africa	15.0	8.7	—4.7
Thailand	5.2	4.3	—4.6
Turkey	1.9	5.1	0.7
Vietnam	1.3	6.2	— 0.6

Source: IMF.

The problem that the international investor faces is related to the potential of generating the expected profit out of the international diversification in times of crises that the emerging and developed capital markets have. The way financial crises developed in the last three decades suggest that the promised profits for international diversification tend to significantly decrease during crises (as a paradox, this is the moment when the investor needs them most), especially due to the evolution of correlations between international markets.

### 3. The impact of the financial crises and the portfolio foreign investments on an emerging capital market. The case of Romania

Evolutions on international financial markets and the dynamics of domestic macroeconomic equilibriums/disequilibrium have led to a reassessment of the risks that have influenced the capital market in Romania.

The growth of risk aversion on international markets and limited liquidity on financial markets have influenced the behavior of non-resident and local investors and determined the contraction in nominal terms of the amounts placed by investors on capital market, but also the contraction of the share which foreign investors had on the market.

**Table 4** The evolution of investors in the Bucharest Stock Exchange

The investors' structure		Purchases % of total	Sales % of total
2005	Aggregate Accounts	-	-
	Residents	72,03	78,02
	Non-residents	27,97	21,98
2006	Aggregate Accounts	-	-
	Residents	69,83	75,9
	Non-residents	30,17	24,1
2007	Aggregate Accounts	-	-
	Residents	59,9	65,3
	Non-residents	40,1	34,67
2008	Aggregate Accounts	1,48	2
	Residents	69,85	67,2
	Non-residents	28,67	30,81
2009	Aggregate Accounts	1,68	2,48
	Residents	75,12	78,02
	Non-residents	23,2	19,5

*Source: CNVM Annual Report, 2009*

In this context, we can say that the Romanian capital market is facing a new long-term trend, a maturation trend. This trend is subject to a multitude of factors that may influence the market dynamics, factors related both to domestic and international developments.

This paper will try to quantify and analyze the relation that exists between BET stock index (the reference index of the capital market, which is a price index shared with free float capitalization of the 10 most liquid companies listed on the regulated market of Bucharest Stock Exchange), purchases and sales of financial instruments of non-resident investors, the source of statistical data being represented by the Bucharest Stock Exchange. The study covers the period from January 2005 - December 2009, monthly series.

The analysis aims at determining the correlation coefficient (Pearson's correlation) between monthly returns of BET stock index and the share of purchases and, respectively, of sales made by non-resident investors in the total of transactions from the regulated market.

Pearson's correlation reflects the degree of linear relationship between two variables. It ranges from +1 to -1. A correlation of +1 means that there is a perfect positive linear relationship between variables. A correlation of -1 means that there is a perfect negative linear relationship between variables.

In the most recent developments that have occurred on the Romanian capital market there were two important moments: mid-2007, when on the mature markets have felt the first effects of the financial crisis, and the year 2008, when the financial turbulences have caused a dramatic reversal of BET's trend and when there have been recorded negative performances on the Bucharest Stock Exchange.

Thus, to refine the analysis, we will determine the correlation coefficients both for 2005-2009 and for the two sub-periods 2005-2007 and 2008-2009 also considered important (see Table 2).

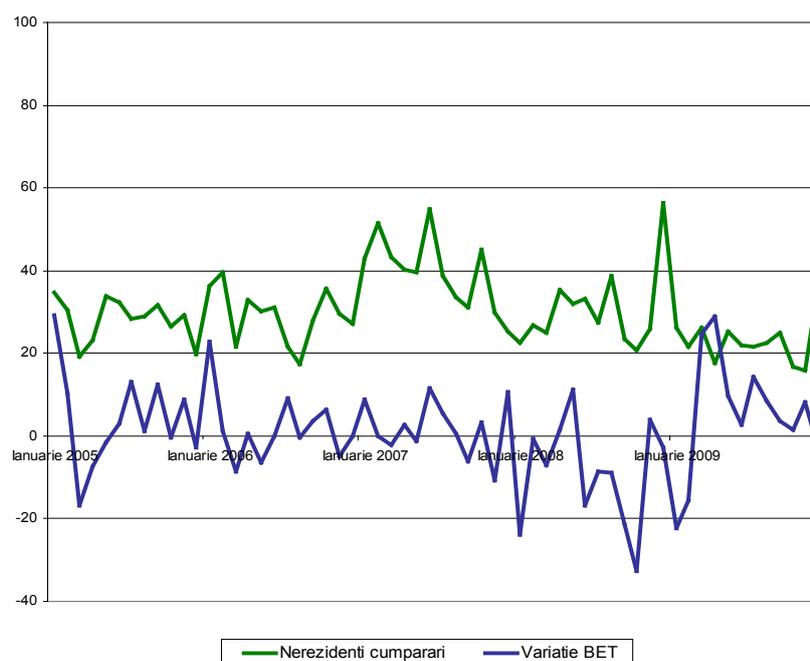
**Table 5** Correlation coefficients. BET index – the transactions of non-resident investors within Bucharest Stock Exchange

Period	Correlation coefficient	Correlation coefficient
	BET index – purchases non-residents	BET index–sales non-residents
2005-2009	0.1333	-0.4017
2005-2007	0.2928	-0.2764
2008-2009	-0.1016	-0.5499

Source: Data processed by the authors based on information provided by BSE, [www.bvb.ro](http://www.bvb.ro)

Analyzing the data obtained, we can see a low and direct correlation of 0.2928 between the BET index and the stocks purchases of non-resident investors only for 2005-2007. In this context we can say that the investment strategy of non-residents is aimed at achieving a higher return than that obtained on mature markets in risk conditions considered acceptable by them. We can also notice the contribution of foreign investments in maintaining the upward trend of BET, as the index records better performance in the months when the weight of non-resident investors' purchases in total of purchases of listed stocks was high (see Fig. 1).

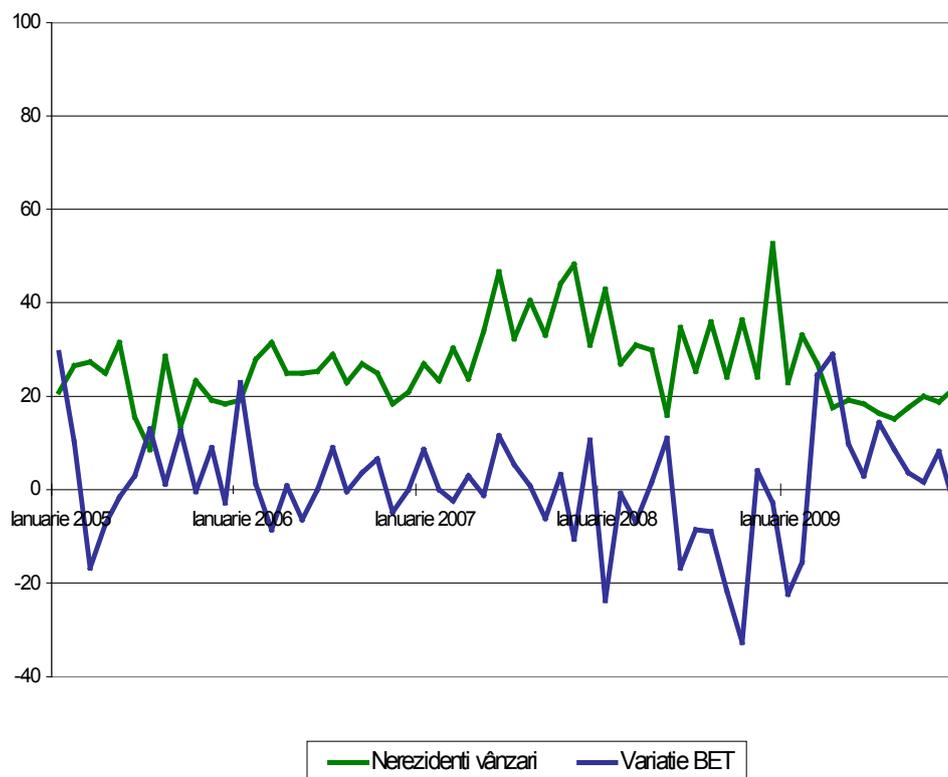
**Figure 1** The dynamics of BET and of purchases made by non-residents investors



Source: Data processed by the authors based on information provided by BSE, [www.bvb.ro](http://www.bvb.ro)

Regarding the correlation between monthly returns of BET index and the weight of monthly sales of non-resident investors in total sales within the Bucharest Stock Exchange we can see that in the months when non-residents' sales are higher, the performances of BET index are weaker (see Fig. 2).

**Figure 2** The dynamics of BET and of sales made by non-residents investors



Source: Data processed by the authors based on information provided by BSE, [www.bvb.ro](http://www.bvb.ro)

The correlation coefficient between BET index and the sales of non-residents is negative, the connection being strong and reverse, especially for the period 2008 – 2009 when it reaches the value of -0.5499 (statistically significant value), which confirms the increase of risk aversion of foreign investors and the of change investment strategy by reducing the share hold by stocks listed on emerging markets in the global portfolio structure.

## 4. Conclusions

The portfolio foreign investments have often set the trend of the evolutions registered on the emerging capital markets (both positive and negative evolutions), by changing the direction of liquidity towards other markets or financial instruments. Because of the small dimensions in terms of number of issuers, capitalization, daily volume of transactions, we could say that emerging capital markets are much more sensitive to these movements of the foreign capital.

For example, on the Romanian capital market, the amplitude of “disturbing” effects recorded by BET index under the impact of sales made by non-resident investors is greater than that generated by the volume of foreign portfolio investment inflows.

This can be explained by the attitude of non-resident portfolio investors, but also resident investors towards the secondary capital market. The interest shown by investors towards financial instruments traded on the BSE obviously influences the dynamics of the latter. Therefore, the determinants of the investment alternatives can be also considered influence factors of the capital market development.

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# Developing Internationalization Competence for consultants and managers of micro, small and medium enterprises

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A very important component of the European economy and its strength are exports – EU internal as well as EU external trade - (DG Economic and Financial Affairs “Economic forecast autumn 2009”, Brussels, autumn 2009). Furthermore SMEs form the backbone of the economy in every European country. But Europe is still facing a problem: some countries lag behind in their internationalization endeavours and are participating significantly less in exports than other countries; this problem has even increased due to the financial crisis.

In scope of a project series a growing number of institutions started to work on the task of developing a curriculum which is intended to be used to train internal and external experts and consultants for internationalisation of micro, small and medium Enterprises. Final aims of this set of projects is to install a certified curriculum for internationalisation consulting, which can be offered by partner institutions all over Europe (and beyond) and to install a Europe-wide network of institutions participating in the further development of the curriculum.

The current research focuses on how to best relate the issues connected to internationalisation of micro, small and medium companies to training programme tailored specifically for this target group. A qualitative survey helped to build a basic understanding of potential problems and challenges SME’s face while attempting to internationalize. This analysis includes details of their structure, their relation to consulting companies and how they cope with the challenges of internationalisation. 336 Companies in Austria, Finland, Slovenia, Spain and Turkey participated.

The developed curriculum intends to transfer most recent knowledge from prior projects and research into practice by means of state of the art teaching methodology and improve pertinent skills aiding the target audiences to better tackle the challenge of going international or consulting in such endeavours.

The paper at hand will present the results of the Europe-wide survey and demonstrate how these results were integrated into the development process of the curriculum.

## Keywords

Curriculum Development, Education, Entrepreneurship, Internationalisation, SMEs

## 1. Introduction

The European Lisbon strategy aimed at developing the whole of Europe as the strongest knowledge based economy in the world by 2010. At the forefront of this ambitious aim, which influenced all activities on the European level, lifelong learning and – in terms of economic development – vocational training became a crucial issue. Therefore the participation rate in education has been set as one major Lisbon progress indicator (LIS-F22). Furthermore, participants at a two-day agreed that governments should play a more active role in helping companies to try to expand abroad and provide training in key areas. Increasingly, companies are seeing participation in international markets as critical to their survival, job creation and growth. (OECD, 2006). In 2008 the European Commission started an initiative called "Agenda for new skills and jobs", two of the major aims of this initiative are "Bridging the gap between the world of education, training and work" and "Better matching skills and

jobs" (European Commission, 2011) which aims to support educational institutions by providing a framework for educational institutions of how to set up trainings and relate them to actual jobs. In their expert group report for 2010 the European Commission experts' state that "These challenges, and opportunities, come at a time of serious fiscal restraint facing most, if not all, Member States as well as the EU itself. This requires explicit and sensible choices about priorities for public funding of education and training. We must strongly encourage individuals and employers to invest more heavily in their skills development, not only to secure the best 'value for money' but to reap the benefits of people's potential." (European Union, 2010)

A very important component of the European economy and its strength are exports – EU internal as well as EU external trade. "...in recent years, other factors have become increasingly important in the face of the structural changes engendered by globalisation. These relate to export specialisation, which includes the range and the quality of the products a country exports, and the particular markets it exports to. In this regard, it is important that our countries take advantage of their high technological advancement and well-educated labour forces, to produce higher quality and more sophisticated goods and to redirect their exports towards strongly growing markets." (European Central Bank, 2009) Furthermore SMEs form the backbone of the economy in every European country. "What usually gets lost is that more than 99% of all European businesses are, in fact, SMEs (see definition of SMEs). They provide two out of three of the private sector jobs and contribute to more than half of the total value-added created by businesses in the EU. Moreover, SMEs are the true back-bone of the European economy, being primarily responsible for wealth and economic growth, next to their key role in innovation and R&D". (European Commission, 2011) But Europe is still facing a problem: some countries lag behind in their internationalization endeavours and are participating significantly less in exports than other countries, this problem has even increased due to the financial crisis.

To sum up: It seems to be highly necessary to develop a methodology which allows for the development of a curriculum for internationalisation, especially for small and medium enterprises, which provides the competences which are actually needed by internal and external internationalisation consultants and managers. The INCO project series, which was started by FH JOANNEUM in 2004, has been tackling the issue ever since. One of the follow up projects - INCO2 - has been set up by "bit management" in Austria. "In the short term the results of the project should increase the know-how of consultants to further upgrade their own skills and abilities and the competencies of their clients (SMEs) for their internationalization activities. In the long run the project will add value to the whole European economy, with increasing the competitiveness of enterprises, communities and regions. " (bit management, 2011) Another project dealing with this issue – INCONEXT, a transfer of the INCO-curriculum to Lithuania – has started in 2010.

## **2. The survey**

### **2.1 How was it done?**

With the help of a survey, the INCO2 consortium did take a closer look on SME's in order to get a better understanding of potential participants in the INCO2 courses. Aim was to analyse their structure, their relation to consulting companies and how they cope with the challenges of internationalisation. 336 Companies in Austria, Finland, Slovenia, Spain and Turkey participated. The Inco2 survey was done with the help of the platform Survey monkey in 5 national languages (German, Finnish, Slovene, Spanish and Turkish) an additional version was available in English. Two methods of data gathering were used. On one hand we invited participants to enter their data in survey monkey directly; on the other hand we provided a pen and paper version, which was later on entered in the database by project team members.

### **2.2 How international and how experience were the SMEs?**

Over all participating countries, the results were that 37,8% of all companies were active in the domestic market only, whilst 62,2% were already active in at least one foreign market. Yet a closer look on the different country results showed a significantly different picture. In Finland the focus of participating companies was mainly in the domestic market (75%) most of them (47%) being active in the region only, in comparison most companies in Austria (77%) are internationally active.

As a result of these numbers we expected definite differences in the level of pre-experiences between the participating countries but also between participants in a course. Investments for internalisation

are vastly different in the participating countries responses; we conclude that also the willingness to invest time and resources in the process would be different. So it would be essential to provide different levels of training in providing core material but also additional material which allowed to deepen knowledge for advanced participants. Also it was clear that experienced trainers needed to be involved and briefed accordingly.

Also as a trend in all participating countries, the amount of money invested in internalisation activities is increasing from year to year. This of course underlines the increasing importance of courses like INCO2. Only 12% of the participating companies stated that they are active since less than 2 years pointing at the fact that start-ups should not be the main target group for the trainings and participants looking for knowledge concerning the start-up of a new business would be needed to be pointed elsewhere..

### **2.3 Where do the managers get their information from when internationalising?**

The following were the answer alternatives offered, they are sorted by frequency:

**Table 1** Information sources

	Frequency	Average Grade
Research by employees / Internet	118	2,0
Networks / Industrial associations	110	2,1
Public institutions (eg. Chamber of commerce)	102	2,4
Intuition	101	2,4
Consulting companies	82	2,7
Other (specify)	14	2,1

Two things seem to be obvious: consulting companies are the least often chosen source, and they receive the worst grades of all available alternatives (including intuition). Obviously companies prefer internal knowledge and / or support which is free of charge over consulting services. Even if companies pick consulting services, they are less often content with these services than with other alternatives. Looking at these answers it was clear that providing information concerning public support and funding, tailored for each country was a necessary part of training.

### **2.4. Consulting services – a necessary evil?**

Nearly exactly half (50,5%) of the companies stated that they did, at least once buy consulting services, while the other half (49,5%) did not. Mostly the respondents who did use consulting services were content with the results, even though a sizeable amount of answers shows that not everything worked out fine all the time. 26% of companies claim (agree or partially agree) that “consultants sold solutions that did not lead to the desired outcome” and / or that the “analysis of the consultants were incorrect”. Sometimes (29% agree or partially agree) good outcomes could not be implemented because of internal resistance.

We also asked which of the following reasons were the most relevant for engaging an external consulting company. The following alternatives were available, they have been ordered according to the number of “I strongly agree” (the most positive possible) answers as it is highly probable that only strong agreement leads to actually employing a consultant:

1. Lack of internal knowledge (109)
2. To verify management’s belief, recommendations or decisions (86)
3. To deal with a capacity problem (76)
4. Consulting for set up of a business / sales office in an other country (74)

5. To overcome an emergency situation (68)
6. To provide an objective analysis of a problem or opportunity (66)
7. To gain Governmental funding (45)
8. To deal with a sensitive issue (35)
9. To provide the most cost efficient solution (27)

The by far most often picked answer “lack of internal knowledge” showed us clearly that INCO2 should not only target consultants but should also offer the training to internal company experts to allow for acquiring the knowledge themselves, which is, as many SMEs are very reluctant to pay for consultancy, very important. As a bit more than a quarter of the companies who answered the questionnaire (27,2%) used consulting services for internationalizing. The market for internationalization consulting could be considered to be sizeable.

Obviously companies use consulting services rather haltingly, about 45% of companies prefer to not use any consultancy at all, while most others (another 35%) will use consulting sporadically with a maximum of 15 man-days per year paid for. Knowing this for INCO2 the market for teaching these skills to internal consultants might even be bigger than for external consultants. The main surprise in our numbers is, that currently even more companies are looking for consultancy concerning funding opportunities than in the classic consulting fields of Law and Taxation. This of course underlines, how important a module for funding would be. Another interesting result is that 42% of all companies are willing to pay more than 5000€ for internationalisation consulting.

## **2.5. And what would they like to learn?**

We asked which of the following skills were the most relevant for employees concerned with internationalisation. The following alternatives were available, they have been ordered according to the number of “I strongly agree answers”

1. Language Skills (162)
2. Market access and market knowledge (121)
3. Presentation skills in an international environment (119)
4. Knowledge of different market entry skills (115)
5. International project management skills (103)
6. International negotiations (93)
7. Knowledge of funding opportunities (83)
8. Knowledge of contract law for international companies (71)
9. Inter cultural management (71)
10. Knowledge of logistics for international companies (54)
11. Knowledge of individual characteristics of SMEs (53)
12. Financing and accounting for international companies (51)

Also we checked for how good the actual skills of employees are rated by the respondents (ordered according to average grade):

1. Language Skills (1,9)
2. Presentation skills in an international environment (2,0)
3. International negotiations (2,1)
4. Market access and market knowledge (2,2)
5. Knowledge of different market entry skills (2,3)
6. International project management skills (2,3)
7. Inter cultural management (2,3)
8. Knowledge of individual characteristics of SMEs (2,4)
9. Knowledge of logistics for international companies (2,5)
10. Financing and accounting for international companies (2,6)
11. Knowledge of contract law for international companies (2,8)

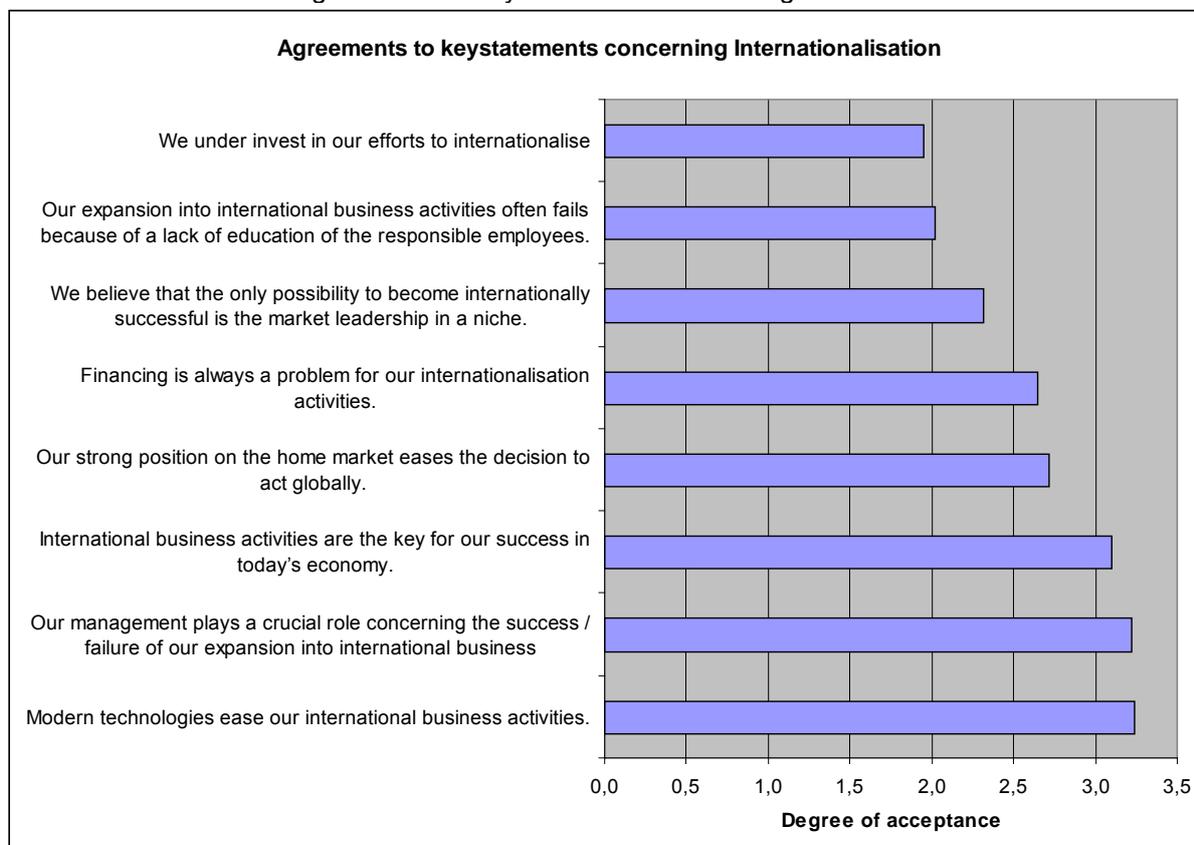
Asides from language, presentation and negotiation skills, which are not prime focus of the INCO 2 course (but which was - as a result of the survey included as a side topic), international market entry, international project management and knowledge of funding opportunities are, together with a core internationalisation course covering the most important topics. All in all the skills of the employees are rated good to average, with the weakest spots in logistics, financing and law. The results of these

questions were influencing the number of training hours assigned to specific topics. The more important the topic was and the weaker the actual skills of the employees were rated, the more time was assigned to the courses.

## 2.6. And how could such a training look like?

We asked the survey participants to which extent they agree to the following key statements concerning internationalisation:

**Table 2** Agreements to key statements concerning internationalisation



Even as there seems to be a general tendency to agree to all of the statements above, there is definite difference in the level of agreement. The statements “Modern technologies ease our international business activities”, “Our management plays a crucial role concerning the success / failure of our expansion into international business” and “International business activities are the key for our success in today’s economy.” have the highest level of acceptance.

Agreement to “Modern technologies ease our international business activities” shows clearly that modern technologies like a learning platform can and should be used. Agreement to “Our management plays a crucial role concerning the success / failure of our expansion into international business” shows that the target group for INCO 2 should definitely include and perhaps mainly aim at the management level of companies. The agreement to “International business activities are the key for our success in today’s economy” shows that companies consider the topic of internalisation of extreme importance. As a conclusion introducing a comprehensive and successful course for Internationalisation consulting can be successfully sold in the price segment between 5000 to 10000 EUR, but most probably not above.

## 3. Conclusions

Many universities in Europe already link the competences they teach in their full studies with employer needs and base them on a competence based teaching approach. This process can be, depending on

the size of the target group, the topic and the institution involved, very time consuming and involves elaborate tools like employer and alumni questionnaires, competence catalogues, competence matrices and even e-solutions. However VET offers are often lacking behind in this regard, as they often use evaluation and market research tools that are not so sophisticated and that do not show exploitable results.

Because of budget and time issues it is often not possible to do fully the same for smaller lifelong learning courses. The INCO-project series show that valuable results can be gathered with usage of limited resources. The application of the questionnaire in preparation of a course for Internationalisation consulting shows, that much can be won with little effort. Comparing the curricula of INCO and INCO2 a significant evolution of the later is obvious. A mayor part of the adaptations is based on the results of the survey. Now the INCO2 trainings differ from the predecessor project not only in duration but also in the composition of the courses.

Note that the side project IC&IC changed the target group from small companies to medium-sized companies resulting from analyses of a similar survey. INCONEXT which has started in November 2010 is now in the process of surveying the environmental conditions for Lithuanian SMEs. The project team is curious about the results of the survey and is ready to adapt the curriculum to the needs of Lithuanian companies.

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# Entrepreneurial process in small and medium – sized organic agricultural holdings in Serbia

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**Agriculture production has been recognized as the strategic chance for development and successful factor for economic integration of Serbia into European Union. Special section of the agricultural production is organic agricultural production. In the last few years this type of production has been popularized as from the organic producers so as from the state of Serbia. In this area, as in other parts of Serbian economy, entrepreneurship gets more and more important role because entrepreneurial process can be useful in developing and improving small and medium agricultural holdings in way of production, productivity and efficiency. This paper have presented main parts of entrepreneurial process on small and medium agricultural holdings in Serbia, including possible investment calculation in organic production with risk perception, so as the stimulus that have been brought by the state. All three parts of the paper present unique entrepreneurial process created for enhancing market possibilities of organic producers.**

## Keywords

Organic agricultural production, entrepreneurial process, efficiency, risk, subsidies

## 1. Introduction

In all industries, the advantage of small and medium – sized enterprises is that they can easily adapt to a market where they operate. Contrary to a widespread opinion that the theory of management is adapted only to large companies, the need for continuous planning and management in small and medium enterprises, because of the above facts, is even more important. In this paper, emphasis is placed on the organization of small and medium – sized farms that are starting with organic vegetable production in greenhouses. In this type of production, especially in the first few years, the range of possibilities is wide, and every decision entails a long – term consequences.

The specificity of the production in greenhouses is reflected in the fact that, unlike the crop production (which occurs in natural climatic conditions) this production takes place indoors, year round. Of great importance is that through the production, market is supplied with specific products during the autumn – winter, i.e. time when natural and climatic conditions do not allow the production in the open. Constructed area under greenhouses in Serbia cannot meet market needs for products in the off – season such as tomato, peppers, cucumbers, etc. and consumers are directed to the imported vegetables.

Serbia has extremely high potential for organic production. The development of organic agriculture could affect the quality of life in local communities and the state as a whole. Long – term, organic farming would help in reducing the gap between rich and poor regions and achieving stability in production. Also, through education and informing of producers and consumers it can be built awareness of the need of consuming organic food in function of health improvement. The necessity of

this research appeared because of the lack of information in management of small and medium households, which make the largest number of agricultural organizations in Serbia. Because of that, and many other facts such as economic result (profitability), social responsibility and environmental preservation, number of organic producers is increasing each year. This can be confirmed by table 1 which shows number of organic producers in region of Balkan and East Europe in the last five years.

**Table 1** The organic producers in the region from 2005 until 2009

Year	2009	2008	2007	2006	2005
Country	Producers	Producers	Producers	Producers	Producers
Albania	50	50	100	100	93
Bosnia and Herzegovina	331	304	304	329	26
Bulgaria	254	254	240	218	111
Croatia	817	632	483	368	269
Hungary	1.617	1.614	1.389	1.553	1.553
Macedonia FYR	99	99	127	101	21
Montenegro	29	25	13	15	-
Romania	3.078	2.775	2.238	3.033	2.920
Serbia	2.969	224	-	35	-
Slovenia	2.096	2.067	2.000	1.953	1.718

Source: <http://www.organic-world.net/statistics-europe-production.html> (date of access 31/01/2011)

According to table 1 in almost every country in the region Balkan and near Serbia number of organic producers increased in the last five years. Main increase in 2009 was in Serbia, from 224 to 2.696 producers, Croatia from 632 to 817 and Romania from 2.775 to 3.078. A positive trend of growth in number of producers had Bulgaria, Croatia, Montenegro, Romania, Serbia and Slovenia. In those countries number of organic producers was increasing each year taken into analysis.

The aim of this research is synthesizing all aspects of management and investment opportunities to make appropriate entrepreneurial approach to holdings engaged in organic production of different types of vegetables. Besides that, it is also considered a legal frame work for organic production in Serbia, possibilities and restrictions that are brought by the state.

## 2. Methodology and data for the research

For research purposes, it has been used methodology of analysis of literature and statistical data in the field of management, agribusiness and organic production, which was completed by a series of interviews with the producers. It has been interviewed six farmers involved in organic production in the Republic of Serbia.

In order to gather the necessary information, we used the technique of direct interviews. In this type of testing, the instrument is prepared as a list of research problems and questions tailored specifically to an individual. Questions are asked in a particular order, and the interview is not a rigid plan, but it serves as a reminder of topics that must be processed. The advantage of partially structured interview is that it allows the possibility of checking some information with others from the same source and makes their comparison [1].

## 3. Results of the research

### 3.1 Entrepreneurial process in small and medium – sized organic agricultural holdings in Serbia

Management capabilities in organic production today are as important as technical capacity. This production requires even additional management skills if we have in mind the complexity of the type of production [2]. Besides the above, managers in Serbia do not have enough business experience in

market conditions, and they need help in the knowledge, skills and standards of organic production. One form of assistance is the dissemination of managerial knowledge through consulting [3].

### **3.1.1 Management of production**

Management of the production process is essential for rational logistic action and economic efficiency of reproduction cycle. In agriculture, this segment refers to the planning of work, of labour, of sowing, harvesting, etc. For decision makers in small households the most important are the following plans:

- Plan of the required amounts of vegetables for each period,
- Planting plans with precisely specified dates for each type,
- Plan of the area that is required for normal growth of vegetables,
- Plan of rotation crops,
- Plan of planting crops according to the seedbeds.

### **3.1.2 Management of finances**

Financial management includes planning of investment and current spending, bill paying, book keeping, paying employees, payment of taxes and the like. What is missing in Serbia is, eventually, free training in the field of book keeping for owners of small and medium – sized households, especially because of the complexity of the fiscal system in this field. However, interviewed producers of organic vegetables pointed out the site of Agricultural extension services of Serbia [4], where are found a lot of literature on this subject, and the list of advisors by specialty and regions. For small and medium producers of organic products, the most important is to seamlessly do book keeping that the inspectors require, such as:

- Plan of property,
- Extract from the register of holdings,
- Bills of purchase of seeds and other products and the like.

Decision – makers on households need to learn basic book keeping, to synchronously keep accounts, and to use Excel programme (or other, similar program for calculating and recording).

### **3.1.3 Human resources management**

Possibilities for human resource management in agriculture are numerous. The method of management depends on the owner's management skills. Important is the fact that the wage workers usually use only the kinetic energy and not a creative one, which is used for finding better solutions and practices in business [5]. Therefore, in addition to hiring seasonal workers, there is a need to take into account the human capital that will sustain the entrepreneurial spirit of household.

Human resources in agricultural production can be divided into the following categories:

- *Family members*: the benefits of working with family members are knowledge of the workers who usually work without formal charges and who are dedicated.
- *Local labour force*: the population in rural areas is in most cases the main source of seasonal labour. The benefits of employing them are the proximity and the possibility of finding "trusted" people. The disadvantages are the motivation, education, and their unwillingness to work intensively.
- *Foreign labour force*: in Serbia mostly come from Romania and Bulgaria. The advantage of opting for this work force is an extremely efficient and willing to work more hours, and the disadvantages are the necessity of providing shelter, food and language barriers.
- *Interns and students*: all agricultural educational institution (whether school or university) has in its program a mandatory practice. The advantage of the decision for this work force is in low cost (sometimes even unpaid work). The disadvantages are reflected in the fact that this category of labour generally is available only for part of the season, and at least in August and September, when there is the most intensive work.
- *Woofers* [6]: mainly young people, who travel around the world and work on the farms of countries that are members of the organization WWOOF (World Wide Opportunities on Organic Farms or Willing Workers on Organic Farms), or which are not members, but have "hosts" who care about

their stay at a particular farm. In Serbia there is only one household which is registered as the host for woofers. The advantages of hiring woofers are free labour force in exchange for food and accommodation. They are motivated professionals who have rich experience, so thanks to the most professional of them business can be even improved. The disadvantage is the uncertainty. When they arrive, the moment of departure is unknown. Their working hours are usually shorter than the traditional seasonal work, and there are language barriers.

### **3.1.4 Management of the process of organic certification**

One of the important factors in organic production is the work on the certification process. Final consequence is that without this certificate the price of products will never be justified in the eyes of consumers. This process is logical sequence of events as a result of production plan, management of the household and financial resources. The manufacturer shall maintain records on the use of plots of land intended for organic farming in the prescribed form. These records contain information on the order of applied operations, fertilizer, processing, protection, and irrigation, and all other operations applied before and after harvesting.

All depends on which regulations producers are applying. For example, if an organic product should be disbursed to the Swiss market, then it should be applied to BioSuisse standard [7], which is very rigorous. In this case, there should be no conventional nursery on the estate, i.e. it must all be organic. Then, at harvest it must be used gloves that do not contain latex, and they are supplied exclusively in Switzerland. Also, 7% of the area should remain undeveloped (as an ecological zone). Inspection by EU standards it is much simpler, but the major predispositions are good management skills. Average cost of inspection for certification per hectare is about 300 Euros, and that depends on the inspection agency. It is necessary to bear in mind that the yield in the first year of the certification process does not mark as organic. The so-called conversion takes 3 years.

To established organic production in Serbia, it is necessary to provide spatial isolation of parcels and farms of the possible sources of pollution and shall prescribe the quality of irrigation water and air. Engaging plot of land in organic agriculture can start immediately if the land has not been used in the last two or three years (for perennial plants) or processed without the use of synthetic – chemical means for fertilization [8]. If the plot was used with the funds of synthetic chemical origin, it can be switched to organic agriculture at the end of the transitional period (conversion) – two or three years for growing crops without using synthetic – chemical means. All authority over the certification of organic production has the Ministry of Agriculture, Forestry and Water Management of Republic of Serbia and in 2010 mandate to carry out certification of organic production received eight certification organizations. Based on the report of authorized certification organization, Ministry of Agriculture since 2008 is making the unique records of organic producers (certified and those during the conversion).

### **3.1.5 Risk management**

Agricultural production is subject to many uncertainties. Any farm production decision plan is typically associated with multiple potential outcomes with different probabilities. Weather, market developments and other events cannot be controlled by the farmer but have a direct incidence on the returns from farming. In this context, the farmer has to manage risk in farming as part of the general management of the farming business. Hazards and unforeseen events occur in all economic and business activities and are not specific to agriculture [9].

We will show how options influence decisions and reduce eventual risks that farmers could face on the market. To illustrate, we will say that on October 1, 2008, Serbian organic wheat farmers could have sold their 2009 crop for 320€/t by selling a July 2009 futures contract on the Procurement agency in Serbia.

If wheat price at harvest in July is 300€/t, farmer buys a futures contract for 300€/t for a net gain of 20€/t on the futures market, and then sells wheat for 300€/t in the cash market. His net position is  $300\text{€} + 20\text{€} = 320\text{€/t}$ . If wheat price at harvest is 340€/t, farmer buys a futures contract at 340€/t for a net loss of 40€/t on the futures market, and then sells wheat for 340€/t in the cash market. His net position is now  $340\text{€} - 20\text{€} = 320\text{€/t}$ . Furthermore, on October 1, 2009, Serbian organic wheat farmers could have bought an option that gave them the right to sell a July futures contract for 320€/t. If wheat price at harvest is 300€/t, they will exercise the option. More precisely, they will sell a futures at 320€/t, buy one at 300€/t, for a gain of 20€/t. On the other hand, if wheat price at harvest is 340€/t, they do not have to exercise this option.

Even if farmers do not want to trade with futures or with a government, they have some other possibilities to succeed. To moderate some risks, they can do a diversification of the production, or they could make forward contracts with processors. To conclude, there are a lot of options that can reduce the downside risk without giving up the upside potential [10].

### 3.2 The start – up of entrepreneurial process

Management development in SMEs, unlike large companies, has its specificities. In the first phase of work and business of small companies attention is mostly focused on the product and its placement [11]. This is precisely the period in which the most important are knowledge and skills of producer, because he is the holder of managerial functions.

Reorientation on the organic type of production requires new investments in machinery and means of production. In the growth phase there is a limitation of the resources, and the question of fixed assets is very significant in developing new ways of doing business. In this paper it has been analyzed household that for the first time is performing the process of organic production.

#### 3.2.1 Investment calculation for organic production in the greenhouse

With proper organization and management of the estate, by hands it can be produced up to 3.000 vegetable seedlings (Interviewed producers gave an example of tomato production). Each part of plan, from labour to yield, must be ensured so that the process of production will be effective. Producers, who have been interviewed for this article, and who do not use or use poor machinery, said that, if hand work is intense (From April to August even 50 hours a week ), it can also generate a higher yield per hectare than the mechanized work. However, they stressed out that in this case it is necessary to keep the farm level in small businesses and to provide additional resources during the winter.

Organic farming is a production method that requires a big commitment, and thus performance. As the managerial capacity is developing through experience, in the initial phase of low mechanized organic farming, it should not be produced more than 2.000 seedlings. Overview of the necessary investment for organic production around 2.000 vegetable seedlings is located in Table 2 (The estate and field were not calculated).

**Table 2** Material and investment for starting phase of production of 2.000 vegetable seedlings

<b>Infrastructure</b>	<b>Costs €</b>
Greenhouse of 0,3ha	2.000 (average cost)
System for heating greenhouse	1.000
Refrigerator	2.000
Extension for the preparation of seedlings	depends on the existing infrastructure
The main irrigation system	500
<b>Tools and equipment</b>	
Cultivator	2.000
Knapsack sprayers	50
Rakes, shovels, spades and wheelbarrows	70
Black foil	100
Crates, weighing	100
Trailer	200
<b>Total costs</b>	<b>8'020</b>

*Note: Costs are approximate for 2010 and they are variable in case of different suppliers*

As the certification of organic production takes about 3 years, a medium – term planning is minimal challenge for decision makers. Table 3 presents the medium – term plan of investment on holdings in order to increase production at 15.000 plants.

**Table 3** Medium – term plan for production of 15.000 plants

Infrastructure	Costs u €					
	2010	2011	2012	2013	2014	2015
Land	Bought in 2010					
Facilities	Bought in 2010					
Barn (76x22)	Bought in 2010					
Storage			1'000			
Refrigerator				2'000		
Greenhouse		2'000				
Certification			300	300	300	300
Workshop						3'000
Mechanization						
Tractor (30ks)		12'000				
Cultivator		2'000				
Equipment						
Tool for gardening		70		50		
Main system for irrigation		500				
System "drop by drop"			700			500
Other equipment			300			
Van for delivery			3'500		5'000	
<b>Investments per year</b>		<b>16'570</b>	<b>5'800</b>	<b>2'350</b>	<b>5'300</b>	<b>3'800</b>

Such investment plan must be accompanied by an adequate investment program i.e. business plan which is serving as a proof that investments are carefully planned and have operational and financial sense.

### **3.3 The role of the State in entrepreneurial process**

Serbia has enacted a new Law on Organic Production (in May 2010), trying to follow the changes that have occurred in the legislation of the European Union [12]. It has been active from 1st January 2011. Article 4 of the Law speaks about promoting of development and promotion of organic production resources which will be provided from the budget of the Republic of Serbia, grants and other sources. Ministry of Agriculture, Forestry and Water Management, as a ministry of the Republic of Serbia for these questions has provided terms and manners of distribution and the use of these incentive funds in 2010 by the Regulation on the use of incentive funds to support the development of organic production for 2010 [13].

In Serbia's budget for 2010 it was envisaged to subsidize agriculture with nearly 183 million Euros (If you look back years later data indicate that part of the budget allocated to agriculture increased gradually. In 2000 this sector has got 95 million Euros. In 2005 the amount that was allocated to agriculture was 230 million Euros. However, the economic crisis affected the agriculture and the extraction decreased to the less than 200 million Euros). From this amount only 97.000 Euros has been allocated to subsidize producers of organic products, which represents approximately 0.05% of total funds allocated to subsidize agriculture. Incentives for the support of the development of organic production in 2010 was for the intended crop, vegetable, fruit and wine growing organic production which may be conducted in open and closed areas (greenhouses). The support through subsidies was provided by the same regulation and for organic live stock production. The right to use subsidies had individuals as holders of domestic commercial farms, then enterprises and cooperatives if they meet the requirements prescribed by regulation. Exercising the rights to subsidies was not only for the owners of land that is used for organic production, but also the tenants of the land, engaged in organic production. Namely, it was subsidized hectare area in which has been performed the organic production. For crop production per hectare the state approved 243 Euros, for vegetable production 340 Euros per hectare and for fruit and wine production 437 Euros per hectare. The right for encouragement from the Republic of Serbia had producers of organic products that have entered into agreements with certifying organizations authorized by Ministry of Agriculture.

The ultimate goal in the development of organic farming, which is represented in the National Plan for the development of organic production in Serbia, is that the total area under temporary organic production, whether it is a certified or a production during the period of conversion, should reach a volume of 50.000ha in 2014. In order to realize these objectives, it is necessary to take the action plan

in 12 steps, and one of them is to subsidize producers of organic products [14]. So far the part of the budget for financing organic production was low, and the aid was allocated only in the form of direct assistance. There are proposals to provide indirect assistance to organic producers, for example to reduce the rate of VAT in turnover of organic products, but such measures are still only an option. Financial support for organic production has started for the first time in 2005/2006, when the volume of subsidies for organic production was 19.000 Euros. In 2010 subsidies were granted to 82 applicants, and the amount was increased to 97.000 Euros. In addition to this sum the Ministry of Agriculture, Forestry and Water Management together with the Ministry of Economy and Regional Development also subsidizes 50% of the certification costs of organic production. At the beginning of 2011 the plans for the financing of organic production are much more ambitious. The Ministry is planning funds for subsidies for organic production in 2011 two times higher than funds set in 2010 [15]. Even there are no new adopted by laws on the manner of financing agricultural production in 2011, in Serbian budget for 2011 there is planned 12 million Euros more for subsidize agriculture, and perhaps that is signalling that the Ministry will fulfil the promises.

## 4. Conclusion

Development of organic agricultural production implies many efforts that come from areas of finances, human resources, risk management, law, etc. In this area, as in other parts of Serbian economy, entrepreneurship gets more and more important role because entrepreneurial process can be useful in developing and improving small and medium agricultural holdings in way of production, productivity and efficiency. This paper have presented main parts of entrepreneurial process on small and medium agricultural holdings in Serbia, including possible investment calculation in organic production with risk perception, so as the stimulus that have been brought by the state. All three parts of the paper present unique entrepreneurial process created for enhancing market possibilities of organic producers.

Using methodology of literature analysis and interviews authors were enabled to analyse main parts of entrepreneurial process in organic agricultural production in greenhouses. This process included the analysis of:

- Production management in organic agriculture, with elements of planning,
- Financial management – the accounting and book keeping, with possible investment calculation for new greenhouse,
- Human resource management, where authors made an analysis for possible and needed working force on households,
- Certification management as an important and unavoidable step in organic production,
- Risk management where authors gave optional decisions for possible reduce of eventual risks that farmers could face on the market,
- Involvement of the state in promoting the organic agriculture, where it can be seen a regulatory framework and budget for development of this type of production. The state is trying to stimulate farmers to re – orient on the organic production method, but in the opinion of the surveyed farmers incentives that the state pays are not enough.

At the end of the analysis, authors made a conclusion that organic production in Serbia is still a risky and costly investment. There are many interested producers and enough natural resources for this kind of production, but for entrepreneurial process it is important to include and manage all the elements presented in the paper.

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# Cost Management and Implementation of ABC Method in Business of Enterprises

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Contemporary organizations operate in conditions of rapid technological development, globalization, implementation of new technologies and fierce fighting in a highly competitive market. Changed business conditions in the form of integration and globalization of markets and increased uncertainty call into question traditional approaches and techniques of business management. To successfully operated under the new conditions, the enterprises put in first plan meeting of needs consumers which demand ever higher quality, functionality and product design with high reliability and quick delivery if this is possible with the lowest price. Such demands of modern customers, the enterprise primarily be answered achievement and maintenance of the lower operating costs relative to competitors, thereby contributing to achieving, maintaining and improving market position. All this requires finding new approaches, instruments and methods of cost management that can respond to changed business conditions.

This paper discusses the ABC method that transforms the way in which enterprise manage costs. Model of cost management based on activities (Activity Based Costing – ABC) involves the deployment costs by activities. ABC method it can be applied in all types of production.

The purpose of this paper is to inform the management of small and medium enterprises (SMEs) about benefits of introducing modern systems calculation costs, especially the ABC method in their business. Application of the ABC model gives more accurate data on product costs compared to conventional accounting system. ABC method is not only precise method for calculating costs, but also it is a very useful guide to improve enterprise performance. The system of activity based costing should to identify activities and to analyze the profitability of products, customers and markets.

## Keywords

(ABC method, business of enterprise, cost management, cost)

## 1. Introduction

Business processes are not possible without the expenditure of resources and costs. Costs represent value expressed in consumptions of labor, materials, fixed and current assets and others of services for achieving certain effects (products, goods or services). Costs are spread through the entire business and is particularly is important know them manage.

Expanding the activities of the enterprises and complex, toward increasing and changing demands of consumers, from product research, its design, to post-sales services, as well as the increasing importance of not only individual but also the overhead costs (particularly management and sales) and the complexity of their full and proper allocation per the places of origin and the holders, imposed the necessity of innovation approach to cost management in order to achieve cost of competitiveness. The subject of this paper is the ABC method wich represent a modern tool for managing complex business operations through a detailed analysis and assessment activities. The main goals of this

paper are: 1. emphasize on the need for cost management per individual of activity or part of the business processes in enterprises, 2. to present basic characteristics of a cost management model based on the activities, 3. on the hypothetical example of business one enterprises illustrate implementation of activity based costing in the allocation of indirect costs to products and 4. familiarize businesses with the benefits of the introduction ABC method in calculation cost.

The paper highlights on the importance of cost management per particular activity or part of the business processes in enterprises, and analyzes the characteristics model cost of management based activities. Then, in the paper is on the hypothetical example of business one enterprise whose the production – sales range make the produces A and B explained in more detail activity-based costing in allocate indirect costs to products. Also, the paper are presents the advantages and disadvantages of ABC method. At the end paper followed the conclusions and a list of references.

## Importance of Cost Management In Business Practice

The goal of cost management is achieve the greatest possible long-term benefit from of realized cost or achieve certain management goal with as the lower costs, without long-term negative effects on business results and on competitive position enterprises. Successful cost management in enterprises is carried out using different models of cost management [1]:

- Model of traditional management production costs (TPC),
- Model of cost management based on processes (PBC),
- Model of cost management based on activities (ABC),
- Model of cost management based on the integration approach process/activities (PBC/TNT),
- Model of management target cost (TC),
- Budgeting based on activities (ABB),
- Model balance of achievement (BSC),
- Model of cost management based on continuous process improvement (CC),
- Analysis value (VE),
- Model of management cost of quality (QCM), and other managerial concepts as determinants of influence on the development of information system model for business process management, or overall system management of enterprises. ABC model is now very popular in the area of cost management.

### 2.1 Model of Cost Management Based on Activities

The model of cost management based on activities is developed since 1984. years, and the large the development a experiences early nineties years [2]. This method follows the trend in costs for each activity or part of the business process. Model of cost management based on activities is formed based on a methodology that measures the cost and performance activities, resources and cost objects, where are the resources involved the activities, while the activities involved to cost objects based on the scope of use. This model take account of the causal link between cost indicators and activities. In within the application of model of cost management based on activities developed are and special terminology in which the terms have the following meaning:

- Resource is the economic element wich is used for the realization of performance activities (eg, wages and material resources are used in the implementation of performance activities). Resources are factors of production wich used to perform activities;
- Activities are a set of tasks or actions that are aimed at creating added value, and they include a set of jobs of similar nature wich are related to the making of products or providing socially useful of services. Activities convert resources - material, labor and technology in the outputs - products and services. The choice of activities depends on the organizational structure, size, services, technical equipment, etc.. When choosing activities often starts from the functions of the company, as possible activities can be listed : research and development, product design, manufacturing and assembly, packaging, delivery, marketing, quality management, etc.;
- Cost objects may be a product, product groups, customer groups, market territories, market segments and the like;
- Cost indicator is the factor that causes changes in the costs of certain activities;

- The system of costs based on activities is system that maintains and processes financial and operating data on resources enterprises, activities, cost objects and measures performance of activities;
- Management based on activities is a discipline focused on management activities as a source improvement of values obtained from the customer and the profit achieved made by insurance those value.

Model of cost management based on activities involves process-oriented organization with developed, documented and implemented business processes. It give answer on the question: "Why are appear the costs?".

## **2.2 Modern System of Calculation and Allocation General of Production Costs on Carriers of the Costs - ABC System**

The calculation of the costs includes collection of information on the costs and their connection with carry of the costs. The carry of the costs (cost object) can be any item or activity that require cost calculation: any product or service wich provides any enterprise can be the carry of the costs. The calculation of the costs can be useful managers for [3]:

- Planning – in predicting future commercial transactions, it is necessary to have some idea of how much are product and service cost, to be are a future outflow of resources could reliably estimated;
- Assessment of alternatives and making of decisions – if is the cost of units less than its price, the product need produce;
- Monitoring results – in order to effectively monitor outcomes, need are information on how much are the expected and actual costs of products or services.

The difference between traditional systems of costing and activity based costing, or ABC system is that traditional system of calculating the costs, allocate the costs to organizational units or points cost, while ABC system allocate the costs to activities. The system of activity based costing should to identify activities wich create loss and that analyze the profitability of products, customers and markets. In ABC system there is a problem of allocation of indirect costs and so based on that applied are two phases costing [4]:

- in the first phase are all indirect costs allocated per activities;
- in the second phase are the costs to activities allocated per products.

Implementation of activity based costing in the allocation of indirect costs on products is illustrated on the hypothetical example of business one enterprises whose the production – sales range make the produces A and B.

Example: Based on data on the number of activities carried out per product and the cost of activities, execute the calculation of the cost for each product. The enterprise can produce two products: A and B. Direct costs making of the products illustrates the following table:

**Table 1** Direct costs making of the products.

<b>Products</b>	<b>Production volume (Q)</b>	<b>Costs of materials</b>	<b>Costs of labor</b>
A	8,000	2,500,000.00	1,300,000.00
B	10,000	3,500,000.00	2,600,000.00
Total	18,000	6,000,000.00	3,900,000.00

Indirect costs making of the products are:

- Costs of production resources 3,800,000.00 are refer to the activity of machining of materials 90% and the activity of the preparation machine 10%;
- Costs of service resources 1,400,000.00 of these 800,000.00 relating to stored materials, and the rest of 600,000.00 comprising the staff expenses which are allocate to activities based on the number of persons working on these activities (on procurement (purchase) of the materials 15 persons, on receipt of the materials 10 persons and on control of the material 5 persons).

*PHASE I – The amount of indirect costs per activities*

Allocation of the cost of production resources illustrates the following table:

**Table 2** Allocation of the cost of production resources.

Total	3,800,000.00
Machining of the materials (hours) 90%	3,420,000.00
Preparation of the machines 10%	380,000.00

Auxiliary operations:

$$100\%:3,800,000.00=90\%:x, \quad x=3,420,000.00; \quad 100\%:3,800,000.00=10\%:x, \quad x=380,000.00.$$

Allocation of the cost of production resources illustrates the following table:

**Table 3** Allocation of the cost of production resources.

<b>Total</b>	<b>1,400,000.00</b>
Procurement of the materials (purchase)	300,000.00
Receipt of the materials (report of the admission)	200,000.00
Control of the materials (report of the control)	100,000.00
Storage of the materials (types of the materials)	800,000.00

Auxiliary operations:

$$15/30*600,000.00=300,000.00; \quad 10/30*600,000.00=200,000.00; \quad 5/30*600,000.00=100,000.00.$$

ABC system involves identifying the main activities and their causes. Financial Director carefully analyze main activities for operations of the enterprises and establishes six basic activities that take place: machining of the materials, preparation of the machines, procurement of the materials, receipt of the materials, control of the materials and storage of the materials.

The costs in certain activities and the number of activities or causes of the spending in certain activities illustrates the following table:

**Table 4** The costs in certain activities and the number of activities or causes of the spending in certain activities.

Activities	Number of activities	Cost per activities	Costs per unit of activity
1.	2.	3.	4. (3:2)
1. Machining of the materials (hours)	4,000	3,420,000.00	855.00
2. Preparation of the machines	100	380,000.00	3,800.00
3. Procurement of the materials (purchase)	5,000	300,000.00	60.00
4. Receipt of the materials (report of the admission)	2,500	200,000.00	80.00
5. Control of the materials (report of the control)	2,500	100,000.00	40.00
6. Storage of the materials (types of the materials )	80,000	800,000.00	10.00

*PHASE II – Allocation of indirect costs per products A and B*

Transfer cost of activity per products (in RSD) illustrates the following table:

**Table 5** Transfer cost of activity per products (in RSD).

Activities	Number of activities per products		Costs per unit of activity	Costs of activity per products	
	A	B		A	B
1.	2.	3.	4.	5. (2x4)	6. (3x4)
1. Machining of the materials	1,000	3,000	855.00	855,000.00	2,565,000.00
2. Preparation of the machines	90	10	3,800.00	342,000.00	38,000.00
3. Procurement of the materials	4,000	1,000	60.00	240,000.00	60,000.00
4. Receipt of the materials	2,000	500	80.00	160,000.00	40,000.00
5. Control of the materials	2,000	500	40.00	80,000.00	20,000.00
6. Storage of the materials	70,000	10,000	10.00	700,000.00	100,000.00
Total costs	-	-	-	2,377,000.00	2,823,000.00

The calculation of cost price by applying of the calculation per activities illustrates the following table:

**Table 6** The calculation cost price by applying of the calculation per activities.

Elements	A	B	Total
1.	2.	3.	4.
1. Costs materials	2,500,000.00	3,500,000.00	6,000,000.00
2. Costs labor	1,300,000.00	2,600,000.00	3,900,000.00
3. Direct costs	3,800,000.00	6,100,000.00	9,900,000.00
4. Costs of activity	2,377,000.00	2,823,000.00	5,200,000.00
5. Total (3+4)	6,177,000.00	8,923,000.00	15,100,000.00
6. Production volume (Q)	8,000	10,000	18,000
7. Direct costs per products (3:6)	475.00	610.00	1,085.00
8. Costs of activity per products (4:6)	297.125	282.30	-
9. Total (7+8)	772.125	892.30	-

The basis of allocation of overhead costs to products according to traditional calculation costs is usually volume production. According to this method of cost accounting, general costs per unit of products would be:

$$Tiq = \frac{\sum Ti}{\sum Q} = 5,200,000.00 / 18,000 = 288.89 \text{ RSD,}$$

Ti – indirect or general costs,

Tiq – indirect costs per unit products.

Comparative review of cost price by traditional calculation costs and calculation per activity illustrates the following table:

**Table 7** Comparative review of cost price by traditional calculation costs and calculation per activity.

Elements	Products	
	A	B
I. Traditional calculation		
1. Direct costs	475.00	610.00
2. General costs	288.89	288.89
3. Cost price (1+2)	763.89	898.89
II. Calculation per activity		
4. Direct costs	475.00	610.00
5. Cost per activity	297.125	282.3
6. Cost price (4+5)	772.125	892.3
7. Difference cost price (6-3)	8.235	-6.59

In our example, product B according to the traditional method costs more than the product A. When is applying the ABC method, the positions are reversed. Activity-based costing provides more accurate cost price, because the allocation of overhead costs per the products takes into account the activities that causes every product or series.

Employees in enterprises may be wary toward implementing ABC systems if they are worried that will the new approaches of the calculation of the costs lead to change priorities of enterprises. Employees are may be afraid of layoffs or changes their working life. If managers of a higher level of force impose the changes that are necessary in order to introduce the ABC system, they risk to are employees alienate, and the resistance of employee may lead to more or less deliberate of attempt to sabotage the new system. Evidence show that it is adopted by a minority of large enterprises that operate in production environments, in service industries and public sectors.

### 3. Advantages and Disadvantages of ABC Method

Modern method of allocating manufacturing overhead costs to products – ABC method has a higher degree of objectivity in the allocation of overhead costs of production compared to traditional methods [5]. Since the modern manufacturing sectors in developed countries, predominantly capital-intensive, due to the high degree of automation, the use of traditional methods in these circumstances can not provide objective and reliable information on the assessment of profitability of individual products, because in the structure of production modern automated manufacturing sectors a dominant share make up indirect costs of production. Objective and reliable assessment of product profitability can be achieved using modern ABC method that is primarily directs on the allocation of production general costs to products based on factors of spending identified through the participation identified activities in the manufacture of a certain product. However, activities are numerous and consideration of all the activities makes the calculation of costly and vague, which is one of the main criticism of ABC method. The advantages of ABC method are [6]:

- Allows for better control and planning activities,
- Allows to compare the activities per the departments,
- Allows for better operation and wiser making of decisions by managers because he may the better can looks at the relation of cause (activities) and consequences (costs),
- Enabling better cost reduction as the main focus for cost management is on core activities rather than on the products. Good conduct of activities leading to lower costs and to greater competitiveness of products on the market,
- Allows you to obtain more accurate insight into the costs and helps control costs, pointing to multiple causes for emergence costs, etc..

The disadvantages of ABC method are:

- Complex to understand and implement, because must be aggregated and processed large amounts of information,
- Expensive is for implement and to maintain. The costs may include the purchase or development of software, consulting payments, restructuring and the cost layoffs of labor.

### 4. Conclusions

Quality cost management is features of the successful enterprises and managers. The costs are in the domain of internal sphere of business enterprises and their reduction, with other conditions unchanged, are a sure way to improve results of business. Profits are realized only if is the income from sale products larger from the value of production factors that had to be spent in producing these products. Hence the importance of cost management in business practice is not necessary especially emphasize.

Activity-based costing, or ABC system gives management insight into the structure of costs in manufacturing and selling various products or services. On based the calculated cost of the product or service manager may decide to reduce or increase the price of the product or service. After making decisions about product price the manager can make decisions about the product or service mix, or may make a decision on which products or services need put the emphasis, to increase or to decrease the production of a product and to determine the amount of certain products wich will to be placed on the market.

ABC method can provide enterprises the better answers the following questions: 1 Which the products or services need to put in our product line? 2. How much are cost their production? 3. How are they profitable? 4. Which the cost of products already exist on the workshop ? 5. Where can to reduced the costs? 6. Which to clients should aspire? 7. Where to invest resources in order to maximize value for shareholder? 8. What is our performance in compared to our competitors? 9. How can we improve our performance in order to achieve competitive advantage?.

Adoption of the ABC method in practice is often controversial and met with resistance by employees. Despite disadvantages, the ABC method continues to attract much interest in practice because of better quality informations that provides to the enterprises.

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# STRATEGY AND METHODS OF FORMING THE PRICE TO SMALL AND MEDIUM ENTERPRISES IN THE FUNCTION OF RESULTS

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In poorer countries, prices are for customers the primary determinant of product selection. Therefore, such countries including and Serbia, should have a market that is characterized a variety of pricing strategies of enterprises and continuous improvement of sales and the subject of this paper is aimed in this direction. The key factors of price policy are: 1 costs. 2. demand, 3 competition on the supply side, 4 economic policy and other governmental actions.

The purpose of this paper is to present the essence of the pricing strategies of small and medium enterprises (SMEs) in Serbia which should be use in order to achieve competitive advantage in the areas of quality, price, terms and special of services. Good success in business is provided if are constantly and timely determined the costs, in order to adequately taken measures aimed in the direction their reducing and bringing into compliance with the sales prices.

At the time of the consumer economy goes the principle: Price - Cost = Profit. In this case the price is known, determined by the market and does not respect enormously high production costs, some manufacturers. This orientation in production to market requires of manufacturers to focus on reducing all costs to achieve the greatest possible profit. Be pleased customer, is key to managing costs.

Effectively designing and implementing of strategies prices requires knowledge of consumer psychology. Small and medium enterprises (SMEs) need to develop and nurture direct relationship with customers and partners, which will result in creating value for clients for which the enterprises exists and of which gets revenue. To permanently survive enterprises in the market should be realize short-term goal (profitability) and long-term goal (customer loyalty), integrated effort, knowledge and experience professional team from marketing, accounting and finance.

## **Keywords**

(costs, price, profit, SMEs, strategies)

## **1. Introduction**

Small and medium enterprises in Serbia should take adequate pricing policy which is a function of maximizing business results. The main problem of price policy is reduced to finding those prices for products and services enterprise that will, in conjunction with volume of the production and sales, with an assortment and costs provide the most favorable result for the planning period. Manage modern enterprise is a complex process. Management of the enterprises should choose the most favorable strategic direction of the enterprise, i.e. Strategy that will create a sustainable competitive advantage of enterprise in the market and its superior performance. For these reasons, the subject of this paper is devoted that.

Proceeding from the purpose of paper ie. of the displaying the essence of pricing strategies which enterprises in Serbia should be used in order to achieve competitive advantage in the areas of quality, price, terms and special services, goals of the paper are: 1. emphasize the role of costs and their

calculation in terms of price policy, 2. explain price formation based on demand and competition, 3. underscore the importance of the target pricing and calculating based of the target cost and 4. present the different strategies adaptation of prices.

The paper briefly is presented the method of price formation based on cost, demand and competition. Also, are exposed the specifics of target pricing and the calculation based of target costs. The paper are presented strategies adaptation of price. At the end paper followed the conclusions and a list of references.

## 2. Price Formation Based on Costs

Management accounting must has a key role in deciding on prices, particularly when is the price based on costs. Pricing methods are based on accounting information, especially on information of the costs and outputs. The key goals of calculation of the cost are: 1. providing data for formation of the prices, 2. providing data for making the decision, 3. providing data for planning and control.

Costs of production and sales in most cases are the main factors in price formation of the products. However, many enterprises in Serbia make a mistake, because with every change in costs, they work audits of existing prices, which have caused declining of same enterprises. Cost-oriented methods take into account the costs of the product and ignore supply and demand of the products on the market, ignore the competition, and they assume that there is a market demand for the product regardless on its price. Good success in business will be provide with continuously monitoring of the costs and formatting of cost price, in order to adequately taken measures aimed at reducing and bringing them into compliance with the sales prices.

Some enterprises may decide that the goods or services sale for less than the cost of their production. This strategy if they are often applied would cause rapid deterioration of the enterprise. However, this strategy makes sense when [1]:

- there is a large amount of goods that has a short shelf life,
- when the goods or services are treated as a "product-bait", ie. product or service that is used to attract the attention of the buyer on a range of products or on a particular supplier.

The classical method calculations of costs are:

- system of calculation based on actual costs,
- system of calculation based on standard costs,
- system of calculation based on variable costs (direct costing).

Modern conditions of business have caused the inadequacy of applying traditional calculation of costs, because in modern enterprise direct costs of labor are continuously decrease in total costs. Modern systems the calculation of the cost are:

- activity-based costing,
- super-variable costing,
- deferred charges,
- costing operations.

When enterprises can not influence the level of prices, the business success can be increased by reducing costs. Therefore, costs are a significant factor in shaping of the price. On the basis of calculation and knowledge of cost price of products enterprises can develop different business strategies to improve their business results.

## 3. Price Formation Based on Demand and Competition

According to the economic model of formation prices, demand and supply are basic factors the prices. Before deciding on prices, the enterprise needs to collect information on demand for its products. In a market economy, low demand is a limiting factor for increasing the price of the product. Also, the lack supply of a product results in the higher prices. For example: the price of strawberries in Serbia in the summer months, (when the strawberries are grown in Serbia and they are available in large quantities) tends to be lower than in the winter months, when the offer is lower, because strawberries are available only through imports.

Demand-oriented approach, looks at consumer tastes and preferences. There are the following pricing strategies [2]:

- Sliding prices – starting with a relatively high price, when meet the needs of the market which it is ready to pay, then are reduced level of the price to a lower level of customers;
- Breakdown rates – new low cost products to help you quickly won a broader market;
- Prestigious prices – prices that represent a measure of quality or prestige of the product;  
Line rates – use companies that sell not one, but the product line (eg, pants) and for a particular line have a specific price;
- Equally odd prices – e.g. 199.90 RSD instead of 200.00 RSD, this creates a picture in customers head that will pay slightly more than 100.00 RSD, therefore not less than 200.00 RSD;
- Formed back prices – the starting point is the price that the buyer is actually willing to pay and go to backwards, subtracting the margin in the chain of sales;
- Common (packed) prices – the prices of two or more products that are sold under one price package.

The competition is a framework from which prices should not deviate significantly. The competitive approach is an approach that emphasizes what on the market the competition works. Here we highlight:

- Normal price – used for products where the competitive factors dictate the price;
- Higher, the same or lower market price – for some products is difficult to determine market price, so choose one of these three strategies;
- Cost to repair the reputation – to be draw attention to vendors are made promotional cuts of the price.

According to the Law on prices the Government of the Republic of Serbia in terms of free education price, measures of economic policy provide stability of market and prices, and prevent distortion of competition [3]. This law regulates the manner and conditions of education cost of products and services, monitoring movements of prices, activities of state bodies in the exercise of macroeconomic policies on price and other issues of importance for the field price. Price in terms of the law is a monetary value per unit of product or service that has been formed in accordance with market conditions and in accordance with special regulations. The enterprise can not be under the same conditions and at different prices to sell the same type of product or provide the same type of service, unless a special regulation provides otherwise.

## 4. Target Formation of Price and Calculation Based on Target Costing

Target price is the price of a product which is customer is willing to pay. It is determined by a review of the market (price survey of related products, preferences of consumer and of relative levels of elasticity price), and not based on costs. So, do not determine the cost level of prices, but selling price is determined by market - determined allowable costs. In this method of cost starting point are always the possibility and the requirements of customers. The process of establishing the target cost, the new products have their origin in long-term profit and sales plans, which are defined in the enterprise for a period of five years [4].

Selling price of products or services is determined by demand, competition, supply and economic policy of the state. Therefore, the sale price determined by the market, not cost the enterprise. By research and market analysis are obtain informations about the price that customers (buyers) are willing to pay for quality products they expect. The target selling price is usually a combination of equivalent sales price of existing products and incremental costs, due to the enhanced functionality of the new model [5]. Many Japanese companies use an incremental approach in pricing formation new products, which include compliance with current prices and the value that customers assign any additional product features. Incremental increase in price must be viewed in terms of competitive bids. Target profit margin of products is determined based on previous experience with similar models of products, the company's expectations regarding future profits and assess the competitive power supply.

Subtracting from the target price desired profit margin leads to the amount of target costs or of maximum amount expenses that the enterprise can have in producing a product or service (Target

selling price (selling price per unit of product X target volume of production) - Target profit = Target costs). If it appears that the sum is too low to cover all related costs, the enterprise needs to reduce those costs, so you can achieve the target price. This can include:

- introduction of the program for general reduction of costs,
- investment to would be provided additional production efficiency,
- compromises in the quality of raw materials,
- planning of additional volume production to thereby reducing the costs per unit products (for example, discounts for buying large quantities).

Because of planning measures for reduce costs need is compare the actual cost and market-determined allowable costs. The difference between current (actual) costs and of market-determined allowable costs is subject to reduction. The aim is to predict the final cost which is moving within the range of the target cost. If this is not possible need is stop the product development process, because it will not be able to be sell at target price and enterprises will not make target profit.

The essence of the concept of cost management is that the selling price (cost + profit) is viewed as a constant, as immutable, which is determined by market factors. It is the industrial way of thinking which was developed in Japan, the only cost reduction can provide a profit. Because the proceeds of the sale price given the market, does not mistakes in product design, and it aims to achieve lower purchase prices, but not at the expense of suppliers, but are trying reducing price of components of the products by the continuous improvement of internal processes, with constant maintaining the functionality and performance of products (use and implementation of TQM, JIT and introducing of flexible manufacturing systems). Calculation of target costing - TC is used in [6]:

- developing and improving products,
- planning products and services,
- planning the profit and the involvement of employees in profit,
- improving products by reducing costs.

As part of the calculation of target costs is value engineering, which is based on the detection of alternative design solutions that will increase the value of the product in the eyes of the customer, while keeping their costs at the target level. Process of functional analysis, which is an integral part of value engineering, aims to define a set of functions that will allow the creation of the required characteristics of the product and satisfaction of customers requirements (the value of individual functionality of the product = functionality/cost). The following hypothetical example illustrates the calculation of market - determined allowable direct costs.

For example: The enterprise "X" makes room furniture which consisting of four components. Market research showed that customers rated furniture based on four characteristics:

- comfort 50%,
- nice design 25%,
- low maintenance 15%,
- security 10%.

The customers are willing to the furniture that meets their requirements salary: 50,000.00 RSD with VAT and net 41,000.00 RSD. The enterprise expects profit of 8,000.00 RSD per furniture. The direct costs of the furniture are:

A1 - sponge	17,000.00 RSD,
A2 - pillows	5,000.00 RSD,
A3 - upholstery	15,000.00 RSD,
<u>A4 - wheels</u>	<u>1,000.00 RSD.</u>
	38,000.00 RSD.

The overall costs per unit are 2,000.00 RSD.

**Table 1** Market-potential costs per product (in RSD).

ELEMENTS	AMOUNT
1. market price (net)	41,000.00
2. expected (desired) profit	8,000.00
3. market - determined allowable costs	33,000.00
4. overhead costs	2,000.00
5. market - determined allowable direct costs	31,000.00
6. direct costs	38,000.00
7. difference of costs (5-6)	7,000.00

**Table 2** Importance of individual components of the product.

Essential characteristics of the product	Rating of the characteristics per components of the product				Requests of the customers (%)	Weighted importance of characteristics of the product			
	A1	A2	A3	A4		A1	A2	A3	A4
1	2	3	4	5	6	7 (2x6)	8 (3x6)	9 (4x6)	10 (5X6)
comfort	60	20	15	5	50	0.3	0.1	0.075	0.025
nice design	30	30	20	20	25	0.075	0.075	0.05	0.05
low maintenance	30	15	40	15	15	0.045	0.0225	0.06	0.0225
security	20	25	25	30	10	0.02	0.025	0.025	0.03
TOTAL:					100	0.44	0.2225	0.21	0.1275

Table 2 was formed on the basis of an assessment team of the enterprise and customers' demands. The rating of the team in terms of influence of each component of the product on the properties of products and the rating of the customers gives weighted importance of each component that is used to determine of target costs per components.

**Table 3** Targeting costs per components (in RSD).

Components of the product	Direct costs of the production	Participation of components certain based on properties	Target cost of making components	Reduction of direct costs of the production
1	2	3	4 (3)	5 (4-2)
A1	17,000.00	31,000.00 X 0.44	13,640.00	- 3,360.00
A2	5,000.00	31,000.00 X 0.2225	6,897.50	1,897.50
A3	15,000.00	31,000.00 X 0.21	6,510.00	- 8,490.00
A4	1,000.00	31,000.00 X 0.1275	3,952.50	2,952.50
TOTAL:	38,000.00	31,000.00 X 1.00	31,000.00	- 7,000.00

The strategy of confrontation is a response to all competition that was created not only intense pressure to reduce product costs in all phases of its value chain, but also to increase the quality, functionality, products etc. [7]. Thus, a key role in formulating the strategy of confrontation enterprises has three strategic components and features of the product [8]: 1. Price/cost, 2. Quality and 3. Functionality. The strategy of individual product marks the customers who are willing to accept a product on price, quality, and functionality. The essence of the confrontation strategy rests on the ability of enterprises to develop one of the three characteristics of the product.

The competitive positioning of the enterprise through cost leadership or differentiation is aided by the inclusion of cost calculation in the process of designing a strategy of individual products. By selection of appropriate strategies to individual products are tend accomplish the goals that will enable to the enterprise meet market requirements and the achievement of expected profits.

Practice has shown that for successful competitive bidding is no longer enough to have low costs, but it is necessary to find ways for continually improving the quality and functionality of products. Competitive advantage in the industry and achieving above-average earnings is achieved by the successful combination of generic strategies of low cost and by strategy of the differentiation [9].

The strategy of low-cost requires the lowering of prices relative to competitors. The difference in sale price, with growth in sales volume, resulting in above-average profits. The strategy of the differentiation requires that the enterprise produces unique high-quality products that exceed identity of the brand, and have higher prices. Using strategies of the differentiation the enterprise can achieve above average profits through higher sales prices that include the costs of achieving quality at which are the products differ from other products.

## 5. Strategies Adaptation of Prices

To set up and implement good price strategy should be more knowledge, research, and power and energy expert team in marketing, accounting and finance. It is a key lever in determining whether an enterprise will to develop or not. Enterprises can apply different strategies adaptation of the price [10]:

1. Geographical price,
2. Discounts and benefits,
3. Promotional price and
4. Differentiation of the price.

When the enterprise applies geographical formation of the price, it needs to decide how to charge for their products to different customers from different locations or from different countries. Many enterprises will granted discounts and bonuses if the payment is done immediately, if there is a big quantity or off-season shopping. The enterprise will grant discounts on the sale price to reward loyal (profitable) customers and to ensure an early payment for goods or services which are sold on credit. Facilitation as well as discounts are the benefits that to give the customer to perform specific activity. Some techniques of promotional prices that are functional to stimulate sales are:

- Pricing to attract customers – supermarkets and department stores often reduce the prices of well known brands in order to stimulate more traffic and additional sales. The leader of the price is aware reduced of price of the product that is well known to customers;
- Pricing for special occasions – for example, sale of school supplies before the start of school year;
- Cash rebates – car manufacturers and consumer goods often offer cash rebates to encourage the purchase of their products in a given period;
- Crediting with low interest – to attract customers, carmakers offer interest-free loans;
- Longer terms of payment – sellers, especially banks and mortgage enterprise involved in selling a car, extend loans for long periods and thus reduce the monthly payments;

There are several ways of forming discriminatory prices:

- Customer as a base – not all customers the same treatment;
- Product as a base – selling the products at much higher prices than the cost of production;
- Place as a base – different prices for customers who are located in different geographical locations;
- Time as the base – when it comes to seasonal products, or before expiration date.

Thanks to studies which are related to consumer behavior, management of the enterprise is able to analyze how formation prices affect on consumers' willingness to buy, or on the satisfaction which it derived by the purchase. With good horizontal and vertical segmentation of customers, the placement of the benefits of the product, and a good analysis of the first available alternatives, it is possible with high confidence to set the right price of the product and based on that allow maximization of the profit and allow further development and growth of enterprises.

## 6. Conclusions

In the transition period, when begins establishment all more small and medium enterprises, the problem of selecting the optimal strategy in function achievements more adequate competitive position in the market, gains in importance. Strategic decisions – how to determine prices will be reflected in the success of the enterprise and its performance. The enterprises should be oriented towards holistic marketing, i.e. integration of research value, creation of the value and delivery of bonds, with the aim of building long-term, mutually satisfactory relationship between the key stakeholders. Properly set price policy and price strategy allows the enterprise to: 1. reflect the value which is offered to customers compared to competitors, 2. consider what the market actually paid, 3. reaches a certain level of revenue and market share, 4. maximize the profits.

Knowledge of costs is necessary for profitability, but it should not be a decisive factor that will influence on price setting and pricing strategies which specific enterprise adopted for their business. In contemporary conditions, efficient formation of the price should be mainly based on the value for the customer, not based on the cost or on the competition. The method formation of the price by goals means that the enterprise identify marketing goals and establish the price of products to meet the needs of the target market.

The enterprises generally do not determine a single price, but the fact the structural price that reflects: variations in geographical demand and costs, requirements of market segments, the time of purchase, etc.. On available to them is a few strategies of adaptation of the prices: 1. geographical price, 2. discounts and benefits, 3. promotional prices and 4. discrimination of the prices. The efficiency of sales staff and the entire marketing of the team, is reflected in the sales volume of each market segment as well as in relevant business results and profit of the enterprises.

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# How candidates for employment prepare themselves for the job interview

Analysis of the process of preparation of candidate for the job interview in Macedonian companies

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Management of human resources is a strategic and coherent approach to managing the most important factor in the organization – the people, those who individually and collectively contribute to achieving organizational goals. Human resources management covers the recruitment, selection, training, developing, rewarding, compensating, and motivating the workforce, and must reflect clearly the organization's strategy regarding people, profit, and overall effectiveness. One of the main aim of human resource management is to ensure and obtain at minimum cost the number and the quality of the employees required to satisfy the human resource needs of the organization, which is accomplished through selection and interviews of candidates for employment. Historically, the interview is one of the most commonly used and most liked selection tool [17]. According to [18] job interview right after the candidate application is commonly used way to evaluate applicants. According to the analysis of [22] in the business organizations, the decision on employment usually is made based on job interviews.

The presented survey will be concerning the preparation for interviews of candidates for employment in Macedonian companies, the level of formal training that candidates attend to prepare for interview, as well as the conduct of interviews analyzed in terms of candidates, and impact of innovation in the area of HR.

## Keywords

Human resources management, job interview, structured interviews, skills, training,

## 1. Introduction

Interviews are usually used as one of the tools and methods of selection / recruitment that help making organizational decisions. Because they are flexible, interviews can be used for accomplishing several goals, such as selection of candidates for employment, introduction, and rejection of unsuitable candidates and so on. Increasing the structure of the interview can help managers in achieving their goals or employment selection by minimizing the external influences on the interviewer's and candidate's decisions. By structuring the interviews a standardization of procedures is introduced and minimized certain differences in objective appraisal of candidates for employment. Well-structuring of the interviews, that balance the need for standardization with the need for discretion of the interviewer and the applicant, can ensure that, both organizations and applicants, have pulled out the maximum of the process.

## 2. Theoretical perspectives

Structuring an interview results in outcomes or scores that are indicative of how the candidate will actually perform on the job [10] [16]. In addition, structured interviews tend to result in very low adverse impact [19]. In particular, there are minor differences in interview results than in the use of many other selection methods [23] [24].

The disadvantages of structured interviews is that they are sometimes less popular with candidates [26]. This might be because structured interviews limit free-flowing conversation and with it the possibility for candidates to steer the interview in a particular direction. Interviewers can reduce candidates' negative reactions about structured interview explaining and expressing support for the method. Moreover, structured questions do not preclude establishing rapport with candidates and expressing friendship, which also are important for the success of the interview.

Two types of highly structured interviews have become increasingly popular as ways of eliciting examples of behavior related to a job or job competency [25] [27] [28].

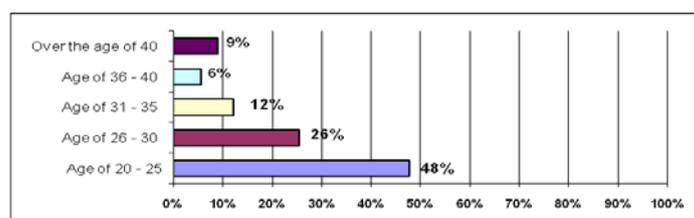
These interviews differ based on the type of questions asked: Situational interview questions ask an applicant to describe what he or she would do in a hypothetical situation. For example, "Imagine you were in a situation where your team was under significant time pressure to complete a project. How would you handle that situation?", or Tell us about a suggestion you will made to improve the way job processes/operations worked. What will be the result? to see the potential of the candidate regarding innovation. Behavior-based interview questions ask applicants what they did in a specific situation. For example, "Think of a situation where you had to lead a team in a company, or when you implement some innovation in your organization. Describe the situation, your actions, and the results of your actions." Much debate has ensued regarding the merits of these two approaches. Research results have been mixed, with both types shown to be related to later job performance. Some researchers indicate that situational interview questions are more appropriate for a broader audience because they do not require that individuals have extensive work experience [28]. Other research, however, tested this assumption and found this not to be the case. Instead, these researchers argued that the nature of behavior-based questions allows for applicants to apply all types of life experiences to the questions [29]. For example, the behavior-based question example that asked about leading a team could be answered by describing a work team, a sports team, or a school group. Research also suggests that individuals explaining past behavior are able to give considerably more information and detail, helping to provide the interviewer with additional insight. Some researchers have argued that situational interviews are less able than behavior-based interviews to address complex and high-level jobs. Situational questions must accurately represent potential situations that job applicants might face. The higher one is in an organization, or the more complex the job, the more difficult it is to develop situational questions that fully encompass all parts of that job. This means that while the interviewer may be able to differentiate between those applicants who might be poor performers and those who would be good performers; it will be significantly more difficult for the interviewer to differentiate between those who will be good and those who will be great. Behavior-based interview questions, on the other hand, allow applicants to choose their own examples, elaborate on what might be very complex considerations and actions, and then explain in detail the different ways their actions lead to results [25]. Behavior based interview questions assess typical performance—what happens day to day— and show an applicant's motivation to carry out the behaviors he or she thinks appropriate. Situational questions assess maximal performance, or what an applicant would do or consider the best option; they do not measure motivation to apply those skills or whether they are likely to actually perform the behaviors [30].

## 3. The methodology

The methodology in this study will be based on exact numerical, theoretical and experimental approaches. Using comparative analysis of the results will be given appropriate conclusions for guiding the selection process and the manner of conducting interviews for positions in Macedonian companies.

## 4. Findings

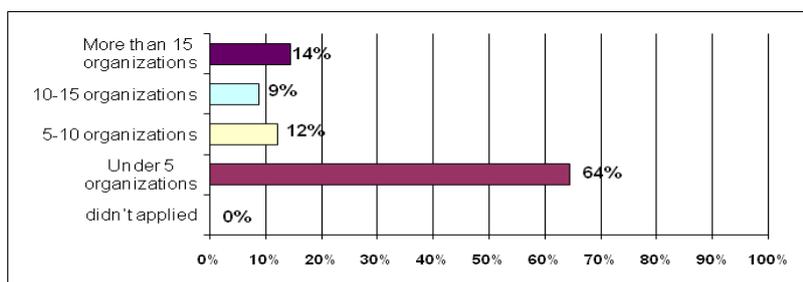
The survey used a questionnaire with 12 questions of which 2 are open questions. The questionnaire was designed to explore important elements in the process of preparing the applicants for employment. The research involved 124 participants, of which 90 participants were taken as relevant to the survey, which according to key criteria had at least one interview during one year. The participants in the survey, from the aspect of gender, were 63% women and 37% men, and their age breakdown is presented in Graph 1



**Figure 1** Demographic information

According to the educational structure, 14% had high school, 61% university degree, and 24% with postgraduate studies.

According to the number of interviews that have attended over the past years, participants in the survey stated that, most of them (64%) applied in the past year in 5 organizations, in 5 to 10 organizations applied 12% of respondents, 10-15 organizations 9% and over 15 organizations, 14% of respondents. (See Graph 2)

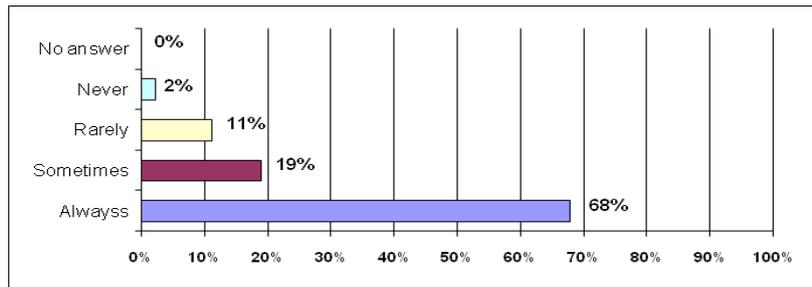


**Figure 2 Q:** Past year I've applied in... organizations

The survey results are statistically elaborated, and in this article will be commented and analyzed several issues that are most important for the analysis of the process of candidate's preparation for employment.

Asked, whether they have had any formal training to prepare for job interview, 91% of respondents said that they did not have attended, and only 9% expressed that they had some formal training.

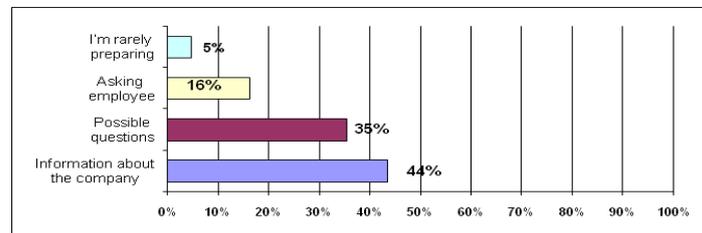
This may be one of the key data that informs about the degree of preparation of the candidates for employment in Macedonian companies, i.e. that formal knowledge and skills for appropriate performance of a job interview are not available to the applicants for employment. Generally, the applicants for employment are preparing based on personal perception and their own personal experience of the performance in the interview. On the question "Am I preparing myself before going on an interview?" Participants in the survey respondents as shown Graph 3



**Figure 3 Q: Am I preparing before going on interview**

In the research, 68% of the participants stated that they are always preparing, 19% sometimes, rarely 11% and never 2%, which confirms the relatively high commitment to preparation for performance at interview.

To analyze the method of preparation of the candidates and what they consider as most important in the process, the following question is constructed, and participants expressed themselves as shown in Graph 4.



**Figure 4 Q: When I'm, going on an interview I'm preparing for**

Most parts of these 44% are preparing data for the company, 35% are preparing for possible questions and 18% of the participants are interested in getting information through their familiar, some of them are asking already employed whether they are satisfied with the company and 6% are rarely preparing.

This analysis leads to the conclusion that most of the candidates are preparing information regarding the organization they are applying to, and less on possible questions and how to respond to them, although it is expected the opposite.

The reason for this method of preparation may lie in the conclusions the way that employers organize and run the interview, i.e. that in the interviews dominated questions refer to the company/organization or its products and services and less questions which are related to the job, the necessary competencies of the candidates, and the candidates behaviour corresponding to the position.

The second possible reason is that candidates have no formal training how effectively to prepare for interviews and adequate direction they should be focused i.e. on which types of questions they should give an appropriate response.

According to [1] there are 3 basic questions that need to be answered at this stage for the selection interviews for employment:

What are the criteria to be used in selecting candidates - they can be classified as essential or desirable and will refer to the experience, qualifications, competencies and skills as set out in the person specification.

What more do I need to find out during the interview, to ensure that the candidate meets the essential selective criteria?

What other information should be obtained during the interview to ensure the interviewer have an accurate picture of how well the candidate meets the criteria?

The problem with interviews is that they are often inadequate as predictors of performance of the candidates, and during the interview, the interviewer may not cover the basic points unless it is not carefully planned. This is not just a result of many interviewers using inadequate interviewing techniques (such as: they talk rather than listen), but it is often a result of inadequate analysis of the competencies required and as a result, examiners do not know what information need to obtain from the candidates as a basis for structuring the interview.

There are several methods of conducting an interview. Worst is the case when the interview is completely unstructured, which includes random questions that are not based on any understanding of what they are looking for. At best they are clearly structured and related to a thorough analysis of role requirements in terms of skills and competencies.

The content of the interviews may be different. Different interviewers ask different questions, focus on different areas of knowledge and experience of the candidates and trying to evaluate different characteristics. According to [37] as a measure for the structure, the interview should be consistent, based on facts and used by everyone as common metrics for description of the degree of an interview structure.

A meta analysis of interviews showed that unstructured interviews place the emphasis on the candidate's background, his personality, physical characteristics and general mental abilities, while structured interviews the context of the questions for all applicants refer to the mental skills, knowledge related to the job, practical social skills and the degree of integration of the candidates in the organization [25].

In the survey it is also important to note that the question "When I'm going to an interview I'm usually preparing for", 11% of respondents said that they talk to their relatives working in the company they are applying, about their satisfaction with the company, i.e. Are the companies that publish vacancies attractive for them as candidates for employment?

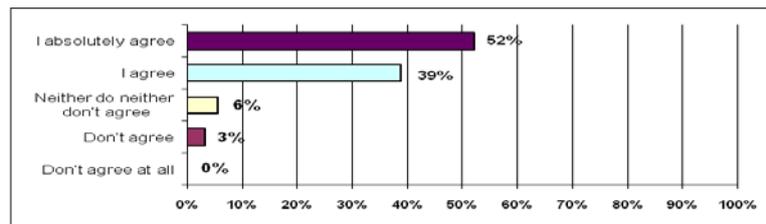
This is another confirmation of previously made similar studies, that during the interviews despite asking questions to assess candidates, interviewers should pay attention on how they represent the company and is the company interesting and attractive to the applicants.

Just as managers are interested in applicants that fit their organizations, applicants generally seek organizations that provide a good fit with their interests and needs [36]. Applicants generally are interested in many of the same criteria: the type of job, location, salary level, training opportunities. However, the type of information they want and how these criteria will affect their decision process are the same for all candidates. Accordingly, interviewers can structure interviews to help applicants make good decisions by taking in consideration the important factors that influence their decision making and the context in which those decisions would be made. This form of interview structure has several benefits. First, rather than providing a standard "speech" about their organizations' positive attributes, interviewers can offer realistic information tailored to applicants' interests. This practice can help the organizations gain an advantage in attracting the interest of the applicants since other firms do not provide such individual approaches.

Interesting data were obtained from the analysis of the types of questions that candidates are using to prepare themselves for the interview. Most of them, 25% indicated that they generally prepare questions based on the position they are applying, 13% questions related to their weaknesses, and only 11% are preparing situational questions and 11% are preparing past behavior based questions. The percentage basically should be higher, considering the fact that the Situational questions and questions related to past behaviors are an integral part of a structured interview. The structure of an interview is an important means to enhance joint decision-making for the candidate and for the interviewer. In 1980, psychologists [14], [20], [11], [12], suggested that the interview could be improved by providing structure, particularly focusing on questions that will highlight the ability of interviewers to make good decisions in different situations. Industrial psychologist [21], suggests another strategy for structured interviews. It is better questions to be focused on past behavior of the candidates rather than on future hypothetical situations, i.e. Situation questions. A review of research in this part of the interviews shows that the biggest problem with a typical interview is a lack of consistency and structure. Regarding this issue there are some suggestions of certain authors suggesting strategies for structuring the interview, thereby indicating that interviewers should have a standard set of questions, to develop a system for scoring the responses of candidates, as well as using more interviews. All these methods help to improve the usefulness and objectivity of the employment interviews.

What is the reason for the low percentage of preparation of these 2 types of questions? Whether is the lack of orientation of the candidates and the low level of formal training or because of poor conducting of the interview by the employers i.e. of not practicing this kind of questions during the employment interviews? This certainly gives new opportunities for new researches in the area of the process of making interviews in the Macedonian companies.

In order to examine the need for formal training about the performance of candidates for employment, in the inquiry is set the question: "If in the formal education (high school or university) in the terms of subject matter is included a training course for presentation for interview, I think it will increase the willingness of the graduates to be more successful in the job search ..results are presented in Graph 5



**Figure 5 Q:** If in the formal education (high school or university) in the terms of subject matter is included a training course for presentation for interview, I think it will increase the willingness of the graduates to be more successful in the job search

On this question, 52% of respondent expressed that they absolutely agree, and 39% that agree within the formal education to be included training in skills for performance at the employment interview. The total amount of 91% confirmed the desire to upgrade these skills for better performance at the interview, which will naturally lead to their better self-presentation and leaving a better impression on job interview. A similar study conducted by [2] with laboratory study, based on candidates for employment, found that use of self-promotion (compared to other-focused) tactics was related to higher ratings, more job offers, and fewer rejections.

## 5. Conclusions and discussions

According to the obtained findings from this research about the level of preparation and how to prepare candidates for employment in Macedonian companies, we can conclude that there is a low level of formal training on interview skills of candidates for employment, i.e. only 9% expressed that have attended a formal training of this kind, on the other hand there is a high level that express the desire and need of the candidates for this type of training, i.e. 91% support this view. This opens the possibility of giving a recommendation to higher educational institutions for introduction into the curriculum appropriate chapters which will give adequate knowledge and skills to prospective graduates on how to prepare and be successful in the job search process, through self presentation and appearance at job interviews.

## 6. Guide for future analysis

According to the results of the research and consideration for the relatively low level of preparation of candidates for employment on Situational questions and questions related to previous behavior, opens up new possibilities for future research in this area, the level of application of structured interviews to Macedonian companies, and the degree of formal training of those who run these job interview. Research in this area confirms that for increased validity of job interviews, one of the criteria is a formal training for proper conducting an interview. Training is probably the most common way to improve interviews [35]. Untrained interviewers are significantly coarser in their assessments, rather than trained in the evaluation of candidates [33]. Thus, training can help in the reliability of the interviewers' judgment and the consistency in different contexts. Researchers have indicated that formal interviewer training enables interviewers to evaluate candidates more effectively (e.g., [31] [32]) and to develop the recruiting function of the interview [34]. Training is an important element of structure in that it increases the likelihood of using other elements of interview structure.

On the other hand the results of these surveys will be used also for providing appropriate recommendations for improving the process of recruitment and selection in Macedonian companies. Practical research in this direction as well as their analysis will show how and to what extent in the Macedonian companies are applied the tools for conducting the interviews and what type of interviews prefer the managers, whether and to what extent are using auxiliary instruments, psychological tests and other information for additional analysis of the candidates, whether managers are formally trained for conducting the interviews. Managers, human resource administrators, employment counsellors and others should strive for continuous improvement in the entire recruitment process, with particular attention to the interview. Continuous improvement will help to insure proper selection decisions in the Macedonian companies. This effort should help decrease turnover rates, increase productivity, improve employee morale, lower grievances and other employee complaints and in general lead to a more stable organization.

According to the survey conducted in 2010 for Macedonia [38], the key recommendations are considered in relation to the recognized weaknesses of the Macedonian companies. One of the recommendations is "inspiring life long learning in the companies", so the training in human resources in the companies for development of skills for conducting job interviews, will contribute to choosing the right candidate or the position, through implementing innovations in segment of HR in order to improve the competitiveness, development and the profitability of the Macedonian companies.

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# The Incitement of Entrepreneurial Behaviour of Young People in The Republic of Serbia

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**In this paper, the authors analyse the necessity of applying the contemporary concept of entrepreneurship in the Serbian market, with a special emphasis on the role of young people and the possibilities of engaging them in entrepreneurial activities. According to the experience of developed countries, the young people who first start their own business represent an important category for developing an entrepreneurship climate on the national economy level. Serbia still does not have a favourable enough ambiances in which young people can be inspired to start up their own business. As a possible solution emerges the encouragement and education of the young to start and run their own business. Encouraging entrepreneurial behaviour among the young is especially important in countries in transition, which are facing transitory recession.**

## **Keywords**

Competitiveness, Entrepreneurship, Knowledge, SMEs, Young entrepreneurs.

## **1. Introduction**

The changes in modern business caused by global economic crisis have influenced companies to change their business philosophy. In other words, companies are forced to accept the model of entrepreneurial behaviour that implies more initiative in the field of innovations and flexibility. Ever-increasing number of companies, different in size, financial capacity and ownership, apply the bases of entrepreneurial behaviour. According to experiences of developed countries the young who start business for the first time represent a significant category for developing entrepreneurial climate on national economy level. Young entrepreneurs in European Union have significant incitements through supporting programs that influence the building of their self-confidence at starting their own business.

## **2. New models of entrepreneurship development**

Entrepreneurship represents continual creative process whose basic objective is implementing innovations in organizations in the function of successful business performance and solving the problems of customers and the society. Successful business in the 21st century will depend on company's relations towards increasing the need for knowledge and implementation of the newest technological achievements in management as well as its capacity to transfer information towards the target groups of customers in the fastest, most understandable and efficient way.

Modern organization must base its business on entrepreneurship concept of behaviour that incites strategic approach grounded on accepting differences, creativity, innovations and responsibility of every individual in the organization. The stress is, here, put on innovations because of the fact that our society is based on knowledge. Companies must apply entrepreneurship concept consciously and organizationally and they should behave „entrepreneurship“ as well as apply innovations constantly. In order to achieve these objectives companies must create an appropriate organizational structure that

allows their employees to behave in entrepreneurial way. Moreover, companies must establish such systems of relations that will enable focusing on such a behaviour.

Entrepreneurial behaviour in modern organization is not related to individuals and their abilities and experience but is mostly based on team work. Therefore, it is developed a model of corporative entrepreneurship that incites team work whose members are motivated to work on achieving success and accepting differences. Big companies should incite entrepreneurship in order to overcome the problems they face while they learn how to work with partners and allies. Big companies make a unit in their organizational structure which behaves completely differently from the rest of the company.

Drucker thinks that every big company should be able to do three important things simultaneously – to improve, to expand, to innovate. He emphasizes that he still doesn't know such a company but that there are numerous companies which are working on that. [1, p. 82].

Majority of economically developed countries are characteristic for the following principles according to which the labour market functions, especially considering the young and their employment :

- unemployment of the young is greater than unemployment of adults and the rates are, at least, doubled;
- increasing the extent of formal education of the young is becoming more significant and this trend will be continued;
- young people are scared of getting married because of the problems related to social security, so they decide to get married later;
- participation of women in employment is becoming more and more significant;
- labour market programs for the young generally have a small rate of return [2, p. 1].

State administrations of developed countries are trying to find out new solutions for employment of the young and the stress is on creating entrepreneurial abilities of young people. Self-employment represents an option for individuals to define their own model of business and development. Governments of developed countries consider self-employment a measure that enables solution of the problems of poverty and employment of the young , so it helps in small business development. Confirmation of this activity is usually based on a great number of potential benefits, among which the following are outstanding:

- entrepreneurship promotes innovations and creation of new work places,
- entrepreneurship and their own business start-up have a direct influence on employment increase on the grounds of creating new work places at present or in near future,
- new small enterprises increase the extent of competitiveness on the level of national economy which makes benefits to customers,
- young entrepreneurs can respond to market requirements flexibly, especially from the standpoint of applying new technologies and following market trends,
- larger extent of self-employment of the young causes self- confidence improvement, as well as social welfare. [2, p. 5].

### **3. Conditions for incitement of entrepreneurship in Republic of Serbia**

Completion of transitional process, in other words, the change in economical society structure – privatization, market economy, liberalization of economic relations with foreign countries, etc., represent a basic precondition of successful international economic flows. Transitional process should enable economic entities from transitional countries for independent market performance, sound competition and making business on international market. Strengthening the private sector and its future development are of essential importance for successful transformation of the economy from planning towards the market one. Development of SMEs sector is significant for privatization because it enables accelerating privatization – SME represents autochthonous private sector and makes possible development of domestic private capital [3].

Development of SME sector is one of essential priorities of domestic economy. Serbian Government has adopted Development Strategy of Competitiveness and Innovations of SMEs for 2008-2013. This strategy should contribute to further strengthening and efficient use of developing potentials of SME sector which will make benefits to economic growth of Republic of Serbia. Such direction should contribute to increasing competitiveness and export, further strengthening the innovation capacities of companies, dynamic employment growth and more equal regional development.

In Republic of Serbia, SMEs participate in the total number of enterprises with 99.8%, with 65.5% in employment, with 67.6% in turnover, and with about 36% in GNP. In the total export SMEs participate

with 50.2%, in import with 64% and with 51.2% in investments in non-financial sector. Micro enterprises are dominating in SMEs sector with participation of 95.6% in the total number and nearly 50% of all employed work in this sector [4, p. 5].

According to the last year's data, in Republic of Serbia, about 40,000 small entrepreneurs closed their business – 3,455 economic societies and 34,909 entrepreneurs' shops. The reasons for such a decline entrepreneurs see in numerous state loads, slow collection of receivables, lack of favourable loans and high interest rates. According to National Agency for Regional Development, the main problem for entrepreneurs represents lack of available monetary resources and then administrative barriers. It often happens in practice that domestic entrepreneurs have liquidity problems so they are not able to collect debts, but the state forces them to pay their receivables in preconceived terms. These problems cause their indebtedness towards banks which later leads to their bankruptcy.

A great problem for Republic of Serbia represents the number of closed medium-size companies as well as those in bankruptcy. The most worrying fact is the loss of work places – when only one medium-size company is closed about 50 to 250 people lose their jobs and new openings are rare.

The owners of SMEs were polled by National Agency for Regional Development and they cited, as a priority problem, the lack of financial means and then administrative barriers, insufficient number of qualified workers, disharmony in standards, lack of market information, little information on technology. Serbian Government is trying to solve all those problems that interfere with basic pillars of development policy of SMEs. One of priority tasks is the so called guillotine of regulations, which means that by simplifying procedures as well as eliminating unnecessary ones it is possible to save about 120 million euros per year. In other words, according to some estimations, our economy loses at least 180 million euros per year because of complicated and unnecessary procedures. However, there has been a delay in realization of this program (only 10 out of 250 proposed regulations have been solved completely or partially) because of unreadiness of state administration to approach this problem in serious and reasonable way. What is new in this field is that companies have been obliged to submit final accounts only at one place since 2010.

Ministry for Economy and Regional Development in cooperation with Serbia Investment and Export Promotion Agency (SIEPA) has taken part for years as a major partner in the Project Support to Enterprise Competitiveness and Export Promotion (SECEP). This project is financed by EU as a part of technical support to Serbia. A consisting part of the program is Development of local suppliers chain which enables domestic small and medium companies to become parts of multinational companies. One of the main barriers is lack of required quality standards which SMEs do not possess. It often happens in practice that suppliers are not able to fulfil severe criteria which multinationals propose. Ministry for Economy and Regional Development via National Agency for Regional Development offers entrepreneurs a wide range of support, both financial and non-financial, trade fair promotions and supporting entrepreneurial projects. Moreover, on the site of this Agency there is an entrepreneurial portal which gives a lot of information to present and future entrepreneurs. The newest project of Ministry for Economy and Regional Development is a cooperation protocol within the project „Establishing partnership for life-long training of entrepreneurs in Serbia“ started by European Training Fund (ETF). Protocol parties are 11 institutions (project partners) whose aim is a common work on creating Strategy and plan of activities for life-long training of entrepreneurs and taking care about measures that every organization should carry out in order to implement the strategy successfully. Institutions included in this project are: Ministry for Economy and Regional Development, Ministry of Education, Ministry of Youth and Sports, Institute for Improvement of Education, National Employment Office, National Agency for Regional Development, Conference of Serbian Universities, Serbian Employers Union, Belgrade Open School, Civil Initiatives and Serbian Chamber of Commerce.

Serbian Government adopted a Program for lending favourable start-up loans, within the support, to those who want to start-up their own business. The planned amount for start-up loans is 2.2 billion RSD. During the period 2007 to 2009 through the contest organized by Ministry for Economy and Regional Development, National Employment Office and Development Fund 6,625 new enterprises were established and 21,121 workers employed which justified financing this program. In addition, through Development Fund, entrepreneurs could apply for start-up loans in amounts from 500 thousand to 1.3 million RSD with interest rate of 2.5% per year and repayment from 3 to 5 years with grace period of one year.

However, according to data provided by National Employment Office, in December 2010, 729,520 unemployed people were registered, which represents a decline of 852 people in comparison to December 2009.

Majority of registered unemployed people are at the age from 25 to 29 years (13.29%), then those from 30 to 34 years (12.46%), from 35 to 39 years (12.03%), from 45 to 49 (11.85%), from 50 to 54 (11.79%) and those from 40 to 44 years old (11.63%) [5]. These data show that financial means

offered by Serbian Government are not sufficient to include all those who need them. This is especially important to young people who represent the most significant resource of the society. In order to incite employment of the young Italian Government donated 1.2 million euros to support solving this problem. Fund for open society as a part of NGO sector provided 570,000 dollars to help a group of 400 young people between 15 and 29 years of age from Bor, Raska, Branicevski and North Banat Districts.

Unfortunately, the young do not have enough business experience so domestic companies are not ready to employ them because they would need a lot of time for their practical professional training. For all these reasons Serbian Government decided to give financial grant to those companies which would employ a certain number of unemployed young people within the employment program „The first chance 2010“. Namely, this program is aimed to provide conditions to young, unemployed people to do three months voluntary practice in companies and afterwards to offer them a possibility to work 12 months as trainees. In order to incite professional training of the young, Serbian Government organized a contest for the program „The first chance 2010“.

Moreover, it should be emphasized that the state has been financially supporting the establishment of clusters and development of innovations in domestic economy for years and by doing this it contributes to improving competitiveness.

According to „Post-crisis model of economic growth and development of Serbia from 2011 to 2020“, one of direct measures of support represent loans; these loans are planned to be given to beginners from all sectors, as well as to beginners in targeted sectors (sectors of medium and high technological fields in industrial production). Unfortunately, these loans are not related to young entrepreneurs because the term „beginner“ is not age limited which increases the number of interested in these loans. However, this kind of support may be significant for young entrepreneurs only if the extent of realization is high.

#### **4. The opinions of young people about start-up business**

The research related to „The analysis of the youth's attitudes and opinions concerning start-up of their own business and applying social responsibility“ was carried out from November till December 2010 and it included 580 students oriented towards management. The research results point at the fact that the majority of students - 80.62% want to start their own business. On the other hand, most of them (29.43% i 20.38%) say that the main reasons why they still haven't started it are insufficient financial means, insecure political and economic situation in the country, which all implies that the state incitement measures are not sufficient to young people who would like to start-up their business. What is really worrying is the percentage of the young who still do not see Serbian market politically and economically secure.

The polled students are mostly (68.57%) oriented towards their own means in order to start-up their own business. The reason for such attitude is students' insufficient confidence in banks and other financial institutions which offer financial means for start-up business. However, it is interesting that the students (13.47%) stated associated funds as the second represented answer, which speaks about their developed consciousness and awareness of the importance of associating financial means. In this way, it is possible to make a considerable starting capital that will enable better perspective for young entrepreneurs. In addition, the polled students (54.17%) think that start up loans offered by commercial banks are not favorable. Namely, according to their opinion, start-up loans of commercial banks are overloaded by high interest rates (48.07%) and by a long process needed for obtaining the means (18.53%). The results collected in the research carried out in 2008 and 2009 showed that the students (53.74% and 54.03%) were not satisfied by conditions of start-up loans and they thought that the reasons were high interest rates (80.38% and 33.79%). The 2010 research showed that more than a half of the polled students (51.03%) were not informed about the existence of stimulating means for start-up business. However, even 53.98% of the polled students were interested in becoming the users of these means. Hence, the imperative seems to be permanent informing of young people via media, public presentations at faculties and colleges. In this way the young will be informed about the conditions for getting the loans. It is necessary to involve the following institutions in promoting activities: Serbian Chamber of Commerce, Belgrade Chamber of Commerce, National Bank, Association of Serbian Banks, National Agency for Regional Development, Ministry for Sports and Youth and similar whose aim is supporting youth's employment and their training for starting their own business.

The polled students said that they missed the following knowledge: the elements of entrepreneurship and small business (23.11%), foreign languages (21.60%) and the elements of finance and accounting

(21.45%). The first two categories are expected but it is positive that the students understand that foreign languages are also important for managing a company. In other words, the art of internal and external communication is of crucial importance for successful businessmen.

According to students' opinion (80.00%) there isn't any appropriate ambience for stimulating the young to start-up their business in Serbia. The students suggest the following barriers that are binding them: lack of financial means (32.26%), unstable political and economic situation (29.75%) and too high taxes (20.30%). In the research from 2009 and 2008 the students were not satisfied with (88.08% and 78.70%) the ambience for inciting the young for business start-up. The limiting factors are, in fact, the same as in the research from 2009 and 2008, only the order is different: unstable political and economic situation (29.92% and 36.54%), long and complicated registration procedure (21.62% and 13.75%), as well as too high taxes (35.52% and 10.02%). On the grounds of all collected results from these three researches it is obvious that the important precondition for improving SME sector is creating the right ambience that will stimulate making new and development of the present SMEs. However, three elements are necessary for creating an appropriate ambience: laws/regulations, institutions and associations of entrepreneurs. Therefore, consensus between the state and its institutions and associations is highly significant for creating such an ambience.

The majority of the polled, even 90.33% considers that the state should have the key role in stimulating the young for business start-up. They emphasize the following: favourable loans (28.70%), education (19.33%), laws/regulations related to young entrepreneurs (15.65%), promotion of the youth concept as entrepreneurs (13.22%), market regulation (12.22%) and development of new business centers and incubators (10.46%). The same opinions shared the polled students from the researches carried out in 2009 and 2008 (88.08% and 90.78%) which implies that the state has to be the driving force of entrepreneurship in Serbia. Supporting measures are the same, only priorities are different: promotion of the youth concept as entrepreneurs (25.38% and 26.86%), education (10.38% and 15.10%), market regulation (16.15% and 14.71%), favourable loans (23.08% and 13.14%), laws/regulations related to the young as entrepreneurs (14.42% and 11.76%). Serbian Government has adopted several strategies for development of SMEs and entrepreneurship and activity plans since 2000 but, unfortunately, it hasn't adopted any strategy for inciting young entrepreneurs. It would be hard to say that there is an appropriate ambience for inciting the young as entrepreneurs without such a document. In addition, there isn't any sector which deals with problems of young entrepreneurs within institutions whose activities are related to SMEs and entrepreneurship. In the economic study "Postcrisis model of economic growth and development of Serbia from 2011-2020" in the part which deals with employment estimation and labour market trends there isn't any estimation concerning employment of the young for the period from 2010 to 2020. This is certainly not a good message to potential young entrepreneurs.

Developed countries and EU as well, have special programs for stimulating the youth concept as entrepreneurs. The program assumes cooperation of several institutions and the result is practical competence of the young for managing companies. Our young people do not have such experience and efforts should be taken in improving this unfavourable situation.

## 5. Suggestions for inciting entrepreneurship of young people on the market of Republic of Serbia

Global economy should enable the regions to bring the wealth from the rest of the world in the future. In order to do this the regions have to be equipped with high educated and disciplined people led by visionary leader able to communicate with the rest of the world [6, p. 256]. Some of these regions are the island Hainan (South China, Province Guandong), Vancouver and British Columbia (Canada), Estonia, Ho Chi Minh City (Vietnam), Coastal and the Island Sakhalin (Russia), Sao Paulo (Brazil), Kjusiu (Japan).

American professor of Marketing of Indian origin, Mahajan, the author of the world bestseller „Solution for 86%“ says: “The state doesn't make business opportunities. Entrepreneurs are those who make them. Whatever the state does it must stimulate entrepreneurship. On this extremely competitive market it is important who has better idea, who knows how to realize it better. Entrepreneurship is not the monopoly of the French, Germans, Americans, Chinese or Indians. The region of the West Balkans is full of entrepreneurs. The problem is in the fact that West Balkan countries are small. They are faced with the challenge of the further growth. But, for the further growth they must have a global vision, they have to turn around and search their chances on the global level” [7].

Serbia has all preconditions to become one of similar regions in the near future if its businessmen change their business philosophy as soon as possible. Capital owners and executives should

establish new elements of competitiveness in domestic companies. It is necessary to overcome old-fashioned policy and techniques of management and to accept modern ones, as well as to learn from the experiences of global leaders and the companies from newly industrialized countries which are exceptionally successful on the global market.

According to some opinions [8], competitiveness, in long terms, cannot be increased by subventions to industry, favourable exchange rate, positive trade balance or low inflation rate. Competitiveness can be improved by increasing productivity. The role of the state is to make equal conditions for all competitors, to protect ideas, innovations, property, to help if it is in the interest of the whole group and not in the interest of any company, and to avoid determining the winners or losers in advance. The issues related to increasing productivity of domestic companies and making equal conditions for all are essential and long-term indicators for overcoming the crisis, especially transitional crisis.

Within the development process of entrepreneurial behaviour in Republic of Serbia it is necessary to improve the business ambience in several ways in order to make the job of the present and future entrepreneurs easier. The process includes the following elements:

- creating regulation framework for faster and easier process of work especially for young entrepreneurs,
- building strategy for development of entrepreneurial concept of the young,
- supporting loans for business start-up to young people,
- stimulating measures for implementation of QMS (individually and in groups), Integrated Management Systems whose aim is development of competitiveness of domestic SMEs,
- more active role of universities in helping entrepreneurs,
- start-up of business incubators and business centres,
- greater engagement of entrepreneur associations in promoting entrepreneurial concept of the young
- promoting entrepreneurial concept as a way for overcoming transitional problems during recession.

It is important to emphasize that the problems related to development of entrepreneurial behaviour should be treated by several interest groups, such as: the state and its institutions and ministries, universities, entrepreneurs associations, media who can give a positive contribution to creating an appropriate ambience for small business start-up.

As we have mentioned before, Serbian Government began improving the business ambience by accelerating slow procedures for registration of companies, giving more favourable start-up loans, professional training of unemployed, etc. What is crucial on the state level is making a strategy for development of entrepreneurial concept for young people that will include several parts: training, knowledge application in practice, institutions for young people and similar.

Training is especially important and a particular attention should be paid to it in primary and in secondary schools and later at universities and colleges. There are certain programs which are being applied in secondary schools but they are not followed sufficiently by appropriate measures of the state, economy and professional associations.

Practical application of the acquired knowledge from the field of entrepreneurship represents a separate segment of the training process and, here, the following institutions have the key role : Serbian Chamber of Commerce, Employers' Union, National Agency for Regional Development, universities, Ministry for the Youth and Sports, Ministry for Economy and Regional Development In this way young people are getting necessary experience which can be later applied in real life, in their own or in other companies.

Promotion of entrepreneurial concept for young people is a special issue which should involve numerous segments within a society such as: media, associations of entrepreneurs, ministries, universities, students' associations. In this way, young people should be given information about entrepreneurial concept, the importance of innovations for entrepreneurs, using certain tools for development and application of business ideas. EU programs may serve as good examples because they approach these problems with special attention.

Moreover, successful domestic entrepreneurs should give speeches at universities and colleges, sharing their experiences, talking about their beginnings, reasons for start-ups and the difficulties they had. In this way, they can incite young people to start their own business and uncover prejudices and stereotypes.

## 6. Conclusion

Interests for business start-ups are rising everywhere in the world. However, involving young people in entrepreneurial activities requires certain activities of the state and its institutions. The results of this research point at the fact that the state must have the key role in this field on domestic market through issuing certain documents whose aim is promotion of entrepreneurial concept of the young. The projects should involve universities, Serbian Chamber of Commerce and its regional chambers, National Agency for Regional Development, relevant Ministries, and associations of entrepreneurs in order to help those who are planning to start their own business.

Young people consider that the biggest problem in business start-up represents lack of financial resources. Financial support to domestic economy is insufficient and this is especially discouraging for those young people who want to start their own business. The state is trying to change this situation but commercial banks are still in favour of other ways of lending money under much better conditions. Institutions are necessary for creating successful ambience for inciting young people to start-up their business. However, the problem is when their activities are not synchronized and according to The World Economic Forum Serbian institutions are not efficient enough. Institutional cooperation is very important because, only in this way, it is possible to support young people to start their business completely.

However, the imperative in developing entrepreneurship of the young in Republic of Serbia must be creating secure political and economic situation. It represents a precondition and without it there is no normal entrepreneurship development in Republic of Serbia.

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# Copreneurship as Work-Life Balance Facilitator

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In the recent years the economic crisis hitting all the developed countries resulted in major changes in the economic structure and also resulted in major changes for the companies and private life, having an important input to state economy. Of course this could not avoid women's status at the labour system of the companies and the change of the relation with their private life. In this turbulent time copreneurship as the sharing of the ownership and management of a business between spouses might be seen as a facilitator of work-life balance. The main focus of this study is on the impacts of the European Union (EU) regulation on the work-life balance with a special emphasis on copreneurship as the work-life balance facilitator. Through a thorough analysis we disclose whether copreneurship has any encouraging influence on work-life balance with special regard to women's status at their companies or at economic performance in the EU. The principal goals of the study are to identify copreneurship and work-life balance and examine the correlation between these two concepts. The research results show how EU labour/gender regulation affects women and copreneurs status, level and quality of employment and private life at job contraction practice at the companies. On the basis of the research findings, we might be able to give advice that the growth of supporting regulations are increasing pressure on national and EU level policy decision makers. The study provides significant contributions to gender apportionment at the labour market and to employment effects of parenthood on men and women.

## Keywords

Copreneurship, Work-life balance, Employment impact, Gender distribution

## 1. Introduction

In the last decades the number of working women has significantly increased. Merely the fact that recent years' economic crisis is hitting all the developed countries resulted in major changes to the economic structure, companies and private life. Families in which both partners work full-time are facing new challenges as well. This primary alteration could not avoid women's status at the labour system of the companies and the change of the relation with their private life. By the consequences of the employment uncertainty, or short, unpaid maternity leaves, a vast number of women dare to step into private businesses alone or with their spouses. The main question that arises is how to achieve the balance between work and family responsibilities in this hard economic period and recession at the labour market. Besides working long hours, women also have to engage in domestic work and child care. Women have therefore to cope with multiple responsibilities both at work and at home at the same time.

As a challenging goal to achieve, work-life balance became a much discussed concept not only on the individual level and organizational level but also on EU level. Although many organizations have already been adopting policies that facilitate the balancing of work and private life, the area still needs to be improved and enriched with additional schemes and programs helpful for the process.

Copreneurship defined as couples sharing the ownership, management and responsibility for a business creates conditions in which women and copreneurs as a whole can balance their work with personal life in an easier way. By establishing a family firm it is possible to combine and merge work

and personal life. Therefore, copreneurship can be seen as a facilitator in the process of achieving work-life balance.

There are numerous bright and dark sides of entrepreneurial couples however in most cases the common decision of co-working is based on the family. Reasons can differ or even correspond why women decide by copreneurship. The fundamental argument is the flexibility that a mother desires to be able to take care of family or personal matters while she feels secured that her partner is looking after the business [1]. Other significant factors are that women in copreneurship have chance to live and work according to their values. Couples can frame their own mission and vision that might be left as a legacy for their children [1]. Through a thorough analysis we disclose whether copreneurship has any encouraging influence on work-life balance with special regard to women's status at their companies or at economic performance in the EU. The principal goals of the study are to identify copreneurship and work-life balance and examine the correlation between these two concepts. Through international legal acts the research results show how EU labour/gender regulation affects women and copreneurs status, level and quality of employment and private life at job contraction practice at the companies.

In the next sections the legal background of work-life balance is presented, the role of copreneurship in work-life balance is discussed and the conclusions are drawn.

## **2. Legal Background of Work-Life Balance**

All the same, both on the international and national level there are many fundamental legal backgrounds that are providing women's rights to foster work-life balance. The major point of work-life balance either for women or men is to diminish the gender gap with special regard to unequal treatment, payment between them. With less workplace conflict the motivation and effectiveness is growing that is ensuring the future success. Success at work can positively influence women where they can gain power to fulfil their private life duties.

Universal Declaration of Human Rights (1948), the United Nations Convention on the Elimination of All Forms of Discrimination Against Women (1979), the United Nations Convention on the Rights of the Child (1989), the Beijing Declaration and Platform for Action (1995), the International Labour Organization's Declaration on Equality of Opportunity and Treatment for Women Workers (1975), the International Labour Organization's Declaration on Fundamental Principles and Rights at Work and its Follow-up (1998), as well as the international labour Conventions and Recommendations aimed at ensuring equality of opportunity and treatment for men and women workers, in particular the Convention concerning Workers with Family Responsibilities (1981) [2]. All of the above mentioned declarations, conventions, regulations are serving the same purpose to create an effective equal and well balanced (work) environment for men and women with family responsibilities.

### **2.1 International Perspective**

In 2009 the International Labour Organisation's (ILO) annual report, the Global Employment Trends for Women (GET) 1/ (2009) already informed that the global job crisis is just deepening in consequence of the recession unfortunately with 22 million expected unemployed women. Next to this increasing unemployed numbers, the economic crisis caused many other difficulties to maintain a socially more sustainable work environment for women [3]. Due to this hurdles there is less option to be addressed the gender gap, hence this situation is again more disadvantageous for women then for men.

According to ILO vision on gender equality, there are four Conventions that are promoting opportunities for women. These are the ILO Convention No. 111, of the Discrimination -Employment and Occupation- (1985), Convention No. 100 of the Equal Remuneration Convention, (1951), Convention No. 156 of the Workers with Family Responsibilities Convention, (1981) and the Convention No. 183 about the Maternity Protection (2000), moreover the Part VIII of the Human Resources Development Recommendation (1975) [4].

Convention No. 156 of the Workers with Family Responsibilities Convention already in 1981 illuminates the need to change and emphasises the Convention No. 111 of the Discrimination »does not expressly cover distinctions made on the basis of family responsibilities, and considering that supplementary standards are necessary in this respect« [2].

Additionally this Convention has also stressed that in the fourteenth paragraph of the Preamble of the United Nations Convention on the Elimination of All Forms of Discrimination against Women (1979), to the effect that States Parties are » aware that a change in the traditional role of men as well as the role of women in society and in the family is needed to achieve full equality between men and

women«. [2] Next to this the Convention on the Elimination of All Forms of Discrimination against Women warns to recognise that the problem of workers with family responsibilities are appearances of more open issues regarding the family and society which should be taken into account in national policies [2]. That is why there is an emerge need to create efficient equality between men and women with family responsibilities.

Considering the latest recession and consequently the labour crisis, many of the problems facing all workers are exacerbated in the especially those, who have family responsibilities. Accordingly need rise to improve the conditions of workers in general, and for women workers with family responsibilities.

## **2.2 European View Point**

Further, the paper seeks for the European Union's legislation regarding to the women's status at the labour system. In 23-24 March 2000 the Lisbon European Council emphasised the importance of equality and the facilitation of balance work and family life [5]. Through the Reconciliation of professional, work and family life, there are several regulations that maintain women's situation at workplace. Concerning pregnant women, Directive 92/85/EEC considers pregnant and breast feeding women as a risky group that needs health and safety protection [6]. This Directive also covers maternity leave and discrimination in the workplace. Discrimination at work referring to pregnancy is also covered by the legislation on equal treatment in employment and occupation [7].

Directive 2010/18/EU [8] about minimum requirements on parental leave and time off from work is revising the previous Directive 96/34/EC of parental leave [6]. The directive aims to reconcile work and family life and to promote equal opportunities for men and women in the labour market. These new rules must be applied by all the EU Member States by March 2012 at the latest [6]. The European Commission highlighted a project, named as Strategy 2010-2015, to foster equality between men and women. It is emphasized that inequality between genders does violate Human Rights and can cause economic damages [5].

Hence by developing the equality between men and women, economic and business benefits can be gained. The principle of equality between men and women makes it possible to obliterate those predetermined social standards that women's responsibility is only to take care about the family [5]. Due to this principle old fashioned paradigms will never disadvantage women to step in to the labour market and will not retract men to take an active part in parenthood. It is essential for the future society that both men and women find a balance and take active part in the labour market and in the family life. The above mention principles, rights, maternity, paternity and the rights of children are essential values that need to be safeguarded by us, by the society, the Member States and the European Community.

Concerning the copreneurship, European Commission's projects on balanced participation of women and men in family and working life develop strategies that take account on encourage businesses, in particular small and medium-sized enterprises, to introduce and develop management practices that take account of their workers' family life [5].

In the Commission's "reconciliation package" [5] there is another legislation as well, namely the Directive 86/613/EEC [9] that refers to the equal treatment of self-employed workers and their assisting spouses. Article 2 of Directive 86/613/EEC expresses that the directive covers: »(a) self-employed workers, i.e. all persons pursuing a gainful activity for their own account, under the conditions laid down by national law, including farmers and members of the liberal professions; (b) their spouses, not being employees or partners, where they habitually, under the conditions laid down by national law, participate in the activities of the self-employed worker and perform the same tasks or ancillary tasks. » [9] Next to this, in article 5 it is stressed how important it is to ensure the same conditions without special restrictions in a copreneurship together within a company with unmarried person [9]. In copreneurship, spouses have to respect and follow the universal and European regulations referring to minimum requirements on parental leave for male and female workers, and related employment protection. It is more possible in a copreneurship that spouses pay more attention to gender questions and do not practice discrimination in any way. Concerning the workplace flexibility, spouses can easier agree about changes to their working hours, or return to the same job after maternity or paternity leave. Working together with a spouse might cause certain difficulties such as lack of good communication, professional competition. All these problems can disappear when the spouses turn their focus to common purposes regarding their children's future and balance in work and family life.

### 3. The role of Copreneurship in Work-Life Balance

Work-life balance is referred to as the successful merger of work and personal life, and it requires the ability to balance the work responsibilities and commitments with responsibilities related to personal life. People who experience work life balance achieve a sense of well-being and feel they have control over their lives [10]. Contrary, people who lack work-life balance, experience work to family conflict. The latter is the result of the interference between work and family domains and if not appropriately managed it can lead into dissatisfaction with the job and family. Work to family conflict has significantly increased among the working population in the last few decades, therefore the interweaving of work and family roles recently attracted the interest of many researches and scholars [10]. Nowadays the majority of people are faced with the problem of balancing their family responsibilities with responsibilities that arise from their employment. When it comes to couples where both partners work, women on average still have more responsibilities for home and family than their male spouses [11], therefore the balance between work and life is especially important for working women. Although the number of organizations providing family-friendly environment is somehow increasing, the support of the male spouse still remains a significant factor in achieving work-life balance. Especially in younger families the role of male spouses has changed. Men have to undertake an active role in sharing home and family responsibilities and supporting the career of their wives [11].

The extensive research on family business showed that women who engage in home-based business ownership, experience less work to family conflict [12]. Furthermore women working in family firms enjoy increased status, job security and flexibility, which makes it easier for them to combine career roles and child care [13]. Within family business which represents an important form of work organization [14] there is a very important field that is attracting the interest of many scholars. It is called copreneurship and it is referred to the involvement of both husband and wife in entrepreneurship. Copreneurship itself is not new. It has been intensively developing in the last few decades as a segment in the family business [for example 15-17]. Copreneurship can be defined as the sharing of the ownership, management and responsibility for a business. Copreneurs try to manage both a business relationship and a personal relationship, therefore home and work domains are integrated into a dynamic system [15, 17-21]. The current research body shows that familial entrepreneurship is under-researched [21]. In particular, there is a lack of empirical research on copreneurship, hence there is the need for future research [22].

Since the 1990s, the number of copreneurs has been growing [23, 18]. Beside the higher involvement of women in business, also downsizing, "glass ceiling" and redundancy are contributing to the increased number of copreneurial teams [18]. Additionally, the shift from corporate values to entrepreneurial values, the increased popularity of home-based businesses and a new concern for family values also led to the growth of copreneurial couples [24]. Extended working hours and frequent business trips are very common in the corporate world. Therefore, autonomy in terms of flexible working hours can be seen as significant advantage of copreneurship [18].

Copreneurs are couples that share a personal and work relationship and often see business as a way of life rather than a way of earning income [22]. Beside trust, commitment and loyalty, work-life balance is also recognized as one of the main benefits of copreneurship [25]. By establishing a copreneurial firm and consequently sharing the management and ownership of the firm allows spouses to balance work responsibilities and personal duties more effectively and flexibly [18]. Flexible work arrangements and shared roles in accommodating the home and family needs were identified as major benefits resulting from copreneurship [17]. Further, women as working spouses in family firms can achieve a greater control over their lives [18]. Very often female spouses join the business after it is successful enough to assure a safe future [26]. In achieving work-life balance the spousal support was found to be a very significant source of support [11]. A successful copreneurship is recognized by trust, reciprocal respect, confidence and affection [27]. Past research show that females in copreneurship have equal needs for achievement than their spouses, have great self confidence, take the strategic role in firm development and manage both life at home and life at work [17]. Although it seems like copreneurs undertake equal roles in home and work domains, the sharing of tasks and responsibilities between spouses in copreneurial firms is not necessary equal [16, 18]. Some research show that often in copreneurship the partners adopt more traditional sex roles than couples that do not share the business activity. Couples with two different career paths often share the responsibilities on the basis of their preferences or abilities. On the contrary, in copreneurship men tend to focus on tasks related to the business domain and work longer hours, while women tend to spend more time for household duties and childcare [16, 17, 21]. The latter is necessary for the success of the firm and the functioning of the family. The needs of the firm as well as family needs may change during the lifetime, therefore the roles of both copreneurs may alternate or be switched.

For example, once the children are grown up, both spouses can devote more time to the business. Past research show that undertaking traditional gender roles in copreneurship avoids the work to family conflict and contributes to a more harmonious marital [18]. In addition, it was found that female copreneurs see themselves firstly as wives and mothers and secondly as business owners and managers [16], hence copreneurship enables women to assume working responsibilities and at the same time to undertake the traditional role of the household manager [17]. The latter contributes to the work-life balance and consequently improves the relationship between the spouses.

In comparison with couples working in a corporate sector, partners who are involved in a common business activity better understand the family's needs, and consequently contribute to a smoother integration of all the activities related to family responsibility into the working day. If necessary, children can be also brought to work which allows the copreneurs to spend more time with them [18]. The family-friendly copreneurial environment often brings benefits also to women that are employed in the family firm in terms of greater consideration of individual family needs. In general, copreneurship promotes a family-friendly work environment for its employees [18]. It was also found that the copreneurs' relationship at work can be motivating and stimulation for the subordinates. However, in order to prevent the misunderstandings and the possible confusion of the employees, it is important to clearly distinguish the roles of the spouses at work [25].

Being copreneurs allows both partners to more effectively and flexibly manage work and home responsibilities in accordance with the abilities and preferences of both spouses. In order to maintain both a healthy relationship and a successful business, the relationship between the spouses has to be based on reciprocal trust and commitment. Living and working together requires from both spouses a lot of compromises. Although the involvement of both spouses in the firm may sometimes result in diverse tensions between family members, it can be still seen as a viable solution for achieving work-life balance [18].

## 4. Conclusions

The legal background of work-life balance with a special emphasis on copreneurship as a work-life balance facilitator was examined in this paper. Based on the literature review, we argue that copreneurship enable working women to more effectively combine work and home responsibilities, and therefore it has a beneficial influence on work-life balance. Working with their spouses allows women to excel in their careers and at the same time to maintain a work-life balance [25]. The research findings are relevant to students, researchers and EU level policy decision makers.

All the Universal and European regulations, and through the transmission the Member States legislations are corresponding with each other. EU legislation and amendments are followed by Commission's, Council's or Parliament's recommendations where EU Member States' agreements are indispensable for any kind of change. EU has a strong policy for developing work-life balance and to diminish the gender gap inequality. Numerous regulations are ensuring women's rights at the workplace that are safeguarding for example their work returning from maternity or paternity leave, or paying attention at the equal remuneration.

Although from many ways women's status at the workplace is strictly regulated and saved, unfortunately in the practice there are darker than bright sides of this phenomenon. In economically less developed countries, where the recession is still taking its »victims« on the labour market, people, and in our case women are rather focusing only on keeping their job in any circumstances than fighting for their already existing rights. In post socialist countries that are today EU Member States, young generations grapple just to be able to keep themselves where the question is not how to find balance between work and family life, because they do not even have chance to plan a family as a consequence of the today's economic situation. Copreneurship is one of the options how couples could keep together for a common target and how they can respect the opportunity that they can combine professional and private life in an easier way. EU and its Member States should provide labour market and labour policy where people could find adequate and equally paid work, where the conditions are really family friendly and not only in the regulations. This process needs decades but at least it has started and this is already a positive development for our future.

Future research should be directed toward empirical research on copreneurship to examine the work-life balance on real case studies of copreneurs. A longitudinal research would take into consideration different stages in the firm's life cycle as well as the changing family needs, therefore it could provide additional insight in the relationship between copreneurship and work-life balance. Further, a cross-cultural research on copreneurship and its role in achieving work-life balance could provide interesting findings by comparing findings cross-nationally. We can see that work-life balance is a crucial factor

for the socially and economically developed Europe, no matter of recession or labour crises. Our society is based on families and children for who we have to ensure a well balanced environment for a healthy and safe life. Managers, employers and employees, all of us are responsible to promote principles of respect and equality because without these values we cannot set an example to our children and cannot take part in building a better world.

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# The Role of Higher Education Institutes as Intermediaries in Regional Economic Enhancement.

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Universities or Higher Education Institutions (HEI) can play a pivotal role in economic regional enhancement as they can act as an intermediary between business, government and research, thus contributing to valuable knowledge creation, knowledge transfer and knowledge implementation. Entrepreneurs face many barriers to growth such as the knowhow, experience and resources to develop and it can be a considerable expense for an individual business or entrepreneur to access certain desired knowledge. Within regions local entrepreneurs hold large deposits of tacit knowledge which is a valuable resource that can lack physical accessibility. The objective of the SLNIW [33] project is to create greater regional accessibility to this valuable knowledge resource and facilitate the transfer of tacit knowledge for local entrepreneurs. Increasing the accessibility to tacit knowledge can help entrepreneurs to develop and grow their business and thus deliver lasting economic benefits to the region’s economy. This paper addresses the value of the role of Waterford Institute of Technology (WIT) and Aberystwyth University (AU) as intermediaries in the economic enhancement of their respective regions through the Sustainable Learning Networks in Ireland and Wales (SLNIW) project. The discussion highlights that the fiscal impact of research and education intermediaries is regionally undervalued and goes beyond the number of spin off and patents produced by such institutions. The SLNIW project is an ongoing longitudinal study in which six self learning networks have been established (three located in Wales and three located Ireland) to increase entrepreneurial self learning. The current paper draws on aspects of preliminary data collected over a 6 month period which indicates that over the course of 6 months communication outside of network meetings increased and ranged from 69% to 81%, of which 49% of that communication was for business issues and 29% for knowledge sharing. Over the initial 6 month period the perception of network members that self learning networks can help reduce barriers to business increased from 59% to 70%. Furthermore, data shows that there has also been an increase in the networks members who actively helped with other network participant’s businesses which increase from 35% to 45% over 6 months. The data collected over the 6 month period shows increased accessibility to local entrepreneurial tacit knowledge and discusses the change in perception of the benefits and value of networking by the network participants over a period of 6 months. The paper argues for greater quantification of the indirect fiscal benefits education and research intermediaries can have on their local economies as displayed via the SLNIW project.

## Keywords

Entrepreneurial Learning, Higher Education, Intermediaries, Regional Enhancement

# 1. Introduction

Universities and Higher Education Institutions (the two terms will be used intermittently) can have a significant impact on their local economies [1] [2] [3] and the role of the Higher Education Institution in the regional economy has evolved from the pure production of educated individuals to an institution embedded in the growth, development and sustainability of regional and local economies. There is a pre-conceived notion that Higher Education Institutions solely provide economic value by producing spin offs with the result of one piece of research and one patent delivering a viable startup company that will contribute to the development of the local economy [4]. However the impact of Higher Education Institutions on their local economy reaches beyond the direct benefits associated with licensing and contract research [5] as indirect linkages with local businesses can help and support the development of the local business community and economy [6]. Universities are increasingly considered as actors in the economy and play a considerable role in developing, promoting and transferring knowledge exchange and innovation [7]. Bramwell (2008) discussed that Higher Education Institutions and Universities are embedded in regions that facilitate the transfer of technological innovation and knowledge while building and sustaining local networks and flows of knowledge within the global market place. Thus the location of a university can be a significant asset to the development of the local economy [8]. The value of University based intermediaries is supported by Saxenian (1994) [9] in that regional intermediaries aid in the transfer of knowledge within a region and can positively influence the region providing significant positive effects for SMEs [10]. Universities or Higher Education Institutions that behave as local intermediaries generally function within co-proximity of the users and producers of regional knowledge [11] centered between the government and the private sector [12]. As individual organizations, firms and people can act either deliberately or intentionally as an intermediary there is a level of confusion in terms of the range of government, nonprofit and profit making organizations that engage in work that enables the sharing of knowledge, creation of new technologies, business practices, allocation of research partners and the solving of business problems in cohesion to develop regionally and nationally the business environment. Dalziel (2010)[13] argued that there needs to be greater clarification of intermediaries as a separate single class of organization which could also provide a higher recognition of intermediary organizations in strategies for regional, national and business sector development. Furthermore, the full fiscal impact of Higher Education Institutions acting as intermediaries within the local economies is not fully quantified. The following discussion will address in more detail what an intermediary is and what influence an intermediary organization can have on its regional economy.

## 1. What is an Intermediary?

The term intermediary can be complicated to define due the variations of the form and role an intermediary can take. The purpose of the intermediary is to connect organizations to one another in bilateral or multilateral relationships[14] and its form is often referred to as a bridgeing organization[15], or a broker [16]. Many of the loosely described definitions of an intermediary infer a relationship between two or more parties however, Howells (2006)[17] discussed that intermediaries are increasingly involved in more complex relationships incorporating vertical and horizontal collaborations. Regionally embedded intermediaries usually take the form of economic development agencies, chamber of commerce, industry and trade associations, technology and business parks, research institutes, networks and business incubators. While an intermediary can be an organization Smedlund (2006) [18] argued that an intermediary can also be a role or mission statement of an organization and many intermediaries function as an intermediary without the explicit mandate to and intermediaries can be further categorized into national, regional and local level actors. Dalziel [19] (2010) discussed that unions and professional societies are not typically classed as an intermediary as their mandate is the development of their own individuals. While the University or research institute technology transfer office can be an amalgamation of both concepts as the transfer office facilitates research and developing intellectual property for the greater good of the local economy and it also generates revenues for its own benefit[20].

### 1.1 What an Intermediary can do

Intermediaries can perform their role in two key ways; either directly by working with one or more firms to develop innovation and products or indirectly by developing the economic environment and capacity

of regions and nations. Within a specific region or sectoral sphere intermediaries act as intermediary by their ability to connect networks of business, government and University by influencing the flow of resources or the perspectives in which individuals make judgments or decisions in the absence of data or information [21]. Vonortas (2002) [22] discussed that the positive externality effect of intermediaries is not solely technology innovations but more general business functions such as developing business relationships, networking, developing trust, finance, effective management and the training of employees. Literature has emphasised the importance of the function of a local intermediary to cater for the establishment of contacts for local firms, arranging and sustaining networks and increasing the entrepreneurial attractiveness of a region to secure leader firms [23] [24]. Firms can rely on intermediaries to support and facilitate inter-organisational networking activities due to the commitment of intermediaries such as Higher Educational Institutions to establish a starting level of trust for participants. A national intermediary can change law, a regional intermediary can build on basic infrastructure and a local intermediary can improve trust and business relationships within a region [25]. Intermediaries also play a functional part in the reduction of costs in establishing and facilitating relationships for co-operation within projects and alliances[26]. For developing countries the role of the intermediary is critical to the development of the economy via entrepreneurship and knowledge transfer and technological catch up [27]. For the developed or knowledge based economy the intermediary facilitates inter-organisational collaboration of firms, governments and Universities to address long term, social and economic problems.

Technological knowledge transfer from Universities to regional firms underpins the definition of an intermediary in that the role caters for the knowledge transfer from knowledge creator to knowledge user and thus improves the knowledge and competitiveness of a region. In consideration of the University and Higher Education Institution as a regional intermediary its effect and positive economic influence is far greater than the number of spin offs or patents produced. Thus the positive regional effect of the University or Higher Education Institution on its locality can be far greater than first perceived. The current paper discusses the wider impact and value such intermediary institutions can have on their regional economies as displayed in the example of the Sustainable Learning Networks in Ireland and Wales project which aims to enhance regional economies by increasing the ability of local entrepreneurs to self learn and to increase accessibility to entrepreneurial tacit knowledge.

## **2. The Sustainable Learning Networks in Ireland and Wales Project (SLNIW)**

The SLNIW project aims to create and develop business learning networks in West Wales and South East Ireland. In total six networks have been established, three in Ireland and three in West Wales each region consisting of male, female and mixed gender network. The establishment of networks creates a platform or knowledge sharing space in which entrepreneurial orientated SME owners can come together and self learn. The project also aims to deliver sustainable self learning networks and sustainability of the networks infers that post intermediary involvement each network will still be meeting on a regular basis. The SLNIW objective of sustainability in the self learning networks is to provide lasting benefits to both the network participants and their respective regional economies via access to the problem solving skills of the other members of the network and their acquired knowledge.

In the course of this longitudinal study the network sessions were divided into facilitated and self-facilitated sessions. The objective of facilitated sessions was to provide the networks with training in preparation for the self-facilitation stage. Facilitated sessions (conducted from March 2010 to July 2010) for the networks incorporated workshops on change management, team building, and conflict management and training skills analysis. It was also important for network members to take the time to understand that the networks were not primarily about selling to network members but about learning from network members. It is also important that each individual network member believes that they have valuable entrepreneurial knowledge and experience which they can contribute to the network. The objective of the self-facilitated stage is that the networks have complete autonomy and govern themselves, set their own agenda and decide what self learning is of value for the network participants and the group.

### **3.1 Methodology**

As discussed the SLNIW project is an ongoing longitudinal study in which 18 network meetings will be conducted over an 18 month period. The method conducted over the course of the project is participant observation which can be defined as the '*process of learning through exposure to or involvement in the routine or activities of participants*[28]. Each monthly network session is observed by two SLNIW researchers who observe the group interactions and the development of the network.

The monthly observations are also supplemented by a monthly questionnaire which each network member fills in after every network meeting and a more detailed progress questionnaire called the 6 monthly questionnaire which is administered every 6 months throughout the course of the longitudinal study. Data collection is also complemented by observation at inter regional and cross border networking events, on site visits to network participants businesses and on completion of the study the network participants will also be subjected to interviews and reflection of the project. This paper draws on preliminary data derived from the monthly evaluations and two of the 6 monthly questionnaires administered in quarter 1 and quarter 3 of 2010. The following discussion will address data collected from the monthly evaluations and the 6 monthly questionnaires.

### **3.2 Monthly Evaluations**

After every network session the network participants are required to fill in a monthly questionnaire. Part of that questionnaire requests information on how many network members have been in contact with each other since the previous network meeting, how many network members were contacted, the purpose of the communication and the manner in which the communication was conducted. The data collected has concentrated on the self facilitated sessions (i.e. Session 6 to Session 11) as this represents the participants and networks operating under their own autonomy.

From the first self facilitated session in August 2010 69% of the network participants had been in contact with other network members since the previous network meeting. Over the course of the following 6 network sessions the highest percentage of contact registered at 81% (i.e. session 8 and session 10). Over the course of the 6 self facilitated sessions many of the network participants contacted more than one network member between the monthly meetings. For example, in session 6 two people contacted 6 network members since the previous network meeting, in session 7 eight contacted three network members since the previous network meeting and in session 8 ten people contacted one person since the previous network meeting. Over the course of the 6 monthly sessions the level of communication has been high and ranged from 69% to 81%. The level of contact between meetings shows that network participants are engaging with each other and communicating and thus displaying the value of networking. Increasing accessibility of individuals and their knowledge is an objective of the SLNIW project and to date the data suggests that the network participants are communicating and working together. This is further supported by evidence indicating the purpose for such communication (i.e. social, knowledge seeking, collaboration, business, information sharing and problem solving). From session 6 to session 11 the highest rated purpose of communication was for business issues ranging from 39% to 56% with an overall average over the 6 sessions of 49%. Then second highest purpose for communication was information sharing averaging at 29% over the six months and social averaging at 28%.

### **3.3 Six Monthly Questionnaire**

During the course of the longitudinal study the network participants are requested to fill in a 6 monthly questionnaire (i.e. every 6 months). The objective of the questionnaire is to gather data on the network participants and to gauge the divergence of opinion throughout the longitudinal study. The following discussion draws on a selection of questions to support the argument of the wider regional impact and value Higher Education Institutes and Universities can have on their regional economies. The first 6 monthly questionnaire is referred to as the baseline questionnaire which was administered in July 2010 and the second 6 monthly questionnaire which is referred to as Interval 1 which was administered in Jan 2011.

One of the key objectives of the SLNIW project is to aid entrepreneurs in their business growth by reducing barriers to development through the self learning network model. The network participants were asked if a self learning network can help reduce barriers (i.e. finance, staff, confidence, lack of work). The baseline result indicated that 59% of the participants agreed that a network can help reduce barriers and this increased to 70% at the Interval 1 questionnaire. In the baseline survey the

networks were in the facilitated stage and the networks were going through a forming process, however by the Interval 1 questionnaire the networks had spent 6 months together and perhaps had begun to see the benefit of the network and how they can learn from each other.

In the baseline questionnaire 31% of participants agreed that networks can help entrepreneurs to become better managers, which increased to 45% at the Interval 1 questionnaire. While 35% agreed in the baseline that other network members helped with individual participant's business problems this increased to 48% in interval 1. There was a strong consensus of agreement of over 95% in both the baseline and Interval 1 questionnaire that networks can help individual participants to develop new skills for business.

### **3. SLNIW Contribution to Regional Economic Enhancement**

Waterford Institute of Technology and Aberystwyth University as research and education intermediaries contribute to their respective local economies in many ways. The SLNIW project provides an example of that contribution; however the project also displays how certain activities of research and education intermediaries are difficult to quantify and accurately measure in terms of positive impacts on the local economy.

WIT and AU as intermediaries had the objective of enhancing the regional economies in which they locate by supporting and researching SME's and local entrepreneurs. WIT and AU as research and education intermediaries identified that the benefit of networking for the entrepreneur is the access to information, opinion and entrepreneurial advice and access to a constant flow of up to date industrial knowledge of a region. This is supported by empirical research which has shown that there is an association between networking and growth [29] [30] [31] and that an entrepreneur's personal networks and external relations are a critical resource[32] in overcoming barriers associated with growth and development. WIT and AU as intermediaries established six self learning networks to increase accessibility to local tacit knowledge which it is considered a valuable local resource which originates from people, experiences, and places and can require extensive trust and repeated personal contact to be created. In addressing the question if accessibility to tacit knowledge has actually being increased the monthly evaluations at 6 months into the network sessions display that network members are communicating outside of the prescribed meeting hours and that the objective of the majority of the communication is to discuss a business related matter. At the current stage of the project evidence from the monthly evaluations show that network members are communicating primarily for the purpose of business issues and that networks members are often communicating with one or more network members on a regular basis. Therefore the intermediaries have increased accessibility to local tacit knowledge through the establishment and facilitation of the SLNIW project.

The self learning network as an alternative approach to entrepreneurial networking allows for repeated face to face communication through regular monthly meetings and the time taken for network participants to develop trust. Trust is a key issue for the success of the networks. A reflection[33] from a network participant on the difference between the SLNIW networks and subsequent approaches to entrepreneurial networking stated that she was comfortable with divulging information and discussing business problems with the group as the network was confidential. She trusted the confidentiality of the network. The willingness of a network participant to engage and to benefit from the network came from the trust built within the group, their autonomy over their learning, the support they provided for each other and the confidence an individual participant derived from being able to help others. WIT and AU's approach to regional enhancement was to create a alternative networking environment for regional entrepreneurs that allows for the development of trust which in turn affords network participants the confidence to engage without fear of loss of confidently.

The objective of the 6 monthly questionnaires is to gather data on the network participants and to gage any divergence in opinion and perception of the networks from individual network participants. This is important as the self learning network is a different approach to networking and most entrepreneurs would not be familiar with the concept. The entrepreneurs would require time to build trust, to understand that the network is not about selling to each other but about learning from each other. It was also important for the individual participant to realise that they do have valuable knowledge and experiences to contribute to the network. Therefore the network participant requires time to see and apply the value of the network and thus the 6 monthly questionnaire aims to gather this divergence of opinion over the course of the study. The following statements track that divergence of opinion and begin to indicate the change in opinion of the network participants from the start of the study and after 6 months of engaging with the self learning network.

Self Learning Networks can help to reduce barrier to business development

1<sup>st</sup> 6 Monthly = 59% → Interval 1 = 70%

Self Learning Networks can help entrepreneurs become better managers

1<sup>st</sup> 6 Monthly = 31% → Interval 1 = 45%

Other network members have helped me with individual business problems

1<sup>st</sup> 6 Monthly = 31% → Interval 1 = 45%

From the 6 monthly questionnaires network participants consider that barriers to business development for entrepreneurs can be reduced by sharing knowledge and networking through a self learning network approach. At the baseline and at Interval 1 of the 6 monthly questionnaires the network participants agreed that self learning can help overcome barriers to development. To date network members are helping each other with their business problems and that the self learning network as a model for business networking can support participants in becoming more proficient managers and to aid in the development of business skills. A reflection from an employee of a network member discussed that he felt the network has had an impact on how the business operates. The employee said he can see a change; the network participant is engaging in a stronger role as owner and managing director and that there is a greater willingness to embrace new ideas and a new way of thinking [33] for business development.

A core objective of the project is to provide lasting benefits and post intermediary involvement with the networks the desired objective is that the networks keep functioning and thus provide a lasting impact to their respective regions. The desired sustainability is that the networks continue to meet on a regular basis; however sustainability could also infer a level of familiarity with local entrepreneurs that allows an individual to feel comfortable to communicate with peers sporadically when the need arises. Sustainable Learning Networks in Ireland and Wales is an ongoing project and the benefits discussed are an indication of the potential impact it will have on the regional economy. To date the SLNIW project has achieved and impacted the local economies of South East Ireland and West Wales by the establishment of the self learning networks. This has increased accessibility to local entrepreneurial tacit knowledge which is a valuable regional resource. Network participant reflections of the value and impact of the networks is supported by the change in perception of the entrepreneurs displayed in the 6 monthly questionnaires. Any improvements in an individual entrepreneur's business will have knock on effects for the regional economy. To conclude this all supports the long term objective of the intermediaries to provide lasting benefits by delivering sustainability of the self learning networks to the regions.

## 4. Conclusion

As discussed the role and form in which an intermediary can take is varied but ultimately the intermediary is a type of organisation that acts as a bridge or broker between two or more parties. Furthermore the added value of the intermediary role that organisations or institutions can play is overlooked and undervalued. The contribution of Higher Education Institutions and Universities to their regional economies is often cited as the production of an educated workforce and the number of spin offs or patents produced. However, the role of research and education based intermediaries is far more embedded and of greater fiscal value to regional economies than may first appear. The activities and impact of such intermediaries on their regional locality can go far beyond the direct benefits associated with contact research and the commercialisation of knowledge. The SLNIW programme undertaken by WIT and AU as intermediaries displays the potential deeper impact such intermediaries can have on the development and enhancement of regional economies. The SLNIW project which is currently ongoing will contribute to research and understandings on how self learning networks work and why they can fail, while also providing lasting regional benefits by the establishment of the 6 self learning networks in order to understand what makes networks work. Preliminary data from the project indicates that the SLNIW project is having a positive impact on the individual network participants which will provide a knock on effect for the regional economy. In terms of quantification it is possible to determine the value of research and education based intermediaries' contribution to their regional

economics, however not all aspects of the Higher Education Institution regional effects can be so easily measured. Therefore the criteria in which the impact of Higher Education Institutions as regional intermediaries is quantified requires adjustment to take into consideration activities such as the SLNIW project and the benefits it will deliver to its perspective regions during and after the completion of the project

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# Significant Elements of Management Style in Serbian Industrial Enterprises

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The subject here is the statistical evaluation of significant dimensions of management style in Serbian industrial enterprises, conducted on a sample of 111 enterprises. Based on prior recommendations of relevant literature, the paper examines critical dimensions of the management style concept using reliability and factor analyses. Reliability was estimated by calculating the Cronbach's alpha coefficient. Exploratory factor analysis was carried out by applying principal component analysis. The obtained recommendations for significant dimensions of management style indicate that its prominent elements are management proactivity, long-term planning and managerial staff motivation. Other dimensions (extent of delegating a task, level of detail and risk taking tendency) are not of equal significance compared to the elements given above. The proposal for further research is the analysis of how some of the significant elements of management style influence other contingency factors.

## Keywords

management style, dimensions, reliability, factor analysis.

## 1. Introduction

The significance of management style as a contingency factor was first stressed by Child in 1972. Mitzenberg supported this view in 1980 indicating that there are three types of leaders' roles, while Lewin and Stephens [1], in 1994, argued that management style is associated with organizational structure. Miller and Droge [1], in 1986, pointed out that there is a link between the size of enterprise and management style. A prominent contribution to the development of contingency theory of the organization was given by Khandwalla [2] who developed the model of organizational functioning, in 1972, where a significant role is played by management style and philosophy as impact factors in the design of organization. In 1996 Burton and Obel [1,2] employed contingency theory postulates to create the expert system Organizational Consultant with a help of the sample of 232 small and medium enterprises encompassing over a million combinations of contingency factors to diagnose the condition of enterprises' organizational structure. Management style is also a significant variable of this expert system.

Top management is carrying out the defined strategy of the enterprise and also defines the enterprise organizational structure, therefore, not unexpectedly, Burton and Obel [3] point at the link between management style, strategy and manner of organizational design. Management style is a manner in which the enterprise management processes information, makes decisions and coordinates the work of employees [3]. There are different typologies of management style, however, we will focus here on its dimensions only, because they are necessary for further analysis. Tab. 1 shows the characteristics of key information-processing dimensions and decision-making dimensions in management style, according to known typologies.

	THEORY X (MC GREGOR 1969)	THEORY Y (MC GREGOR 1969)	MANAGER (ZALESIK 1977, KOTTER 1990)	LEADER (ZALESIK 1977, KOTTER 1990)	AUTOCRATIC (LIKERT 1967)	DEMOCRATIC (LIKERT 1967)	HIGH NEED FOR REALIZATION (MILLER 1982, 1986)	INTERNAL LOCUS OF CONTROL (MILLER 1982, 1986)	FLEXIBLE PERSONALITY (MILLER 1982, 1986)
Tendency to delegate tasks	low	high	low	high	low	high	low	certain	high
Level of detail in decision-making	formally detailed	basic guidelines	very detailed	low level	high	low	analytic and high level	high orientation to tasks	relatively low
Reactivity or proactivity in decision-making			reactivity	proactivity			proactivity	proactivity	reactivity
Time horizon of decision-making			short-term, according to plans	visions of the future	most commonly short	most commonly long	long-term planning	long-term	short-term planning
risk taking tendency	no risk taking	high	no risk taking but with planning	risk taking in accordance with vision of the future	no risk taking	high	no risk taking	neutral	high
Motivation and control of employees	low motivation, a lot of control	motivation with little control	monitoring of details	high motivation and inspiration	control	motivation	strong control	combination of motivation and control	little control

**Table 1** Characteristics of key management style dimensions according to known typologies [3]

Actually, the management style dimensions describe the tendency of enterprise management to micromanagement, so a manager with a low-level tendency to micromanagement at lower hierarchical levels has the following characteristics:

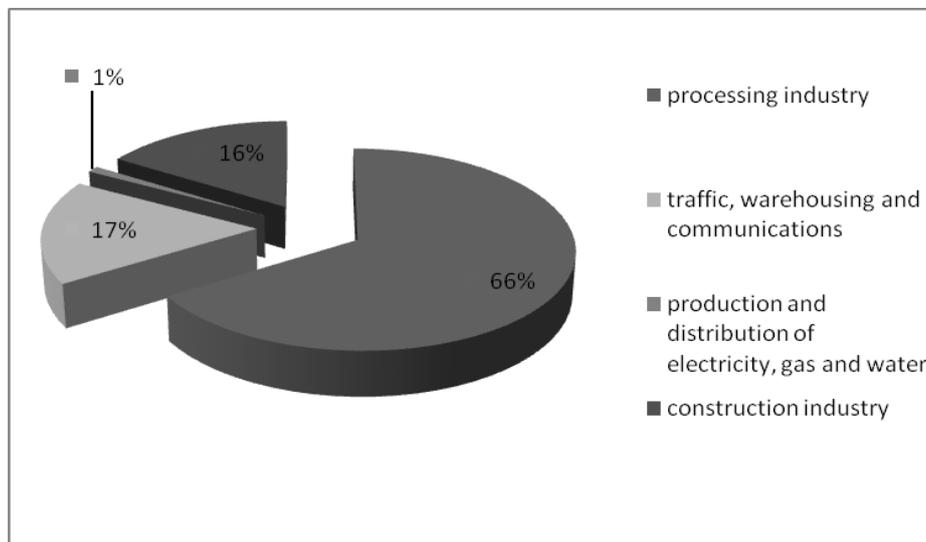
- likes to delegate,
- gives general instructions for decision-making,
- is proactive,
- focuses on long-term goals and “looks ahead”,
- takes a risk if necessary, and
- motivates employees more often than he uses punishment.

## 2. The sample of Serbian industrial enterprises

In Serbia 25,011 industrial enterprises are doing business. Of this number, 1.8% accounts for big enterprises, 4.6% for medium and 93.5% for small. However, production is the predominant activity only in 5% of small and medium industrial enterprises, whereas a larger number of enterprises (71%) are engaged in retail, marketing, consulting etc. in the area of business operations of a certain industry group [4]. Industrial enterprises refer here to the enterprises mainly engaged in industrial production [9]. The number of such Serbian small and medium enterprises totals 1228 only (according to [7]). In 2004 the number of big industrial enterprises was 471 (according to [7]). Due to that, it can be concluded that the population of Serbian industrial enterprises whose predominant activity is production totals 1699 enterprises.

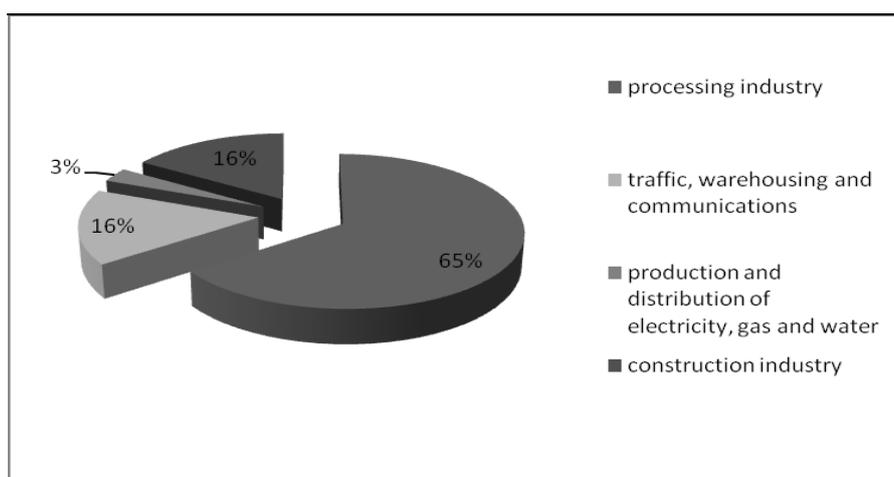
The response in such a type of research ranges from 20% to maximally 60%, according to [5]. If the response from 20 – 30% is assumed, the number from 100 – 150 industrial enterprises can be finally expected in the sample, totaling 5 – 9% of the population of Serbian industrial enterprises, whose predominant activity is production, warehousing, maintenance and the like. The initial sample size is 500 industrial enterprises engaged in production, maintenance, warehousing and the like, which

accounts for approx. 30% of the population. The response to the delivery of 500 questionnaires was received by 112 enterprises, one questionnaire being rejected due to missing of a larger number of data and error in a control question, therefore the response equals 22.22%. Domestic industrial enterprises are doing business within the following four groups: processing industry, traffic, warehousing and communications, production and distribution of electricity, gas and water, and construction industry. Fig. 1 shows the percent of mentioned four groups of industrial enterprises in Serbian industry.



**Figure 1** Percent of the groups of industrial enterprises in Serbian industry

When distributing the questionnaires, care was taken of the percent of individual groups in both the population and the sample, which is noticeable from Fig. 2. The response to the delivered questionnaires was not identical in all industry groups. It was slightly higher in enterprises engaged in production and distribution of electricity, gas and water. One questionnaire from the group of personal delivery was rejected due to the discrepancy of a control question (112 responses were received). It is considered that a given sample size of 111 enterprises is sufficient to describe the population adequately, so that conclusions can be generalized to Serbian industrial enterprises.



**Figure 2** Percent of the groups of industrial enterprises in the sample

### 3. Research of significant management style dimensions in Serbian industrial enterprises by factor and reliability analyses

Significant management style dimensions in Serbian industrial enterprises will be determined by applying factor analysis (principle component analysis) and reliability analysis.

In researches there often occur multidimensional phenomena, concepts or states, whose description requires a larger number, most commonly measurable (evident) variables [6]. It is quite natural to tend to analyzing all interdependent variables together (as an entity as a whole) and simultaneously, but not taking one by one out of the context. One of the most commonly used multivariate data analysis techniques is factor analysis, because it allows for simultaneous analysis of several variables to describe the same phenomenon.

Reliability is a degree to which the dimensions take part in describing the concept [6]. The scale reliability for mutually beneficial relations with suppliers will be estimated by calculating the Cronbach's alpha coefficient. This coefficient is an indicator of the extent of random error present in the scale applied to weigh the quantity. The higher the error percent, the higher the risk of drawing wrong conclusions.

Cronbach's alpha is calculated using the formula [6]:

$$\alpha = \left( \frac{k}{k-1} \right) \cdot \left[ 1 - \sum \frac{s_i^2}{s_{sum}^2} \right], \text{ where } s_i^2 \text{ is a variance for } k \text{ individual measurements, and } s_{sum}^2 \text{ is a}$$

sum of all measurements.

MANAGEMENT STYLE VARIABLES	Mean value after elimination	Variance after elimination	Stand. dev. after elimination	$\alpha$ after elimination	$\bar{x}$ =18.55 SD=3.57 Cronbach $\alpha$ =0.391 Stand. $\alpha$ =0.388
EXT. OF DELEG	15.42202	10.73933	3.277092	.472789	After elimination of SDELEG, NDETALJ i SKL_RIZ Cronbach $\alpha$ =0.789 Stand. $\alpha$ =0.784
DETAIL LEV.	16.10092	12.16413	3.487711	.507380	
MAN. PROAC.	14.96330	7.72342	2.779105	.135595	
L-T_PLAN	15.03670	7.68673	2.772495	.101860	
RISK TAK_TEN.	16.04587	10.70432	3.271745	.397710	
MOTIVATION	15.22936	10.02996	3.167012	.320834	

**Table 2** Reliability analysis for management style variables [7]

The main objective of factor analysis is to reduce the information contained in the original variables to a smaller set of new composite dimensions or factors with minimal loss of information. The sample size required for analysis is at least 50 and preferably 100 or more units of observation [5, 8], which is ensured in our sample.

Exploratory factor analysis allows for identification of what objectively exists in data about the model, while factor loading is a correlation between the construct and the factor describing it. The loading level of the factor considered to be important depends on the sample size and the number of analyzed factors. Larger sample size and higher number of factors require lower loading level of the factor. So, for the sample size (111) in this research and the number of factors analyzed, the 0.40 level can be considered significant for the test power of 0.80 and significance level of 0.05, assuming that errors presuppose a double value of a conventional correlation coefficient, even though not infrequent are researches that take 0.30 for the minimal loading level [5, 6, 8, 9]. Principal component analysis, applied here, is used to reduce the dimensionality of constructs, so that only dimensions, i.e. factors providing enough information about the construct remain. This method was developed back in 1933 by Hotelling [5, 6, 9]. There are a series of criteria for determining the number of factors carrying enough information – principal components. However, the most widely used criterion is the Kaiser criterion [5,



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# Applying Living Lab Strategy in Real Life Conditions

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**In this paper we are examining the Living Lab (LL) concept. Under an Open Innovation environment, we combine the LL and the Mass Customization strategies, so as to achieve customer's satisfaction for a product.**

**In previous surveys researchers found that consumers are willing to pay more for a personalized product, in order to cover their needs better. Besides there are plenty of companies, more or less known, that have already adopted the LL idea. Namely, they give to their clients the opportunity to shape a product or a service in their own environment. In this way they do not conduct surveys such as market research, but they carefully absorb and consider the information, which stems from the everyday life and the interaction of clients with their product and services.**

**Furthermore, the validity and the viability of the proposed method was investigated through the production of a product from a well-known Greek furniture industry. During the period of economic recession we ventured to apply the LL strategy while coming into touch with this company and observing the way they currently act. The aftermath of this process is a new leaner procedure that is adopted during the design and production frameworks of a product.**

**The aim of this research is to overcome industries' idleness and to spotlight customer's capabilities in communicating their desires.**

## **Keywords**

Living Labs, furniture industry, Open Innovation, customized products.

## **1. Introduction**

During the last few years a concern regarding the new form of innovation known as Open Innovation is discerned. This new direction enables production procedures, to take a more anthropocentric shape. Many researchers consider that new strategies as Mass Customization and Living Labs (LL) derive from the openness of innovation.

According to the work presented in [1], nowadays, the user-citizen-consumer is becoming as much producer as consumer. Thus, he exhibits into the system of innovation where a great mass of ideas and knowledge are accumulated into a "pool". As argued by Von Hippel and Thomke in [2], the users are more often the source of innovations rather the manufacturers of technology. According to them, users-customers are provided tools so as to design the product that best fits their needs. The basic problem is to overcome design and production limitations and integrate them to user's requirements. By and large, a user can express himself through Mass Customized products and others developed in a LL environment.

Referring to the first strategy, Mass Customization's point of view addresses the need of applying new technologies, aiming at introducing the user into the innovation process. On the other hand, LL represent a user-centric research methodology for sensing, prototyping, validating and refining complex solutions in multiple and evolving real life contexts. The LL approach strives to break the trial and error process of product development [1]. In other words, the goal is to eliminate the precarity while presenting a new product to the market. For instance, LL involves the consumer into the development process, ensuring highly reliable evaluation, resulting in a significant reduction of technology and business risks.

Apart from all these, the combination of Mass Customization and LL has its extensions to Lean Manufacturing. Namely, production line becomes leaner while work is divided into clusters and products are banded together according to group technology principles.

The remainder of the paper is structured as follows: In Section 2, we briefly discuss what LL represent, with a view to the reader's introduction to the field of innovation theory. Furthermore, previous work on LL and open environments is presented. In section 3, we attempt to approximate the notion of a LL by presenting a real life problem. When all is said and done, in the last section we recapitulate the facts and we gravitate to the contribution they have in new life circumstances.

## 2. The Living Lab Concept

LL are Open Innovation environments where real life conditions do exist. User driven innovation is totally adapted to co-creation processes and Open Innovation Functional Region consists of SMEs Collaborative Networks and Virtual Professional Communities in a Public, Private, Partnership.

In addition, LL have been defined as experimentation environments where technology is given shape in real life contexts and in which (end) users are considered co-producers [3]. This definition differs slightly from the previous, but mainly emphasizes in experimentation as a part of research methodology, i.e. implement the proper level of technological artefacts to experience live scenarios with a large number of users while collecting data which will be analysed in their context during the evaluation activity.

It is indisputable that a LL is a flexible method for developing a new product or a service. In the following table, we try to present some of the most typical and known LL cases, to better understand its breadth of application.

**Table 1** Basic Living Lab Applications

Name	Type	Purpose	Source
Galileo Project	Location-based services	Culture, tourism, health, work	<a href="http://www.gsa.europa.eu">http://www.gsa.europa.eu</a>
Visible Living Lab	Enterprise layout	Better exploitation of space	<a href="http://www.johnsoncontrols.com">http://www.johnsoncontrols.com</a>
The Place Lab	Department equipped with technologies	Monitor human-technology interaction	<a href="http://architecture.mit.edu/house_n/placelab.html">http://architecture.mit.edu/house_n/placelab.html</a>

After an exhaustive scrutiny of the LL concept, we have reached to the conclusion that there is a great need of improvement in this filed of research. In the following section we examine a process about developing a product under a LL concept.

The following figure illustrates an outstanding LL advantage, which corresponds to the incubation time of a product. The first step of the latter involves the Research and Technological Development (RTD) processes followed by the implementation of the infrastructure, whilst training and education procedures occur at the end of the pipeline. According to Fig.1 [4] the product is more acceptable from the real market, in case the users develop it. Also, case studies about customized products [5] show that customers are willing to spend more money for new customized products, so as to better cover their needs.

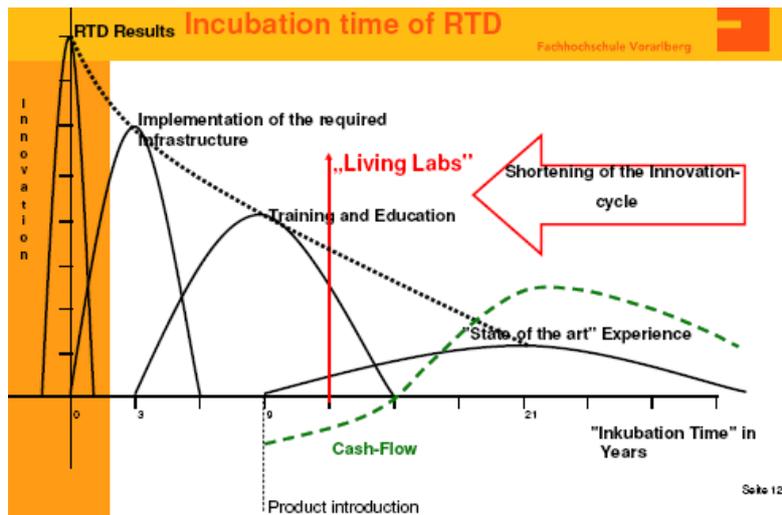


Figure 1 Incubation time of a product [5]

## 2.1 Success Factors for Living Labs

A LL objective is to enable sustainable, collaborative, multi-disciplinary and user relevant innovation. Hence, it can be assumed that the success of the LL can be measured broadly in terms of the following four basic elements (CoreLabs) [6]:

- Innovation: LL aspire to stimulate creativity and innovation; thus, its main success will be measured against quantifiable, accepted, and sustainable innovations. In the LL context, the three "Ps" exist:
  - Number of peer-reviewed *Publications*
  - Number of legally held *Patents*
  - Number of *Products* that reach the market.
- Collaboration: It has become obvious, since cooperation is one important facilitator for innovation, that collaboration among as many participating stakeholders as possible, and also with different combinations of stakeholders represents an important measure of success of LL. Here, it is important to look at the maturity of the collaboration to stimulate positive outcome of the collaboration.
- Multi – Contextuality: Another success factor is the context. By introducing an environment of multiple and diverse dimensions, users can contribute, evaluate and be evaluated in real life situations. This perspective takes user participation to a new level of multiple and merging contexts.
- Sustainability: To determine long-term success, sustainability becomes a valuable indicator. In the LL context sustainability can be measured in terms of:
  - Durable employment* creation: build on tight binds between employees and employers.
  - Inclusion and equality* issues: include users-customers that have same characteristics to the LL processes.
  - Competitiveness*: a competitive environment motivates industries to commune with innovation.

It is important to note here the significant relevance the LL must offer to its location, intended audience, and stakeholders.

## 2.2 Combining Living Labs with Mass Customization

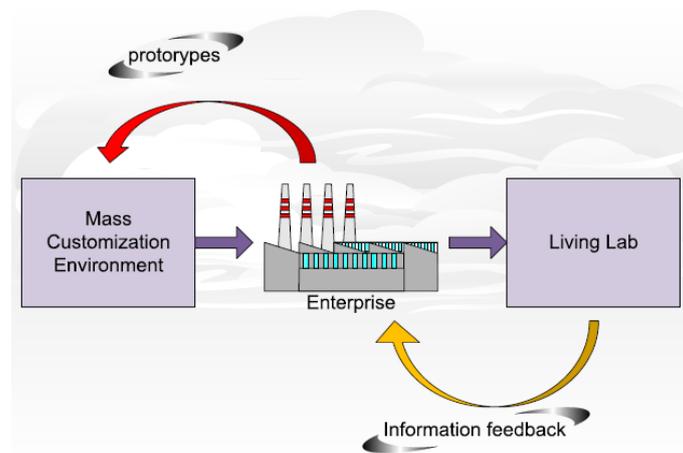
As the standard of living has increased in the last 50 years, individualization has received increased focus. At the same time there has been a massive development of technologies [7]. In this environment, customers have the power to demand individually tailored (e.g. Hackett, Massimo Dutti) products that are specifically designed and manufactured to suit their needs [8]. Due to this revolution, companies have discovered the new frontier in business competition: Mass Customization [9]. We firmly believe that this Marketing strategy can coexist with the LL concept.

The creation of a product, or even a service, through a LL practice and a Mass Customization process, can be considered as a round procedure and not as a separate methodology of

customization. Namely, in a LL, a number of developers identify the attributes and functions of a product or a service. In a following step, the product goes across the production line and takes, from a wider amount of end-users, a Mass Customized form. As a result, the enterprise takes into account the feedback provided by the end-users, so as to produce an “ultimate” product with a mass production viewpoint. For a product to reach this point, this means that it has acquired its complete form that contains its purpose or goal of existence. This is what Aristotle called “entelechia” [10].

The following figure (Fig. 2) [11] portrays the whole procedure of developing a product. It simulates a theoretical approach, of how the two strategies could consist a conjoint set. This picture was designed to represent the flow of information inside and outside the enterprise. The vital issue is that in traditional enterprises, information about a product derives from the internal environment (e.g. Marketing Department). The challenge of the presented work is to exploit, as much as possible, the information feedback that many companies receive from their customers. Under these circumstances, we propose LL not as a “panacea”, but as a different and more “open” mentality that companies could adopt, to be more agile and meet customers’ needs better. Thus, to our minds, LL are considered to be an attitude more than a production method.

As far as it is shown in the picture, on the right half there is the LL process, where the product is produced from scratch, according to customers’ instructions. Afterwards, information enters the enterprise and on the left half the Mass Customization process occurs. Obviously, the process takes the shape of a French “8”, which can last forever, if the product doesn’t meet users’ needs.



**Figure 2** The circular route in a product development process

The aim of this figure is to illustrate the inextricable bind between Mass Customization and LL. Customer becomes the producer of his own product and with his original ideas he also contributes to a “pool of ideas”.

### 3. An Extension of Living Labs in Real-life Conditions

The starting point was the need of a LL application, so as to validate and prove its viability. Due to financial crisis, industries in Greece gathered that they needed to enhance their Customer Relation Management, aiming to capture customers’ interest more and amplify their relation. For that purpose, under the European umbrella (European Network of Living Labs, ENoLL) and the innovative strategies that foreign companies applied, we detected one useful tool: Living Labs.

A large Greek furniture industry aided our research with its data. Particularly, the Production and the R&D department were those two who provided us with information. The reason why we chose a furniture industry is the fact that our house is the place we live in and more and more people seem to be concerned about shaping their space, as they like. They prefer their furniture not to be of Mass Production.

The challenge was to apply this concept keeping in mind the LL principles and industry’s restrictions. After many months of research and information analysis we concluded that the LL process for furniture should have the following shape.



**Figure 3** Row of information, value and work

Analytically, the steps are:

- Customer division: This first step is to create a group of users-customers that have the same characteristics and objectives.
- Customers' participation: Customers are the cores of the whole process, since their desires and needs are indispensable to assign the final product.
- Collect Information: Ways of collecting information should be considered, e.g. interviews, questionnaires, personal informal communication. Companies also receive e-mails and phone calls, in which customers make their comments and remarks about the products or services. This is also an important unexploited source of information.
- Information short-out: After collecting the information, a short-out is needed. By this we mean that the company should fulfil the desires that most people have. Namely, the alternatives should be modularized in a way that they satisfy the majority of users.

Some companies noted that, they are not ready to produce fully customized products due to the complexity of their production lines. Their products seem to be sophisticated and they also need to be synchronized with their suppliers. So, it doesn't depend on the internal shift of a company, but on stakeholders' lack of adaptation. Moreover, the main reason constitutes the fact that customization is not cost effective and companies should find out a way to deal with this.

Enterprises could take a leaf out of the book of ADIDAS that manufactures shoes, t-shirts and jackets that are fully customized using configurators. Furthermore, it should be noted that the company seems to balance the cost effectively. Although there are different challenges for different kinds of product, the main idea of customized products is common.

- Information grouping: It bears resemblance to the previous step, but it is totally different since it represents the procedure that contains the creation of alternative choices available to the customers usually given by configurations.
- After this, the alternatives are ready to be presented to the customers and at the same time, industry should create the G-code needed for the Woodworking Machines.
- Mass production: Afterwards, products are produced in a mass production scale, since mass customization is the mass production of customized products.
- Distribution: The final step, before a possible reiteration of the procedure.

The significant point on the previous graph is the information feedback. This means that, if customers are not satisfied about the product, the procedure is repeated and new characteristics or even products are added to the production line design.

### **3.1 How to Re-form the Developing Process of a Closet**

We have co-operated for six months with a well-known Greek furniture-industry called NEOSET. NEOSET S.A. was established around 80s in Athens and aims to offer qualitative products in low prices. Its innovation was "Furniture-synthesis". For this purpose, consultants and decorators worked together, to generate sets of furniture that could create friendly and agronomical homes. Company's motto is the "Live your House". There are also 100 franchising stores all over Greece and 30 stores in foreign countries. Its infrastructure counts 65.000 square feet and human resources are 1074 people [12].

After elaborative discussion and consideration, we came up with this statement: Companies do need some ameliorative changes of Customer Relation Management, to suit emerging market needs, such as the personalization of products. By this we mean that present R&D practices hinder the progress of product development and innovation. They seem to be too complicated and rigid, eliminating customer vital interference. Additionally, it is generally accepted that extravagant programming and scheduling block agile strategies.

Hence, the furniture industry had indicated the current row of work and information and asked us to modify it to a more lean and flexible one. The product we examined is the closet, because many customers seem to be unsatisfied with the alternatives given to them. Furthermore according to this industry, the closet is a simple product relatively to other furniture. That is to say, it is less complex to be produced and assembled.

The procedure that follows is very catalytic, since effective communication between different departments of an industry builds on the ground of breakthroughs and innovative thinking. It is crucial to underline that the following procedure is a smooth recommendation to the company. We came up with this, after a series of consecutive meetings and brainstorming with people from R&D and production. We all followed the constraints of the present production line, to an extent that we should keep in mind that due to financial crisis, the company couldn't bear any additional cost. So, we propose a pilot reformation of the existing process, having the agility to be differentiated by NEOSET.

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<Stage 1>

Problem/terminus detection

Project time planning

<Stage 2>

Concept presentation to the involved departments (e.g. according to NEOSET: Marketing, R&D, CAD and Production Department)

The Marketing department assigns Design Engineer to price the project. The next step is to be implemented.

<Stage 3>

The department mentioned before takes part in a meeting, so as to define how to introduce the product into the real market.

<Stage 4>

Collect all the information that the company can have access. Particularly, the company approaches customers to detect their inner needs and desires. After this, the company should come into touch with the franchisees i.e. the 100 franchise stores all over Greece. These stakeholders are valuable, due to their experience and the fact that they comprise the recipients of clients' feedback. This is the phase where a LL is taking place – there is a lack of traditional Market Research. That is to say, industry-user contact is immediate and without Marketing agency. Finally, the Marketing and R&D departments in association with Design Engineers do the information short-out and grouping. During the grouping stage the closet starts taking a more personalized and customized shape and essence.

<Stage 5>

Design department creates the patterns, based on customers' and franchisees indulgence.

<Stage 6>

Technical designs are planned by Design Engineers and then they are sent to the suppliers. They note some crucial points, according to technical rules. Then patterns are re-created.

<Stage 7>

Technical designs are also presented to the technicians, because they are those who set furniture (i.e. the closet) and face layout problems. Once again, the patterns are available for re-forming.

<Stage 8>

Some samples, based on technical designs, are manufactured and the departments decide the cost of the product.

<Stage 9>

Samples are presented to CAD and Training departments. The former is in charge of creating designs for a large-scale production, while the latter is responsible for instructing and educating franchisees about how to make the product seductive for the customers.

<Stage 10>

After this, the product is launched to the market.

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In the foregoing analysis we should spot some significant points that emphasise Living Labs' existence and role:

- Companies count on customers-users claims mostly.
- There is not any Market Research in a narrow sense. We concluded to this point, since the company informed us that there is a vast amount of information related to the functionality and shape of the products, but the departments couldn't integrate this feedback to the general production process.
- Designs are ready only when customers are generally satisfied. Many people may argue that this procedure causes cost, but the Department of Management and the consultants of the company assured that without taking risks, it is difficult to overcome obstacles and compete with other similar companies.
- Departments are meeting together only when there is a grave reason. Many times departments use to meet aimlessly and that is time-consuming and confusing too. They just need to recapitulate the facts-milestones.

In fact, these are the principles that condition Mass Customization and LL under the umbrella of lean and open procedures. Should this process be applied, different stakeholders have to reconsider their duties and functions.

## 4. Conclusions

To sum up this brief presentation of a LL methodology, the aim of this paper was to highlight users' significance during research and development processes. Problems do exist and they are mostly related to the fact that customers prefer products that are ideal to them. According to NEOSET, Greek industries need to evaluate and turn to advantage customers' interest, to achieve a sustainable and stable relation with them. It is not that companies are unaware of the diversity of people desires, it is just that they didn't pay much attention to them, because during all these years they were assuming customer needs and neglected possible diachronic changes of user requirements.

The conclusion to be made is not that LL are the unique method to approach customers, but LL could help as to observe customers' deeper acting in their real and daily lives. There will definitely emerge new Marketing methods such as LL, the mission is to outmarch traditional Mass Production mentality and adapt leaner and more open processes to reach customers. The data that NEOSET have, shown that reducing cost is a short-term solution and this does not empower the sustainability of the company-customer relationship.

As far as future work is concerned, research should focus on customer grouping. The previous process should be examined partially because of its complexity and diversity. It is an important process to understand what customers deeply need and divide them into classes, so as to deliberate, in a better way, the image they have in mind, about how the ideal product looks like, to their minds. It is obvious that users from different social, educational and geographical fields have much different priorities and requirements.

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# Designing a Jaw Crusher using Value Analysis-Part I

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Implementation of Value Analysis in designing of industrial equipment is a demonstrated need for a long time in highly developed industries. Beneficial results of applying this creative, functional and very practical multidisciplinary approach can see at all the products that surround us in everyday life.

The paper presents a complete study of Value Analysis applied concretely to a selected part of one jaw crusher. The phases and iterative operation of the Value Analysis method are presented. Value Analysis combines both engineering and economics without, however, placing neither engineering nor economics first. They both are similarly important, as can be concluded by the end of this paper.

## Keywords

value analysis, optimum variant, jaw crusher

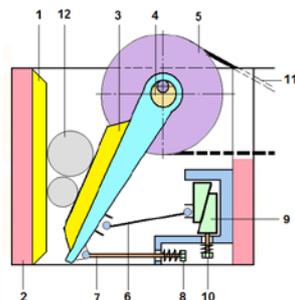
## 1. Introduction

Value Analysis (VA) is a method that provides an operating technique using a creative and organized approach. It is managed by a group, each of them selected by their expertise in specific subjects and coordinated by a Value Analysis expert.

The Value Analysis group activity is managed in eight stages:

1. selecting research topic,
2. information on the research theme,
3. creativity, search the ideas and the solutions,
4. analysis of the solutions developed,
5. development of the chosen solution,
6. presentation of the solution,
7. implementation of the solution,
8. verification of the technical solution.

An example of Value Analysis is presented, applied to the redesign of a jaw crusher (figure 1 and figure 2) used for primary crushing of a wide variety of materials in the mining, iron and steel and pit and quarry industries.



**Figure 1** Jaw crusher: 1 – fixed crushing jaw; 2 – framework; 3 – moveable crushing jaw; 4 – eccentric shaft; 5 – flywheel; 6 – safety lever; 7, 8 – the bar; 9, 10 – adjustable wedge system; 11 – belt drive; 12 – material for crushing.



**Figure 2** Jaw crusher.

The paper presents a complete study of Value Analysis applied specifically to one equipment, with one finality: re-design one selected part and establishing the optimum constructive solution from the technical and economic viewpoint for one part participating in one functions with a high cost: the framework participating at the functions: *F5 - supports the assembly, F10 - ensure rapid change defective components, F11 - ensure user safety and F12 - provide user interface.*

## 2. Establishing the list of technical functions

Table 1 presents the list of functions of the jaw crusher.

**Table 1** List of functions

Symbol	Functions	Type of functions	Technical dimension of functions		
			Name	UM	Value
F1	Ensure crushing	FS*	force	daN	1100
F2	Includes components	FS	volume	m <sup>3</sup>	0,42
F3	Ensure adjustment	FC**	height	mm	10 – 25
F4	Ensure material supply	FS	flow rate	m <sup>3</sup> /h	0,4 – 4
<i>F5</i>	<i>Supports the assembly</i>	<i>FS</i>	<i>force</i>	<i>daN</i>	<i>11000</i>
F6	Ensure material removal	FS	flow rate	m <sup>3</sup> /h	0,4 – 4
F7	Supplies working energy	FS	torque	daN*m	1000
F8	Transforms electric energy into mechanical work	FS	mechanical work	J	-
F9	Ensure kinematic chain protects	FC	force	daN	1100
<i>F10</i>	<i>Ensure rapid change defective components</i>	<i>FC</i>			
<i>F11</i>	<i>Ensure user safety</i>	<i>FC</i>			
<i>F12</i>	<i>Provide user interface</i>	<i>FE***</i>	-	-	-

\*FS – Service function, \*\*FC – Constraint function, \*\*\*FE – Estimation function

## 3. Establishing the levels of importance of the functions

Table 2 presents the value weighting of functions.

**Table 2** Value weighting of the functions (\* - X coordinate). Step 1

Functions	...	F4	F5	F6	F7	F8	F9	F10	F11	F12	Total
F1		0	0	0	0	0	0	0	0	0	
F2		0	0	0	0	0	0	0	0	0	
F3		0	0	0	0	0	0	0	0	0	
F4		1	0	0	0	0	0	0	0	0	
F5		1	1	0	0	0	0	0	0	0	
F6		1	1	1	0	0	0	0	0	0	
F7		1	1	1	1	0	0	0	0	0	
F8		1	1	1	1	1	0	0	0	0	
F9		1	1	1	1	1	1	0	0	0	
F10		1	1	1	1	1	1	1	0	0	
F11		1	1	1	1	1	1	1	1	0	
F12		1	1	1	1	1	1	1	1	1	
No.of points		9	8	7	6	5	4	3	2	1	78
Ratio		0,11	0,10	0,09	0,07	0,06	0,05	0,03	0,02	0,01	1
*Percentage		11,5	10,3	8,97	7,69	6,41	5,13	3,85	2,56	1,28	100

The percentages of value weighting of functions are presented in the last row of the table 2 and the product value is equal to the sum of the functions levels and is equal to 78.

## 4. Economic dimensioning of the functions – step 1

The cost of physical components of the jaw crusher is supplied to the function or functions which take part, shown in table 3, the functions – costs matrix.

The costs are approximated in the first step for the constructive variant of figure 1 and photo 1.

**Table 3** The functions – costs matrix. (\*Y coordinate, \*\* monetary units). Step 1.

No.	Parts	F u n c t i o n s										Cost part**
		..	F4	F5	F6	F7	F8	F9	F10	F11	F12	
1	Framework			370		60	55	20			5	620
2	Mobile jaw											
3			15			90	28	100	20	12	25	310
...												
...						70	60	10	40		30	490
...	...		720	500	550	220	200	300	250	180	110	5330
Total cost			735	870	550	440	343	430	310	192	170	6750
Ratio			0,19	0,19	0,01	0,05	0,01	0,04	0,06	0,08	0,02	1
Cost of functions			10,9	12,9	8,15	6,51	5,08	6,37	4,59	2,84	2,52	100

The percentages of the cost weighting of functions are presented in the last row of the table 3

## 5. Diagrams

The percentage values of the value and cost weighting of functions from the last row of tables 2 and 3 are introduced in table 4, where calculations are made using the method of least squares (\*MLS).

**Table 4** Computational elements for plotting the diagrams.  $^{**}S = \Sigma(Y_i - a \cdot X_i)^2$ ;  $^{***}S' = \Sigma(2 \cdot a \cdot (X_i)^2 - 2 \cdot X_i \cdot Y_i)$ .

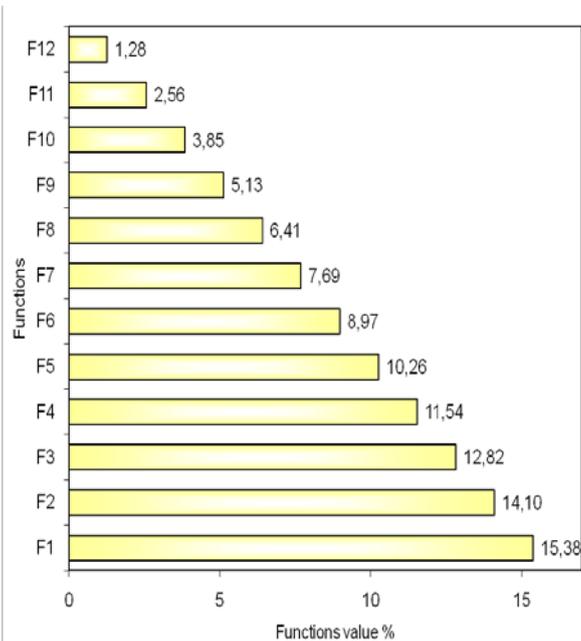
MLS	F u n c t i o n s										Total value
	...	F4	F5	F6	F7	F8	F9	F10	F11	F12	
$X_i$		11,5	10,3	8,97	7,69	6,41	5,13	3,85	2,56	1,28	100
$Y_i$		10,9	12,9	8,15	6,52	5,08	6,37	4,59	2,84	2,52	100
$(X_i)^2$		133,1	105,2	80,54	59,17	41,09	26,29	14,79	6,574	1,644	1068
$X_i \cdot Y_i$		125,6	132,2	73,12	50,14	32,57	32,66	17,66	7,293	3,229	1043
$^{**}S$		0,145	8,246	0,381	0,989	1,390	1,854	0,69	0,115	1,604	20,0
$^{***}S'$		8,784	-58,9	11,08	15,3	15,12	-13,9	-6,43	-1,74	-3,24	0

The parameters have the following computed values:  $a = 0,98$ ,  $\alpha = 44,3^\circ$ ,  $S = 20,1$  and  $S' = 0$ .

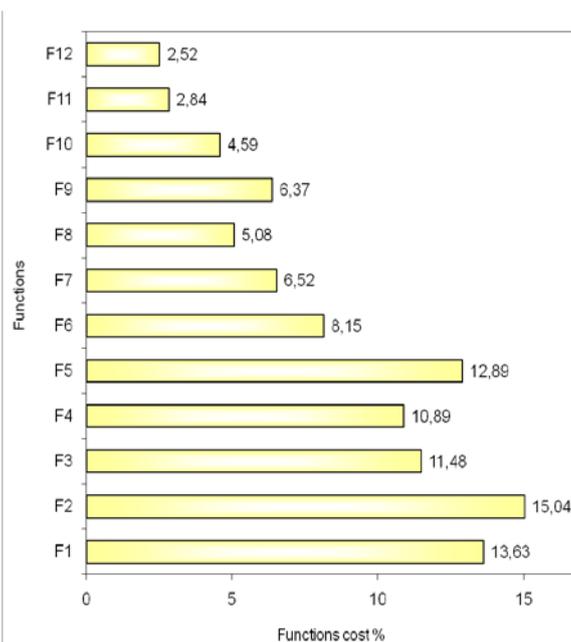
Based on the values for coordinates  $x_i$  and  $y_i$  presented in table 4 the diagrams of figures 2, 3 and 4 are drawing. The drawing of the diagrams is done automatically by a computer program.

The diagram of the value weighting of functions (figure 2), showing the ranking of the functions by their value, the diagram of the cost weighting of functions (figure 3), showing the ranking of the functions by their functional cost and the diagram of the value and cost weighting of functions (figure 4), showing the comparison between the percentages of value and cost weighting of functions. This diagram is the most important part, is actually one modelling of the Value Analysis approach applied to optimize the jaw crusher of economically and technically viewpoint.

The diagram of figure 3 reveals a Pareto type distribution, meaning that 20 - 30% of the total number of functions, include 70 - 80% of the total costs of the functions. These functions are F1, F2, F3 and F5.



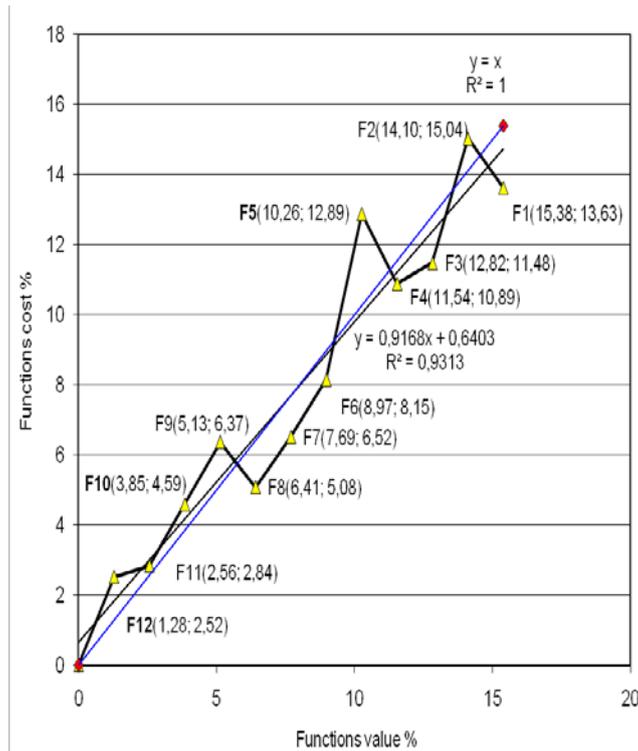
**Figure 2** Diagram of the value weighting of the functions. Step 1.



**Figure 3** Diagram of the cost weighting of the functions. Step 1.

The real situation is represented by the shape of the straight line in figure 4, plotted by means of the smallest squares method and showing disproportions in the distribution of costs and in the contribution of the functions to the value of the jaw crusher.

An analysis of the diagram of figure 4 showing that the functions F12, F11, F10, F9, F5 and F2 are located above the regression line, indicating high costs, not justifiable in relation to the value.



**Figure 4** Value and cost weightings of the functions. Step 1.

To reduce the cost of the functions F12, F11, F10, F9, F5 and F2 will be used in phase 3 of the Value Analysis study (phase of creativity, the search the ideas and the solutions) the morphological analysis presented in table 5.

This study will be made only for the four functions:

*F5 - supports the assembly, F10 - ensure rapid change defective components, F11 - ensure user safety and F12 - provide user interface.*

**Table 5** Morphological analysis

Functions	Possible variants
F5 - supports the assembly,	F5 <sub>1</sub> – welded framework, F5 <sub>2</sub> – screw assembly framework, F5 <sub>3</sub> – cast framework, F5 <sub>4</sub> – combined framework,
F10 - ensure rapid change defective components	F10 <sub>1</sub> – easily remouvable panels, F10 <sub>2</sub> – easily remouvable parts, F10 <sub>3</sub> – compact device, F10 <sub>4</sub> – simple device,
F11 - ensure user safety	F11 <sub>1</sub> – protective devices, F11 <sub>2</sub> – protective screens, F11 <sub>3</sub> – alarm systems, F11 <sub>4</sub> – functioning surveillance systems, F11 <sub>5</sub> – protects mouving parts,
F12 - provide user interface	F12 <sub>1</sub> – external shape, F12 <sub>2</sub> – color, F12 <sub>3</sub> – arrangement in space, F12 <sub>4</sub> – ergonomics,

The number of variants that can design with the technical solutions of this morphology, for these four functions is  $F5_i * F10_i * F11_i * F12_i = 320$ .

For these four functions, structural variants are still in large numbers, to find new technical solutions, can use several methods of sorting one new technical variant like: screening matrix, morphological

analysis through sequence, morphological analysis by listing ordered, morphological analysis by sampling, examined criteria, multi-criteria analysis.

An analysis from the technical and economic viewpoint will be carried out in order to select a technically optimum variant for one of the part.

## 6. Conclusions

In the first part of the Value Analysis study, in the paper entitled "DESIGNING A JAW CRUSHER USING VALUE ANALYSIS, PART I", was determined deficiencies functions of jaw crusher, which are:

F5 - supports the assembly,

F10 - ensure rapid change defective components,

F11 - ensure user safety and

F12 - provide user interface.

By identifying the deficient functions the directions of re-conception of the existing product are determined, with a focus on solutions for the constructive and technological achievement of these functions.

A correctly completed critical evaluation will directly lead to the identification of what can be called the deficient functions of the analyzed product, that is of those functions that include useless costs.

The deficient functions from the economic viewpoint appear as:

- very expensive functions in relation to the others,
  - too expensive functions in relation to the existing technical possibilities of achievement.
- In the second part of the Value Analysis study, in the paper entitled "RESIGNING AND OPTIMISATION A JAW CRUSHER USING VALUE ANALYSIS, PART II" will determine the optimal variants for one part of jaw crusher, the framework who contribute at the functions: *F5 - supports the assembly, F10 - ensure rapid change defective components, F11 - ensure user safety and F12 - provide user interface.*

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# Redesigning and Optimisation a Jaw Crusher using Value Analysis – Part II

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Implementation of Value Analysis in designing of industrial equipment is a demonstrated need for a long time in highly developed industries. Beneficial results of applying this creative, functional and very practical multidisciplinary approach can see at all the products that surround us in everyday life.

The paper presents a complete study of Value Analysis applied concretely to a selected part of one jaw crusher. The phases and iterative operation of the Value Analysis method are presented. Value Analysis combines both engineering and economics without, however, placing neither engineering nor economics first. They both are similarly important, as can be concluded by the end of this paper.

## Keywords

value analysis, optimum variant, jaw crusher

## 1. The Analysis of the Constructive Variants

In this second part of the Value Analysis study, continuation of the first part of paper entitled "DESIGNING A JAW CRUSHER USING VALUE ANALYSIS, PART I" will determine the optimal variants for one part of jaw crusher, the framework who contribute at the functions:

*F5 - supports the assembly,*

*F10 - ensure rapid change defective components,*

*F11 - ensure user safety and*

*F12 - provide user interface.*

The analysis of the constructive variants for the parts is presented on.

Table 6 presents the denoting by 10 assessment criteria of the analyzed constructive variants of the parts.

**Table 6** Synthetic table with the analyzed constructive variants.

No.	Analysis criteria	Type of mechanism		
		welded	screw assembly	cast
1	Functional characteristics	3	3	3
2	Semi-product	1	2	3
3	Mechanical machining	1	2	3
4	Mounting	1	1	3
5	Repair	2	2	2
6	Rigidity	2	1	3
7	Ergonomics	3	3	3
8	Aesthetics	3	3	3
9	Degree of protection	2	1	3
10	Cost	1	2	3
	TOTAL	19	20	29

## 2. Economic Dimensioning of the Functions – Step 2

The score obtained by the cast variant is less than the welded and screw assembly variants and choose the cast variant.

The cost of physical components of the jaw crusher is supplied to the function or functions which take part, shown in table 7, the functions – costs matrix for step 2.

**Table 7** The functions – costs matrix. (\*Y coordinate, \*\* monetary units). Step 2.

No.	Parts	F u n c t i o n s										Cost part**
		...	F4	F5	F6	F7	F8	F9	F10	F11	F12	
1	Framework			240		60	55	20			5	490
2	Mobile jaw											
3			15			90	28	100	20	12	15	300
...												
						70	60	10	40		20	480
...	...		720	500	550	220	200	300	205	160	90	5245
Total cost			735	740	550	440	343	430	265	172	130	6515
Ratio			0,11	0,11	0,08	0,06	0,05	0,06	0,04	0,02	0,02	1
Cost of functions			11,3	11,4	8,44	6,75	5,26	6,6	4,06	2,64	2	100

By introducing the new data into table 8 the diagrams of figures 5 and 6 are plotted.

These diagrams will be compared to those of figures 3 and 4.

**Table 8** Computational elements for plotting the diagrams. Step 2.

No.	MLS	F u n c t i o n s										Total value
		...	F4	F5	F6	F7	F8	F9	F10	F11	F12	
1	$X_i$		11,5	10,3	8,97	7,69	6,41	5,13	3,85	2,56	1,28	100
2	$Y_i$		11,3	11,4	8,44	6,75	5,26	6,6	4,07	2,64	2	100
3	$(X_i)^2$		133,1	105,2	80,54	59,172	41,09	26,29	14,79	6,574	1,64	1068
4	$X_i*Y_i$		130,2	116,5	75,76	51,951	33,74	33,84	15,64	6,7694	2,55	1056
5	S		0,016	1,481	0,186	0,7269	1,152	2,338	0,069	0,011	0,53	10,9
6	S'		2,946	-24,9	7,751	13,116	13,76	-15,68	-2,034	-0,536	-1,86	0

$$S = \sum(Y_i - a*X_i)^2; S' = \sum(2*a*(X_i)^2 - 2*X_i*Y_i).$$

The parameters have the following computed values:  $a = 0,99$ ,  $\alpha = 44,7^\circ$ ,  $S = 11$ ,  $S' = 0$ .

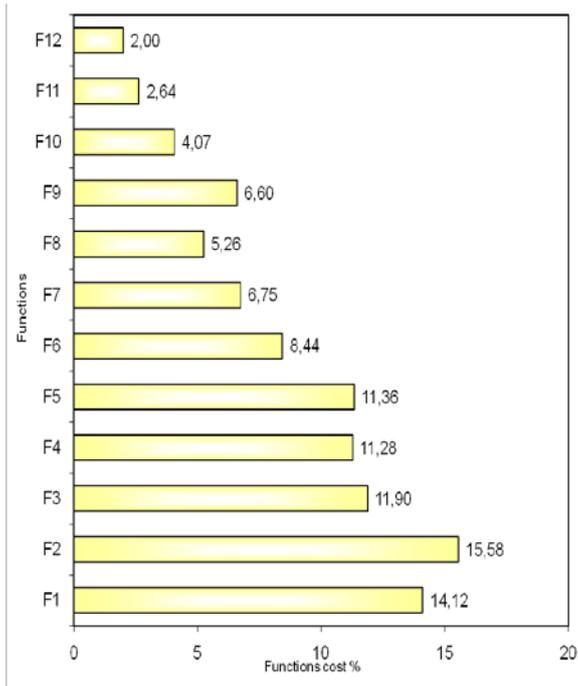
It can be noticed that S have smaller value than in the initial variant.

Table 8 provides the necessary values for plotting the following types of diagrams:

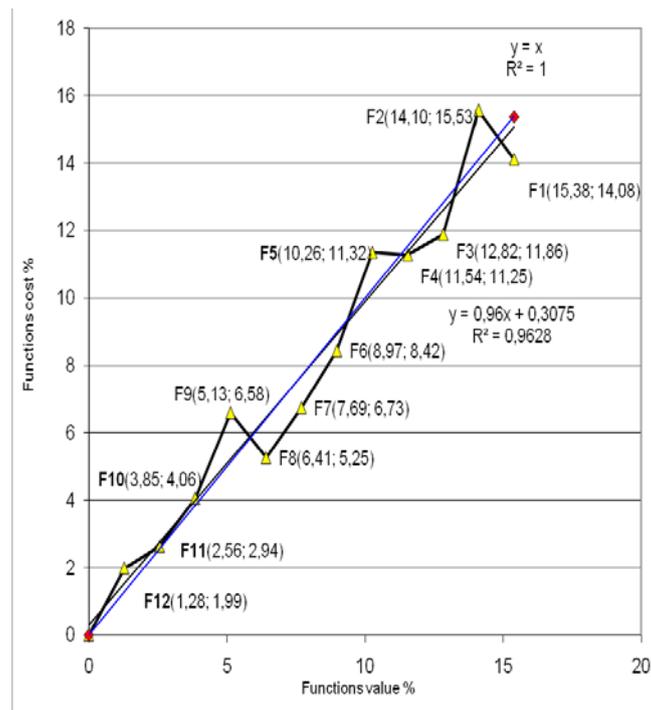
- the diagram of the value weighting of the functions is identical with figure 2; this diagram has not changes, as the value of the system and of the functions has remained the same,
- the diagram of the cost weighting of the functions (figure 5); the diagram of figure 5 presents the functions cost weighting,
- the diagram of the value and cost weightings of the functions (figure 6); figure 6 presents the value and cost weightings of the functions in step 2.

In this diagram is observed the developments of the cost of functions in step 2 of Value Analysis study:

1. F5 from 12,9 %, in first step of Value Analysis study (figure 3-part I) decreases to 11,3 % in second step of Value Analysis study (figure 5),
2. F10 from 4,59 %, in first step of Value Analysis study (figure 3-part I) decreases to 4,06 % in second step of Value Analysis study (figure 5).
3. F11 from 2,84 %, in first step of Value Analysis study (figure 3-part I) decreases to 2,64 % in second step of Value Analysis study (figure 5).
4. F12 from 2,52 %, in first step of Value Analysis study (figure 3-part I) decreases to 2 % in second step of Value Analysis study (figure 5).



**Figure 5** Diagram of the cost weighting of the functions. Step 2.



**Figure 6** Value and cost weightings of the functions. Step 2.

At the moment, in the second step the calculation shall be made as follows:

- others functions can be situated above the regression straight line,
- these are analyzed and their costs reduced, then the regression line is re-plotted and the functions relocated above it are noted; these functions too are analyzed in view of reducing their costs, followed by the re-plotting of the regression line, ..., etc., etc.

Hence the constructive solution is improved from one iteration to the other.

### 3. Conclusions

In two steps of Value Analysis study one part of jaw crusher, the framework who contribute at the functions: *F5 - supports the assembly, F10 - ensure rapid change defective components, F11 - ensure user safety and F12 - provide user interface* was redesign and optimized:

- from engineering viewpoint: from welded variant, to the screw assembly variant and finally to the cast variant.
- from the economic viewpoint (figure 7):
  - a. the cost of function F5 decrease from 12,9 %, in the first step of Value Analysis study to 11,36 % in the second step of Value Analysis study (decrease with 13,5%),
  - b. the cost of function F10 decrease from 4,59 %, in the first step of Value Analysis study to 4,06% in the second step of Value Analysis study (decrease with 12,9 %),
  - c. the cost of function F11 decrease from 2,84 %, in the first step of Value Analysis study to 2,64% in the second step of Value Analysis study (decrease with 7,47 %),
  - d. the cost of function F12 decrease from 2,52 %, in the first step of Value Analysis study to 2% in the second step of Value Analysis study (decrease with 26,2 %),

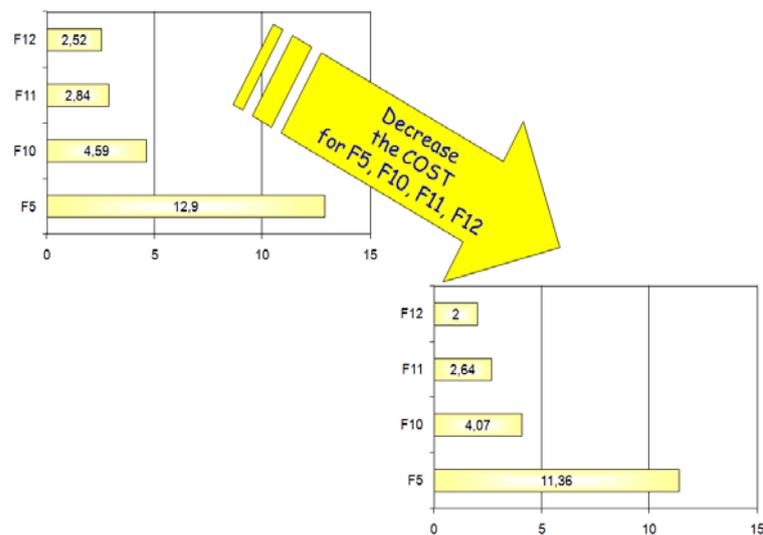


Figure 7

- in the third step of Value Analysis study are analyzed other functions above the regression straight line (for exemple F2, F9) and their costs reduced, then the regression line is re-plotted and the functions relocated above it are noted; these functions too are analyzed in view of reducing their costs, followed by the re-plotting of the regression line, etc. etc.
- in the third step of Value Analysis study are analyzed other functions above the regression straight line and their costs reduced, then the regression line is re-plotted and the functions relocated above it are noted; these functions too are analyzed in view of reducing their costs, followed by the re-plotting of the regression line, etc. etc.

At the end of the Value Analysis study the points are aligned as perfectly as possible along the straight line  $y = a * x$ , with a tilt of  $45^\circ$ , this is the optimal situation, the values weighting of functions and the functions cost weighting are equal, the final interest in Value Analysis study.

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# Trade fairs – a tool for the spread of innovation

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Trade shows in Europe have traditionally served as a tool for bringing innovations to market. This is particularly evident in business-to-business relationships. In many European countries trade shows are regarded as the secondary tool - after personal sales - in terms of efficiency and effectiveness in the presentation of new products and for entering new markets. Today the transformations associated with the development of the knowledge-based economy can be seen at trade shows. The primary sales functions of trade shows, which in the late twentieth century gave way to communication and relationships, are currently undergoing another change. All forms of knowledge sharing at trade shows are gaining increasing importance. It is no longer the same presentation of a new product. Knowledge about the possibilities of its application, modern technical knowledge and the ability to solve customers' problems is becoming a major element of trade shows. A manifestation of these changes is the growing interest in conferences and seminars taking place during European trade shows, resulting in the transformation of fairgrounds into conference centres. This trend has a different intensity in European countries, however, it is strong enough to be interesting in the context of the spread of innovation. This paper presents reflections on the nature of innovation and its diffusion, and then analyzes the changes in the function of trade shows and finally suggests a plan of a research.

## Keywords

Clustering and networking, knowledge transfer, trade fairs, conferences

## 1. Introduction

Trade fairs since their inception have been associated with innovation. The first exhibitions aimed exclusively to present the latest solutions and newest trends. In this paper we consider the trade fair in relation to the key elements proposed by Rogers in the study of innovation [1]: the innovation communication channel and entities of the trade fair model taken as a fair system of social innovation. Traditionally trade fairs are perceived as industry meetings concluded with a transaction, whereas trade fairs also have an information-promotional function. The appearance of non-selling aims does not stem from a decrease in the significance of the trade function of trade fairs, but is due to an increase in the significance of promotion in contemporary exchange [2]. The classic form of trade fairs is becoming blurred as a result of functional complementarity of meetings, events, conferences and the exhibition. Through convergence the trade fair is becoming a multifunctional industry event. Particularly noticeable is the trend towards combining trade fairs with conferences. However, in the research and publications on the trade fair industry not enough attention is being paid to this phenomenon. This paper aims to show the specificity of trade fairs and trade fair conferences as a tool for facilitating the sharing of knowledge and the stimulation of innovation and is conceptual in nature. The authors, based on a literature review and the research findings of an exploratory study offer a qualitative approach to studies on the role of the trade fair in the diffusion of innovation.

## 2. Trade fair development

Trade fairs have a long tradition in Europe. Today trade fairs have become a multifunctional and complex marketing tool that allows for the presentation of the enterprise and its products, and also facilitates contact between customers and contractors. Contemporary industry trade shows constitute at the same time a forum to present new products, services and ideas, to exchange information during meetings, seminars and conferences, and to make contacts and establish cooperation. Participation in trade fairs is treated first of all as a tool for communicating with the world and for building and sustaining contacts with other market players. Thus, trade shows today have three main purposes (applied to both groups of trade fair participants - visitors and exhibitors) [3]:

- to give companies access to information about the technologies,
- to enable producers to be in face-to-face contact with their competitors, clients or suppliers,
- to provide companies with the opportunity to meet existing partners without having to travel to many different locations [4].

In analyzing the results of research conducted by fair trade industrial organizations it should be emphasized that the objective of gaining information and knowledge about new solutions is declared by visitors to a greater extent than by exhibitors [5].

## 3. Trade fairs as an innovation communication channel

The knowledge-based economy is based on the creation, transfer and practical use of knowledge and information [6]. In the knowledge-based economy, the production of ideas rather than goods is the source of economic growth [7]. Trade fairs are events that contribute to one of the pillars of the knowledge economy as defined by the World Bank - the creation of the conditions for displaying and comparing innovations and for knowledge exchange. In this way, the trade fair organizer provides the institutional conditions for the development of the knowledge-based economy.

The impact on mutual learning and innovation results from interactions between spatial proximity and relational, institutional and social proximity. Torre [4], meanwhile, has shown that innovation does not require constant spatial proximity. However, it is necessary to temporarily support the various phases of the innovation process. From this perspective, trade fairs, as temporary organized forms of spatial proximity, enable companies access to knowledge and opportunities for interaction similar to those provided by permanent spatial proximity. Consequently, trade fairs can be viewed as temporary clusters [9] which gather together in one place actors from different regions, equipped with a diversity of knowledge and competence [10].

An innovation is communicated through certain channels over time among members of a social system [1]. Trade fairs are events during which the spread of abstract ideas and concepts, technical information, and actual industry practices from innovators to adopters take place. During trade fairs interactions and events specifically relevant for the first two stages of the innovation adoption process occur. In the knowledge stage the trade fair participants are exposed to innovations presented by exhibitors. During the persuasion stage the individuals interested these innovations may see the products, collect data, talk to exhibitors and compare their opinions with those of their competitors. The integration of conferences and seminars into trade fairs enables contact with opinion formers and market leaders who are influential in spreading information about an innovation [1].

In the initial period of their development, the success of the trade fair depended on the quality and quantity of its exhibitors. However, the trade fair model has changed - to attract exhibitors now it is necessary to ensure the adequate quantity and quality of the visitors. This has led to a shift in attention from the needs of the exhibitors to the expectations of the visitors.

Trade fairs allow the systematic acquisition of information about competitors, suppliers and customers and their technological and strategic choices. During trade fairs the participants try to get an overview of current technological and other trends. At most international trade shows, firms are said to have access to information about global developments and "buzz" [3]. As a result, trade fair participants can gain wide access to information about what is happening in their industry. This allows them to assess their own performance against that of the industry as a whole and to make decisions about their future strategies and new product development.

With the growing importance of knowledge in the economy, the development of new forms of communication during trade fairs, such as conferences, seminars and workshops, can be observed [11]. Trade fair conferences are designed for the process of knowledge exchange. For this reason trade fair-accompanying congresses and congress-accompanying trade fairs are increasingly

regarded and made use of as an attractive platform for knowledge transfer with an immediate effect. Participation in such types of meeting is a direct result of the objectives associated with the acquisition of knowledge about current news and trends in the market [2]. The factors contributing to this increase in popularity of new forms of trade fair communication also include the infrastructure owned by the trade fair operator, which is required for the staging of professional conferences.

## **4. Trade fairs as an innovation social system**

According to the Rosson and Seringhaus model [13], the trade fair is an event that can be analyzed through the prism of actor interactions, and more generally through the prism of the interaction network of the actors involved both directly and indirectly in trade fairs. The main participants of the exhibition are the representatives of companies in the given industry. The trade fair participants, the organizer and the environment in which the trade fair takes place are all contribute to relationships that exist both before and after the exhibition. This means the phenomena of the trade fair and its conferences may be analyzed in terms of the network approach.

### **4.1 Trade Fair Participants**

Trade fairs play a key marketing role in most industries and many firms allocate a significant portion of their marketing budgets to participation in these events. The exhibitors intensify their social relations with their customers during trade fairs and attempt to attract new customers, to market their products, to display new designs or functionalities and to negotiate potential contracts [14]. The global face-to-face interaction that takes place at international trade fairs in many ways acts as a substitute for the buzz that takes place in a permanent cluster.

Exhibitors maintain the large investments required to bring their innovations, prototypes, and expert personnel to trade shows in order to signal their competencies to current and potential customers [15]. An individual company's approach to the trade fair depends on its market position. If it is stable, its main objective is to meet with its clients and to reach out to new ones. However, start-ups, or those in the early stages of their development aim to get to know the market and to test their ideas about their marketing and selling arrangements. These companies will therefore be interested in more broadly-based fairs that attract regulatory and industry organizations, and incorporate parallel conference or education programs [16]. It seems important for innovating firms to focus on the spatial agglomeration of competitors, suppliers and customers during trade fairs. In the stages of maturity proximity is less important [8].

Trade fairs make many different sector trends visible and act as a test of the market acceptance of new products ready for launch as well as prototypes and design studies. In particular, small and medium-sized companies benefit from trade fairs because their innovations attract more interest in the spotlight of a trade fair than they otherwise would - almost 90% of the exhibitors at German trade fairs want to present innovations [17]. For visitors, access to new solutions and developments is far more important than any buying objectives [8], and the opportunity of seeing innovations is one of the most important factors attracting them to trade fairs. Industrial buyers attend trade shows to learn about new solutions, suppliers, and products [18]. By viewing products and prototypes and interacting with exhibitors and other market players, visitors obtain tacit knowledge about market offerings that would otherwise be difficult to acquire. However, visitor learning is often related to broader issues rather than to purchase [19,10].

### **4.2 Trade Fair Operators**

The trade fair organizer creates an institutional environment which guides and facilitates the actions needed to present innovations and exchange knowledge about them. In realizing this function, the role of the organizers of trade fair events has evolved from that of facilitating the physical space to the broader one of being a catalyst in the encounter of supply and demand. Their focus, which in the past was mainly on the exhibitor, has now become more balanced by the allocation of more of their resources to the acquisition of the sufficient number and quality of visitors [20]. The organizer has to find a suitable model of feedback effects of the trade fair, in which the relevant audience is attracted by the innovations presented by the exhibitors. The more populous and attractive audience that can see the exhibition, the more likely exhibitors are to present their innovations. It is essential to ensure

the participation of the market leaders because they are considered to be the industry's main sources of innovation and the most important information providers on current technologies and market trends. The organization of seminars and conferences can enrich the program, but not decisively affect the perception of the trade fair. However, in launching a new trade fair the conference program can act as a magnet – in this case, innovation won't be presented at the exhibition, but it may be said about them during a conference.

### **4.3 Influence Market**

Concerning the creation of conditions for innovation, industry bodies and the trade press and media are key groups in the influence market domain [21]. These are complementary institutions for the trade fair organizer. They may aim at familiarizing their members and readers with the industry's innovations and also at stimulating it. Industry organisations are often organizers or co-organizers of trade fairs. The industry media is an important partner for the exhibition organizer, and is also an important channel for informing the industry about the innovation occurring at the trade fair.

### **4.4 Trade Fair Cities**

Trade fairs are primarily treated by city authorities as an element which enriches the city's offer and is an instrument of its promotion. Trade fairs and conferences are activities which generate mass travel movements and are a high spending type of business tourism with profound effects on cities [22]. Trade fairs are perceived as attracting free-spending visitors booking downtown hotel rooms, eating at restaurants, and thronging theatres and night spots [23, 24]. From the city's point of view, trade fairs and conferences are mainly perceived as an element of business tourism. In this sense, trade fairs support and are a part of a city's tourist function. When treating trade fairs and conferences as a potential element to give a city a competitive edge, the question arises: to what degree should and may the city authorities influence their development. The question is especially valid with regard to the role of trade fairs located in Europe, since 60% of the 15 million square meters of exhibition space available worldwide is located in Europe [2]. Therefore, European cities attribute great significance to trade fairs in their strategic records. City authorities expect that a dependence of trade fairs on conferences rather than dependence of conferences on trade fairs will become more and more noticeable. Two common trends can be distinguished: the location of trade fairs within city limits and support for the convergence of exhibition and conference functions. Both phenomena may be taken as features that can be common patterns of European trade fair development [2]. Consideration of the impact of trade fairs on cities' innovation is hard to find in the literature. As trade fairs provide a rich arena for the processes of knowledge exchange where small observations or hints may lead participants into new ways of thinking and to change their scope for creating novel and profitable combinations of existing ideas and capabilities [9]. Contact with new solutions and, in particular, international market leaders during trade fairs can be inspiring and can stimulate innovation amongst the inhabitants of the city and local companies. This aspect is not yet understood.

## **5. Research proposal**

Despite the long history of the development of trade fairs and their important place in the economy, their role in the process of innovation diffusion has not been the subject of extensive research. The majority of the studies are "how to" articles or, at best, conceptual works [25]. Trade fairs are mostly approached from the exhibitors' point of view – their targets, decisions and participation evaluation, and, most of all, sales techniques [26]. The important role of trade fairs in the field of business-to-business marketing is stressed concurrently. A less-frequently considered option is the opportunity of using exhibitions for sales purposes as well as communicative ones [27]. Another research domain is drawing attention to visitors' aims and their comparison with those of exhibitors, as well as reflections on the functional role of trade fairs in urban development. Aside from general acknowledgements that such effects exist, there are no reference in the literature to trade fairs through the prism of knowledge sharing and the creation of innovation. The exceptions are a few works where the authors have looked at trade fairs and conventions as "temporary clusters", whereby because of spatial proximity knowledge sharing is easier among trade fair participants [9, 10].

To answer the fundamental questions about the extent to which trade fairs stimulate the processes of knowledge creation and dissemination it worth departing from the internal factors (from the trade fair

organizer's perspective internal factors can be treated exhibitor-visitor relations), and turn to "external" approaches. The network approach to innovation [28] emphasizes the importance of external relationships. The systems of innovation approach [29] places emphasis on the holistic and ubiquitous nature of innovation, and also on the complex web of interactions and on the institutional environment guiding and facilitating the actions and interactions of economic agents too. From an external perspective actors share knowledge through interrelationships and knowledge can be extrapolated only through interactions, which provide the basis for receiving new knowledge [30]. Assuming that during the diffusion of innovation process the trade fair acts as a channel of communication, as well as an element forming part of the social system, we will treat them as a network which is a collection of long-term relationships that occur between two or more entities [28]. It is an analytical approach, which assumes that within the networks continuous interaction, interdependence occur with a lack of clear boundaries and structure. Therefore, it focuses on how the structure and composition of ties affects companies and their relationships rather than how companies affect these bonds.

From a management perspective, an analysis of the interactive business world may be conducted within three dimensions: network pictures held by network actors, outcomes of interactions between actors, and efforts to influence the interactions between them [31]. In studying trade fairs as a channel for the spread of innovation, one must specify: (1) how distinguished actors perceive their position and role in the diffusion of innovation, (2) what kind of innovation outcomes are expected by these actors, (3) what resources are involved and what actions are undertaken by the actors when using trade fairs as a channel for the spread of innovation. The network approach should not lead to the loss of the previously-discussed effects resulting from the proximity of exhibitors and visitors to create temporary clusters. However, it is necessary to define a broader look at this issue, including the perspectives of the trade fair organizer, industry bodies and the cities / regions in which trade fairs are held.

## 6. Exploratory research

Due to the lack of reference studies our proposal is of a general nature, therefore it was decided to perform exploratory research. The conclusions will be used to construct the final research concept. The exploratory research was conducted in Poland, where trade fairs remain a very important marketing tool, especially in business-to-business relations. According to the data gathered in 2009, twenty companies organized 206 trade fairs and exhibitions, with the participation of 26,519 exhibitors (4,421 from abroad) and 883,330 visitors at exhibition space which amounted to more than 500 thousand square meters [32]. To explore the role of the trade fair and its associated conferences in the diffusion of innovation process a number of in-depth interviews were conducted with trade fair participants (from the construction and the stone industries), representatives of the trade fair organizer, representatives of the city authorities and representatives of industrial magazines.

### 6.1 Trade Fairs Participants

Interviews with exhibitors and visitors indicated that the role of trade fairs in the diffusion of innovation may depend on factors related to the particular industry. In industries where competition is very strong (as is the case in the construction industry), the trade fair is the right place to present new products and to seek information about innovations. However, if the industry is based on cooperation and good relations (as is the case in the stone industry), knowledge about new products is less significant. Other important factors are the structure of the industry and the role of its opinion leaders – if there are no such actors expectations towards trade fairs in the development of innovation are lower. Visitors to stone industry trade fairs do not perceive either the organizer or the trade press as entities that should stimulate the presentation of innovations at trade fairs. Such expectations were only held with regards to the exhibitors. With the increasing importance of the Internet, visitors have begun to look for possibilities for obtaining non-standardized information from previously inaccessible sources. Trade fairs, besides being a meeting place for sellers and buyers, have become a contact point between policy makers and designers, technologists and those responsible for new solutions. Responding to these demands, exhibitors now try to provide the presence not only of salespeople on the stand, but also of people with technical knowledge. however, they are unable to meet with all of the visitors who expect this. The solution to this problem is in communication based on the one-to-group model. During trade fairs this may take the form characteristic of conferences: from meetings to large conferences, seminars, and in some industries even congresses. Interactions traditionally made at the stand will also be transferred to other locations: dedicated spaces for presentations, as well as conference areas.

## **6.2 Trade Fair Organizer**

The representatives of the trade fair organizer perceived their role quite differently than the other respondents. They drew attention to the significant increase in the number of conferences organized by the exhibitors during the fair. In their opinion there is still not enough interest in these conferences from the visitors. According to one representative of the organizer, the main reason for this lies in the attitude of Polish exhibitors to trade fair conferences. Following a European trend, they have now begun to communicate with visitors through conferences, but they still do not put much emphasis on this, instead focusing on activities related to the stand. The result is that their participation in conferences is well-prepared in terms of organization, but in personal terms and with regard to content visitors expectations remain unfulfilled. However, respondents stressed the dual character of the conferences staged by the exhibition organizer, which may complement the fair (in the situation where the markets are developed and there are active professional organizations) or are a major attraction for visitors who have the opportunity to participate in these conference and also meet exhibitors at the stands (e.g. in the medical and gardening industries). This occurs when new trade fairs are launched and if there are no professional industrial organizations or they do not hold a strong/leading position. The representatives of the organizer claimed their organization to be a major player in the market. In their opinion it is important for exhibitors that the organizer stimulates the sharing of knowledge (by organizing conferences, competitions and demonstrations).

The trade fair organizers seem to be oblivious to the innovative impact of the exhibition on the environment in which it is held. Research conducted by the Polish exhibition industry on its impact on the national economy included the relationships between exhibitions and various elements of the micro- and macro-environment but not on innovativeness [32].

## **6.3 Influence Market**

A direct in-depth interview with a representative of the media industry indicated that an attempt was being made to create a position integrator industry, and also to transfer information about innovations within industry. From this perspective, the trade fair is an event that helps them to develop their image as a promoter of innovation, for example, by organizing conferences and demonstrations. Therefore, the organizer of the trade fair can be a media partner, and also a competitor. The information gathered on the role of industry organizations indicates that their position in many industries in Poland is poor and that trade fair participants, trade fair organizers and the media do not perceive them as pro-innovation forces.

## **6.4 Trade Fair City**

An in-depth interview with representative of the local authorities dealt with two related issues - the impact of trade fairs on the development of the city, and factors related to ownership, since the city of Poznan is the co-owner of the trade fair organizer and its grounds. From the perspective of the city authority representatives trade fairs as a business activity (together with the supporting infrastructure), have a vital importance in the city's socio-economic development. The consequence of this is the fact that trade fairs have an impact on the city's identity, and cities can build their image as trade fair cities and use trade fairs for promoting themselves. The research confirmed that the city authorities perceive trade fairs and conferences mainly through the prism of business tourism. On the other hand, respondents see the role of trade fairs and conferences as a place for knowledge sharing and the diffusion of innovation. This attitude was reflected in a promotional campaign for the city launched last year based on the slogan "Poznań - city of know-how". However, the potential of the trade fair as an event which brings together innovations is not used at all. There are also no efforts aimed at inducing the city's inhabitants, local entrepreneurs, or university staff and students to get to see new innovations during the trade fairs.

## **7. Conclusions**

The results from the previously-discussed preliminary studies show that the network approach can give valuable information on the role of the exhibition space in the spread of innovation and the perceptions of the roles of different actors in this process. Noticeable were the claims by survey respondents of having significant places in the network whilst devaluing the roles of the other entities.

Contrary to the idea of cooperation in business networks, the actors in the network surveyed were convinced that they can conduct their innovation activities independently of others. It is therefore necessary to continue research in this area. The research design should facilitate the identification of the impact of trade fairs on the spread of innovation. This would require the gathering of information at several points in time both before and after the trade fair. In relation to the lack of cooperation between the actors in a network, an element of the study should be to develop a picture of the network. By identifying the links between actors in the spread of innovation as reflected by the respondents and incorporating the element of time it should be possible to better understand the phenomenon of trade fairs and conferences. The main limitation of the studies may be the lack of portability of proven business networking applications to others, as yet unexplored. It appears that the system is dependent on the structure of the industry, the role of the markets in the economy of the country and the relationship between the city and the organizer of the trade fair.

In designing further research, the place of the trade fair organizer in the industry should be taken into consideration. The case of Poznan International Fair, as a state-owned company that is the market leader, is unique. In the times of socialism and the centrally-planned economy exhibitions held in Poznań were treated as a “window on the world” for many industries and Poznan International Fair was seen as the pivotal player. To this day this image may remain in some industries. Meanwhile, the trend, which started in Germany, for creating and organizing trade fairs in the vicinity of industrial clusters can also now be seen in Poland. In this situation, the perception of the position and role in the network of the trade fair organizer can vary significantly.

The research results may be significantly affected by cultural and national contexts, since trade fairs play different roles in different parts of the world. In the USA, the trade fair is mainly a meeting place for buyers and sellers. In Europe, the importance of communication and relationship-building can be observed: in Germany, trade fairs, at which there are at the same time and place a dozen or so specialist shows, play a significant role as a communication tool for companies with the market. In the UK, on the other hand, the importance of trade fairs is rather low, with conferences and marketing events developing dynamically instead [33]. Cultural factors should be taken into consideration in further research. There are several dimensions in which Central and East European Countries trail far behind the other EU countries. In the production sectors, the CEECs have a structure resembling the characteristics of the industrial society, while the EU as a whole is more a prototype of the post-industrial society. The CEECs have a different pattern of research funding, and they are also lagging behind in overall research funding [34]. In these countries, in the days of the centrally-planned economy, trade fairs were an essential tool for gaining foreign contracts. Since the fall of socialism, trade fairs have been used by foreign investors to enter these new markets, and therefore trade fairs should still be considered as an important channel for contact with innovation.

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# ICT and Regional Inequality in Croatia

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Technology is becoming increasingly important element for economic competitiveness. International trade of goods and services is constantly changing as a result of the development of ICT - Information and Communication Technology. By interconnecting information technologies we can increase both amount and value of information available to individuals, firms, markets, and governments, allowing them to make more efficient choices and to achieve better performances. Development of ICT industry represents technical advantage in many sectors, and has uplifting influence on economy and society altogether. Fast flow of information through different platforms, is important for development of new services, and for increase of number of IT firms. Croatian ICT industry lags in strength and outspread when compared with ICT industry of EU members. This paper will present current development of IT industry in NUTS II regions, and of each individual region in Croatian IT industry, paper will also include an insight in trend expected changes in the IT industry.

## Keywords

Information and Communication Technology (ICT), IT industry, Croatian economy, NUTSII (Nomenclature of Territorial Units for Statistics), regional competitiveness

## 1. Introduction

Information and communications technology (ICT) has become a major driver of economic growth. Investment in information and communication technology has enabled new technologies to enter the production process, to expand and renew the capital stock, and to sustain economic growth. Diffusion of the Internet, of mobile telephony and of broadband networks all demonstrate how pervasive this technology has become.

Information society is of great significance for EU governments and their policies. Consequently they are actively working on regulatory framework for infrastructure and services, stimulation of technological research and applications development, raising awareness of the significance of information society, and monitoring indicators which are important for measuring influence of ICT on economy, society and culture. Many EU initiatives and interventions, including the financing of economic development, are a part of ICT and information society development framework.

Information and communications technology includes information and communication equipment, software, support services, information services and communication services. According to European Information Technology Observatory and in cooperation with IDC, the world ICT market in 2007 was worth 2.115 billion € (Europe 33.1%, US 28.4%, Japan 13.7%, others 24.8%) of which telecommunication market was worth about 1.137 billion € (Europe 31.7%, US 20.5%, Japan 13.8%, others 40.0%) and IT market was worth about 987 billion €. Croatian IT market in 2007 was worth about billion dollars.

## 2. IT industry in Croatia

Croatia is one of the leading countries of Central and Southeast Europe in application of ICT in economy, but it is still behind some more developed EU countries. Existing administrative division of Croatia matches the statistical criteria NUTS I (entire Croatia), NUTS II (North-West Croatia, East

(Pannonia) Croatia and Adriatic Croatia (Table 1.), NUTS III (counties) and LAU 2 (municipalities and cities).

Relevant data, assorted by counties, necessary for measuring regional competitiveness in IT industry, according to NUTS II (Nomenclature of Territorial Units for Statistics), was provided by FINA (financial agency).

**Table 1** Regional division of the Croatian NUTS II

	Area (km <sup>2</sup> )	Population (number)	Population (%)	GDP per capita PPS 2003 (EU 27 = 100)
Central and East (Panonian) Croatia	23.174	1.351.517	30,46	36
Adriatic Croatia	24.696	1.427.008	32,16	50
North-West Croatia	8.672	1.658.935	37,38	66
CROATIA	56.542	4.437.460	100,00	52

Source: Croatian bureau of statistics[4]

ICTs are highly pervasive technologies and the ICT sector underpins growth in all sectors of the economy. Research shows that service enterprises in the ICT sector are among the three most innovative companies in the entire service sector.[1] Europe has been experiencing an increase in research and development expenditure in the service segment of the ICT sector, especially in the software industry, which has compensated for the decrease in the research and development expenditure in ICT manufacturing.[2] When the Croatian ICT sector is concerned, the service industry outperforms manufacturing. ICT services have been growing faster than the average of the ICT sector, and the lot of employees in the ICT sector belongs to services. In 2008. there are 83,000 active companies in Croatia, including also 2,630 in the field of information technology.

Indicators of IT industry development and its changes in Croatia, from 2002 to 2007 are shown in table 2. All three monitored indicators of development of IT industry in Croatia (Number of IT companies per 1000 inhabitants, Number of employees in the IT industry per 1000 inhabitants, and Average revenue per IT Company (million Kn.)) show a growth rate of 7 – 10% in monitored period of time (2002 - 2007).

**Table 2** An indicator of development of Croatian IT industry, 2002-2007.g.

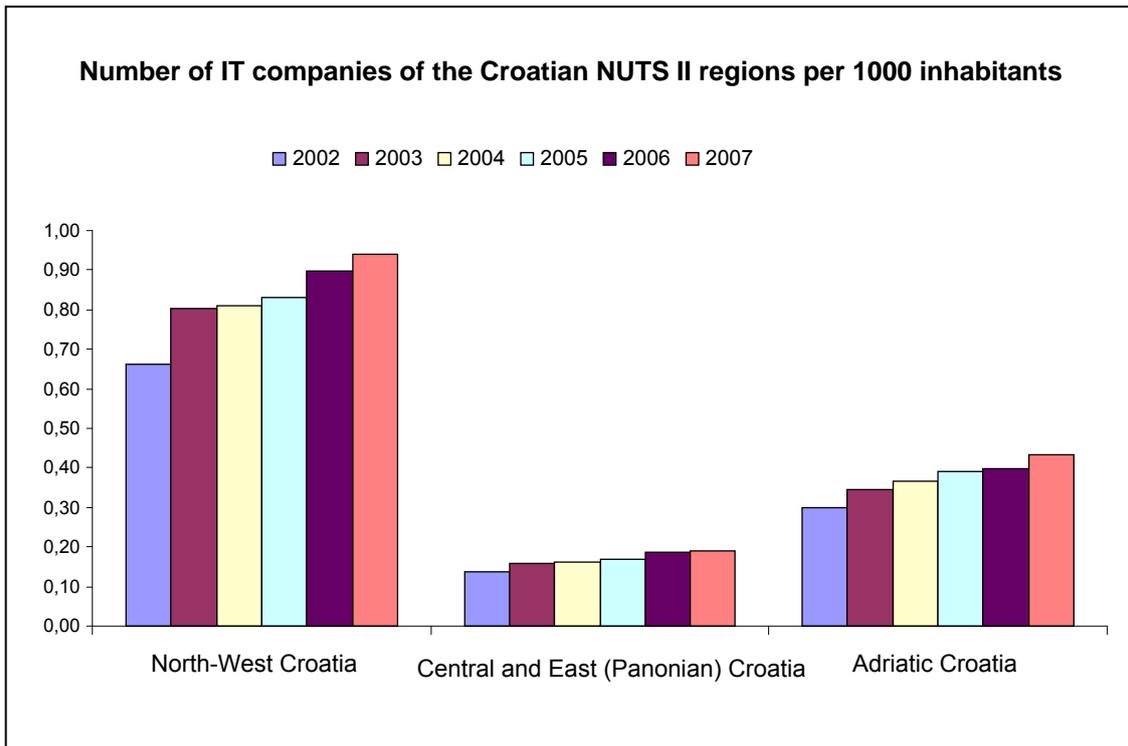
	2002	2003	2004	2005	2006	2007	Growth Rate 2007/02
Number of IT companies (per 1000 inhabitants)	0,39	0,46	0,47	0,49	0,52	0,55	7%
Number of employees in the IT industry (per 1000 inhabitants)	1,52	2,05	2,08	2,18	2,44	2,68	11%
Average revenue per IT Company (million Kn.)	2,95	3,92	3,86	4,25	4,64	4,86	10%

Source: Financial Agency (FINA), author

North-West Croatia with its growth rate of 11% in the monitored period is the greatest contributor to the development of IT industry in Croatia.

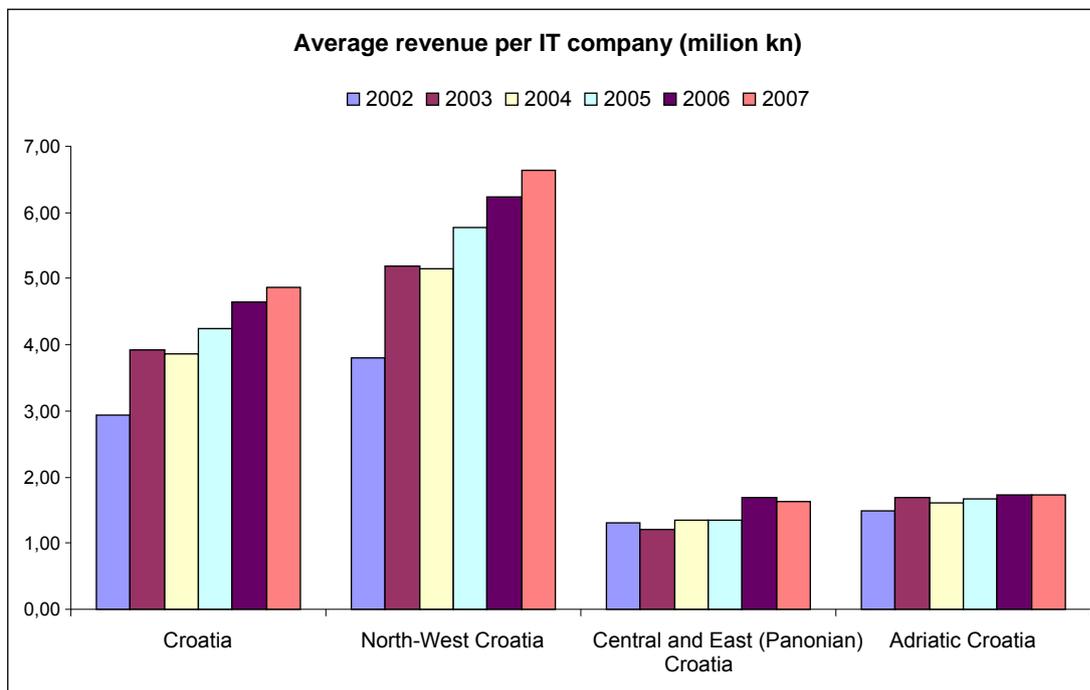
## 2.1 NUTS II Croatian Regions IT industry

All three NUTS II regions have a positive growth rate in the monitored period, as shown in figure 1, (North-West and Adriatic Croatia +7%, Central and East (Panonian) Croatia +6%)



Source: Financial Agency (FINA), author

**Figure 1** Number of IT companies of the Croatian NUTS II regions



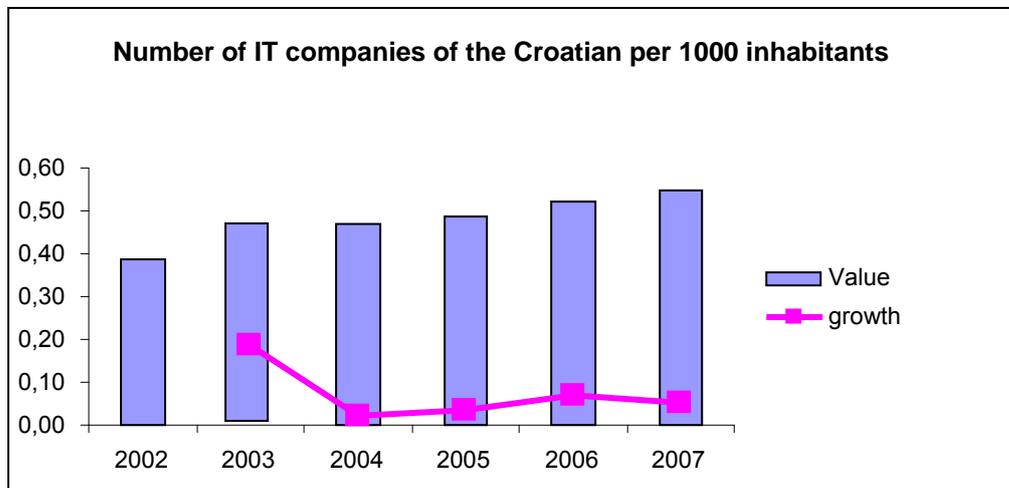
Source: Financial Agency (FINA), author

**Figure 2** Graphic indicators of competitiveness of Croatian and its NUTS II region

Average income for IT company from North-West Croatia is 36% higher than Croatian average (figure 2.). Reason for that is found in the fact that Zagreb, capital city, with its high population density, good infrastructure and large number of IT companies is part of North-West region. All other counties in North-West region have much smaller income per IT company than Zagreb county.

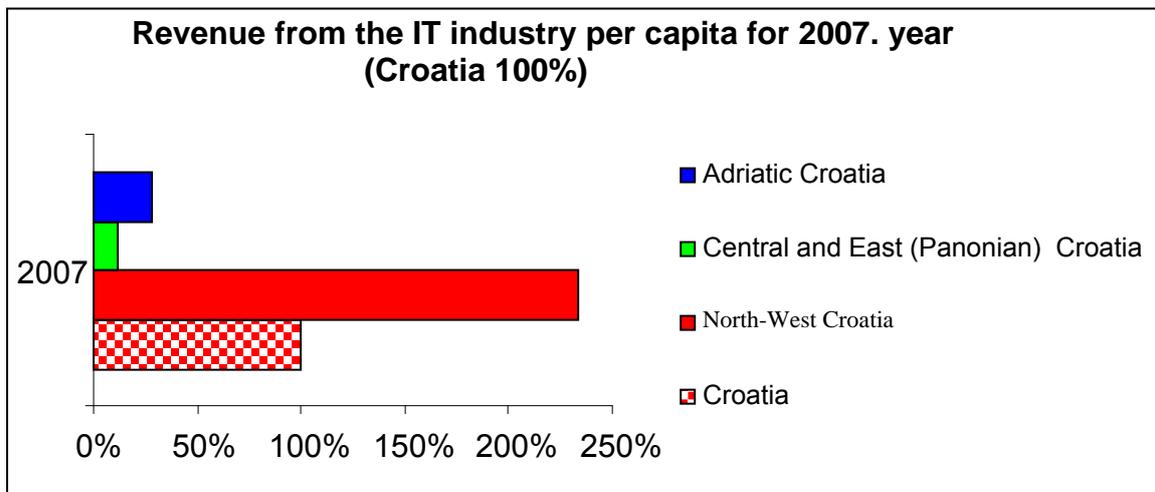
Central and East (Panonian) and Adriatic Croatia are below Croatian average by all competitiveness criteria. Looking at number of IT companies and their growth rate in the monitored period (Figure 3)

we can notice a fall of growth in 2006.- 2007. period. Figure 4 shows comparison between average income of IT industry per capita of all regions and of Croatia whose income is shown as 100%. It is clear that Central and East (Panonian) region has the least share in overall IT industry income. North-West region participates with 67%, Adriatic region with 17%, and Central and East region with 16% of overall income.



Source: Financial Agency (FINA), author

Figure 3 A graphic representations number of IT companies of Croatian



Source: Financial Agency (FINA), author

Figure 4 Revenue per capita of Croatian for 2007. year

### 3. Trends in IT industry

Hardware (PC, servers, printers, peripheral devices, networking equipment, etc.) holds the largest share of IT market. In the monitored period overall number of IT companies has significantly increased, index change is 42% and growth rate 7%, and employment rate in IT industry shows index change of 77% with change rate of 11%. There is visible increasement of number of employees in IT industry. According to information above we can easily come to conclusion that in market segments of software and services there is room for more intensive development than in hardware segment. Average IT company income in monitored period has index change of 57% with a growth rate of 10%.

Growing number of IT companies and of their employees is recorded in all regions, with North-West region leading in all the monitored segments. Growth rate of IT companies is almost same in all regions, but when it comes to number of new employees and average income North-West region is leading with employees growth rate of 13% and IT company income growth of 11%. Central and Eastern region is the following with the employees growth rate of 9% and IT company income growth of 4%. Adriatic region takes the last place with the employees growth rate of 8% and IT company income growth of 3%. But in 2007 Adriatic region has almost two times more IT companies and employees in IT industry per 1000 inhabitants, and 7% larger income per IT company than Central and East region.

Development of ICT industry represents technical advantage of multiple sectors and has an uplifting influence on economy and society overall. Research and investments in ICT will not bring much use by itself, unless the application of ICT in services and products is developed, and economy is adapted to new business models that ICT enables. Main areas of ICT influence on economy are organization structures, acquisitions and application of new knowledge. Financial crisis has also hit the IT industry which is now after years of growth facing the decline of business activities (figure 5.). In 2009, computer equipment, software and IT services sale, in Croatia, have dropped 17%, and last year (2010.) the fall was reduced to 5%. Although the recovery of croatian market, largest in the region with the share of 41%, is on the horizon prognosis for 2011. predict only further reduction of the fall.

All of the above urges the IT industry to restructure and rethink the ways of doing business but also at the same time opens new business opportunities.

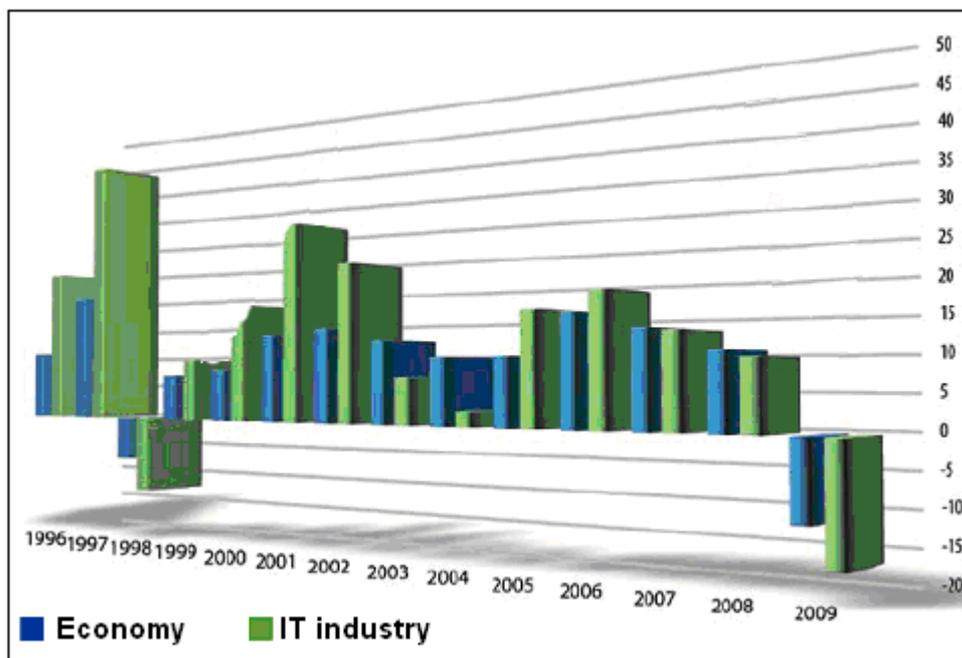


Figure 5 Revenue Croatian economy an IT industry from 1996. to 2009. year

#### 4. IT technology and the Internet

In any industry, Internet performs a number of discrete but interconnected activities that affect the activities, such as operating fabricating, sales or delivering products. Convergence between enterprise intranets and the Internet contributes to development of services such as content distribution and access infrastructures directly offered on the Internet.

Speed of information flow through different platforms is important for; development of new services, increasing the number of IT companies, and increasing the number of employees and income. Availability of broadband internet is one of the basic elements through which the local administration attracts investments, enable distance learning, and enable adequate healthcare.

Table 3. shows number of users of broadband networks and number of internet users in Croatia. There was no data for 2002-2003 period so we monitored only 2004-2007 period. Number of broadband network users has increased in the period from 2003 to 2007 with the growth rate of 94%. In 2007 Croatia has 387.050 users of broadband networks and the number of internet users has increased to 1.984.850, with a growth rate of 12%.

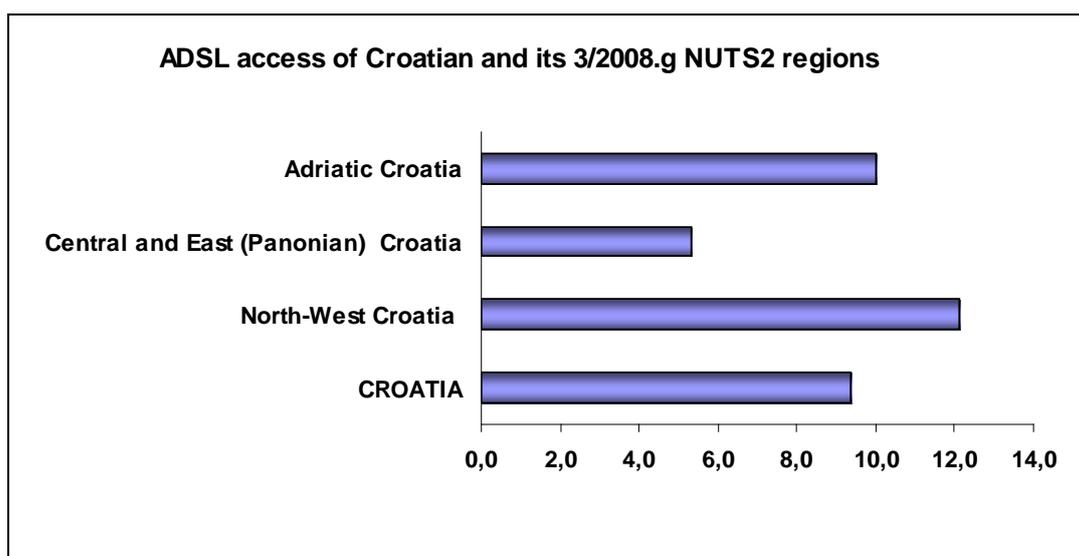
Number of broadband ADSL networks sorted by NUTS II regions is shown in figure 6.

Figure 6. shows number of ADSL accesses for Croatia and its NUTS II regions. Accesses per 100 inhabitants on 3/2008.; North-West region (12,1), Adriatic region (10) and Panonian region (5,3).

**Table 3** Review of Croatian telecommunications indicators 2002 -2007

	2002	2003	2004	2005	2006	2007	Index change	Rate change
Broadband access subscribers			23000	116000	251800	387050	16,83	94%
<i>change</i>				404%	117%	54%		
Total number of Internet Users			1375328	1472400	1684600	1984850	1,44	12%
<i>change</i>				7%	14%	18%		

Source: T-Hrvatski Telekom, author



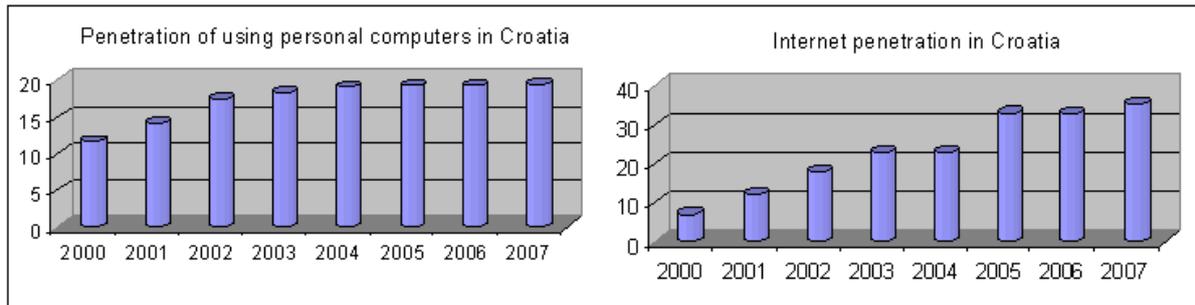
Source: Telekom, author

**Figure 6** Croatian ADSL access 3/2008.g per 100 inhabitants

Penetration of personal computers is a standard indicator used to show the basic parameters of information development of a certain country.

Taking in consideration uneven methodology, available data is very heterogeneous. Having that in mind we have taken data from International Telecommunication Union as referent. ITU uses a calculation of number of computers per 100 users as an indicator of penetration of personal computers in certain country.[3]

Figure 7. shows penetration of computers and broadband internet in Croatia for the 2002-2007 period. It is clear that Croatian users score better in internet access than in personal computer penetration.



Source: ITU, author

**Figure 7** Penetration of computers and internet in Croatia for the 2002-2007 period.

## 5. Conclusion

Development of ICT industry has a positive effect on entire economy, with an emphasis on knowledge transfer from ICT to other activities. There are problems concerning analysis of ICT industry in connection with official classification of ICT industry which is based on NACE classification. ICT companies are partly classified within the industry. Croatian companies in non-financial segment with ten or more employees relatively early adopt ICT (over 95% of companies has internet access). On the other hand when looking at effective use of ICT Croatian companies have weaker results than EU 25.

All three NUTS II regions of Croatia show growth trends in IT industry. Central and East region shows the lowest results and North-West region is gone far ahead, with the income of IT companies in 2007, 36% higher than Croatian average. There is a strong interest in all regions for better use and improvement. Croatian IT industry is still falling behind when compared with EU members. Impact of telecommunication technology is still weak on developing markets because the effect on GDP growth starts after a long period of economic adjustment to new technologies and after reaching awareness of the necessity for a total reorganization of business processes according to the availabilities that ICT provides.

Lack of investments in ICT is visible throughout Europe but particularly in Croatia. There are many reasons for it but lack of managerial skills and knowledge and low level of ICT utilization are primary.

The growth in the European ICT services industry largely has been driven by innovation particularly within telecommunications and ICT consultancy, who have exploited new mobile technology and rapidly diminishing processor costs.

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# Innobarometer Romania 2010

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The innobarometer analyzes and sets hierarchy of region development capacities, in order to create and maintain innovation at the level of economic operators. Regional innovation scoreboard is compared to Romania's 8 development regions. This is being calculated based on the 64 analysis criteria (indicators), included by the innobarometer : 57 quantity criteria and 7 quality criteria. Data has been extracted from official sources, exhaustive research, statistic inquiries and various polls.

In order to get a more accurate view on regional innovation, we have elaborated an evaluation chart, based on 5 innovation criteria: potential of innovation management, potential of generating knowledge, capacity of innovation and integration in a relation based system, innovation activity performance and intellectual property.

Each factor has been divided into sub factors of characterization, after which a number of 16 sub-factors have been obtained. Each sub-factor received an evaluation indicator (criteria). The regional innovation scoreboard has been obtained by aggregating the 16 sub-factors.

Hierarchy has been set from the most innovative to the least innovative. The relatively large number of criteria used by the innobarometer ensures a clear view on innovation for covered regional economies and serves as back-up, in case of misinterpreting one certain criteria. The impact of a single criterion is limited.

Regional innovation is a field of economic knowledge, which analyzes factors and politics which influence the capacity of a certain region, in order to create and maintain an environment which supports novelty for its enterprises and which grants enhanced prosperity to the local population.

Enterprises are highly dependent on the environment in which they activate. Some regions support innovation more than others do, by creating an environment which facilitates innovation of economic operators and by encouraging long term duration. The innobarometer sets hierarchy and analyzes those regional environments.

## **Keywords**

Innobarometer, Innovation, Potential of innovation management, Region development capacities, Regional innovation

## **1. Introduction**

### **1.1 What is the innobarometer?**

The Innobarometer is a report on innovation at the level of development regions and also an access point towards regional innovation, offering landmarks and targeting tendencies which highlight the regional economy innovations.

The Innobarometer analyses and classifies the capacity of regions to create and maintain an environment that sustains innovation. Innovation at regional level is not restricted to the introduction of

what is new, because access to what is new is favored by political, social and cultural aspects at regional level. Thus, the regions must provide an environment that has the most efficient structure, institutions and policies, which encourage innovation at the level of the economic operators.

The Romanian 2010 Innobarometer covers the 8 development regions.

The evaluation criteria were chosen following a thorough research performed by the Technology Information Center IRECSON (TIC-IRECSON) using the economic literature, international and national sources, appraisals of the business community, of the RDI community, of public local administrations and academics, as well as the results gathered from research and development projects. The criteria will be revised and updated on a regular basis, since there are always new theories, research and data, and the economy evolves. A close collaboration with the innovation and technology transfer entities, members of the ReNITT network (Technology Information Centers, Technology Transfer Centers, Technology and Business Incubators, Science and Technology Parks) also contributes to the existence of relevant data, as much updated as possible, about the innovation and technology transfer activity at regional level. In the innovation and technology transfer field, ReNITT is a unique network at the national level, made up of 55 entities that collaborate in order to promote the technology transfer processes at national and regional levels.

## **1.2 What does the Innobarometer analyze?**

The Innobarometer analyses and ranks the capacity of development regions to create and maintain an environment that supports innovation at the level of economic operators. The regional innovation scoreboard is presented comparatively for the 8 regions. Its calculation is based on 64 criteria (indicators) for analysis, included in the Innobarometer: 57 quantitative criteria and 7 qualitative criteria. The data were gathered from official sources, through exhaustive research, statistical surveys or opinion polls.

In order to gain an overall view of innovation at regional level, a model of appraisal was drawn up. It is based on 5 innovation factors: innovation drivers, knowledge creation, entrepreneurship, applications and intellectual property. Each factor was divided in descriptive sub factors, thus obtaining 16 innovation sub factors, to which appraisal criteria (indicators) were attributed (Innovation, Cooperation and Collaboration, Carrying out new products/services/technologies, market modernized or implemented by new/market modernized technologies, CDT Activities, Consultancy Activities, Promotion Activities, Marketing and Distribution, Technical and Economical Documentation, Invention Patents, Protected Industrial Designs and Models, Others (copyright, trademarks, recipes, geographical indications, vegetal and animal species etc), Formal and Informal Education, Staff involved in research activities, in marketing, promotion, forecasting and supervising the economic environment, Sustaining Innovation in front of public authorities, Public/Private Potential of generating knowledge).

By aggregating results extracted from all 16 sub factors, we have obtained the regional innovation degree. The regions are ranked from the most to the least innovative. The relatively high number of criteria used by the Innobarometer provides a clear image of innovation for the regional economies that were analyzed and serves as a guarantee if a certain criterion is misinterpreted. The impact of a single criterion is limited.

### **1.2.1 What does this mean exactly?**

Innovation at regional level is a sphere of economic knowledge, which analyses the factors and the policies influencing the capacity of a region to create and maintain an environment that supports innovation for its enterprises and ensures a greater prosperity for the population.

This means that the enterprises depend to a large extent on the environment in which they operate. Some regions sustain innovation more than others, providing an environment which facilitates the innovativeness of economic operators and encourages long term durability. The Innobarometer ranks and analyses these regional environments.

### **1.2.2 Why is the innobarometer unique?**

The Innobarometer can be considered the first point of access to innovation at regional level, since it is an annual publication containing benchmarks and objective innovation tendencies. It can also be considered a national benchmark for statistics and poll data that signal innovation at the level of

development regions. It primarily focuses on relevant data and the collaboration with the 55 members of the ReNITT network. It is easy to accomplish the analysis of a region's economic situation or to obtain classifications based on certain economic aspects, but it is very difficult to find comparable data about innovation in the 8 regions. In fact, the Innobarometer is a matrix with more than 60 criteria regarding the 8 regions, which are then introduced in various classifications.

### 1.3 Who uses the Innobarometer?

The Innobarometer is a dynamic benchmark, which will be permanently updated for the decisional authorities. The business community will use it as an essential instrument in determining the investment plans and the appraisal of locations for accessing what is new. The regional development agencies and public local administrations will discover important indicators, in order to compare their policies with those of other regions and to appraise the innovation performance through the course of time. The academic community will be able to use the data in the Innobarometer in order to better understand and analyze the way in which regions (and not just enterprises) compete on the market.

## 2. INNOVATION SCOREBOARD AT REGIONAL LEVEL

### 2.1 Innovation scoreboard of development regions

Place	Development region	Score
1.	Bucharest-Ilfov	72,49
2.	South-East	31,73
3.	North-West	29,56
4.	North-East	29,44
5.	Center	28,90
6.	South	28,04
7.	West	26,05
8.	South-West	21,35

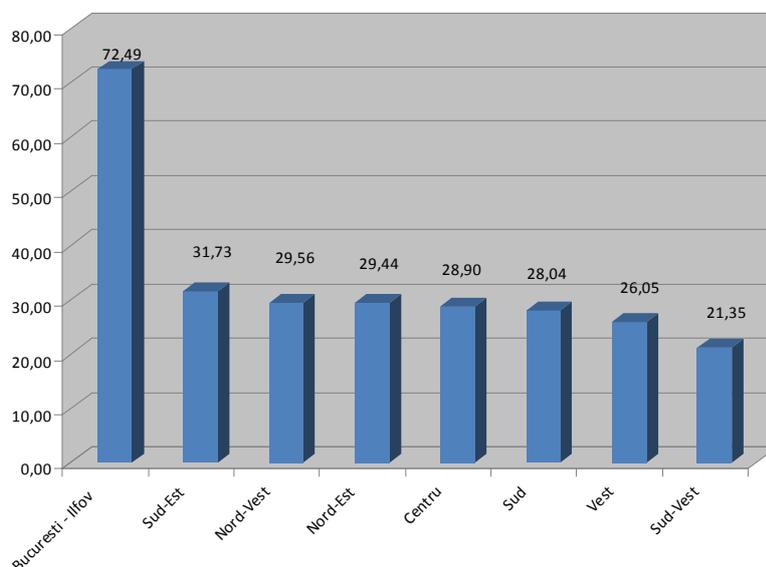
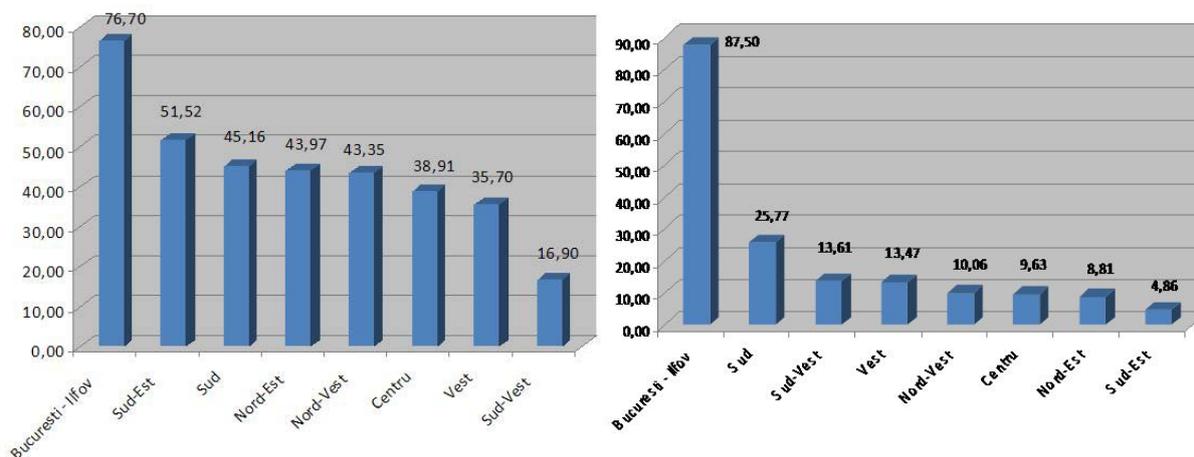
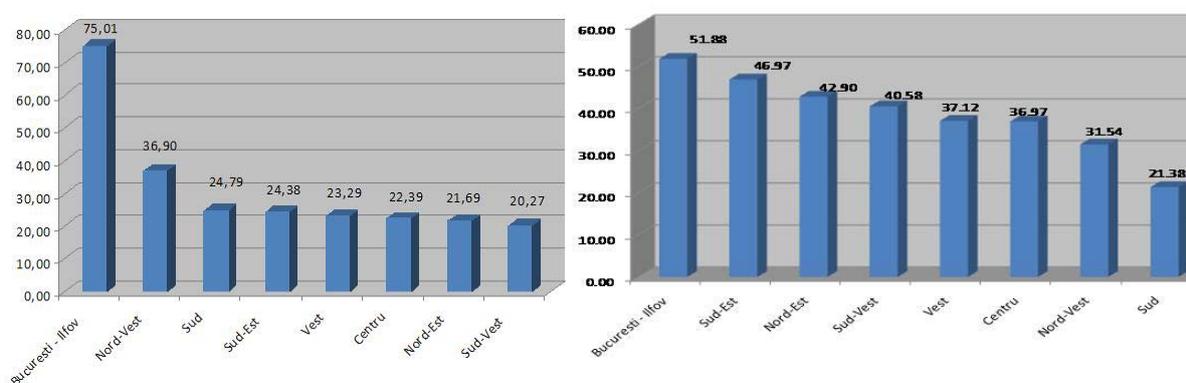


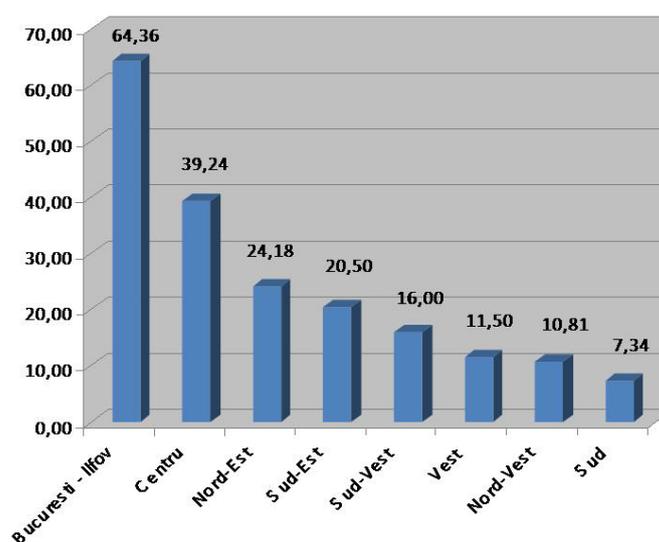
Figure 1 Innovation scoreboard of development regions



**Figure 2** Innovation scoreboard by “innovation drivers”(left);  
Innovation scoreboard by “knowledge creation”(right)



**Figure 3** Innovation scoreboard by “entrepreneurship”(left);  
Innovation scoreboard by “applications”(right)



**Figure 4** Innovation scoreboard by “intellectualproperty”

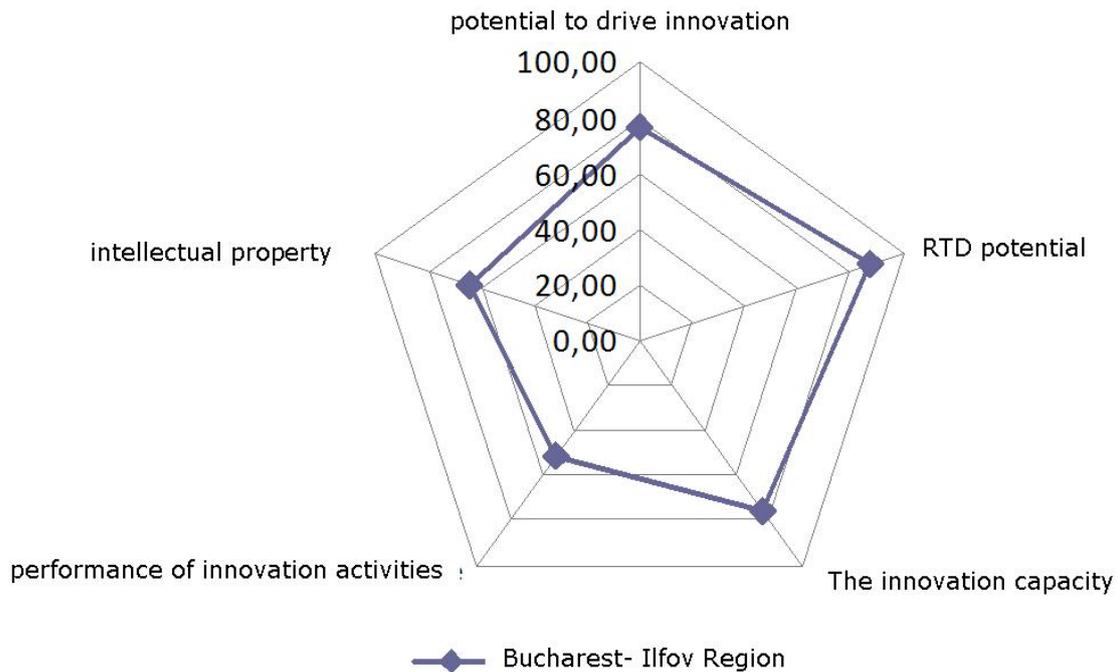
## 2.2. General comparison and comparison by innovation factors

Regions	General classification	Classification by factors				
		Innovation drivers	Knowledge creation	Entrepreneurship	Applications	Intellectual property
Bucharest - Ilfov	1	1	1	1	1	1
South-East	2	2	8	4	2	4
North-West	3	5	5	2	7	7
North-East	4	4	7	7	3	3
Center	5	6	6	6	6	2
South	6	3	2	3	8	8
West	7	7	4	5	5	6
South-West	8	8	3	8	4	5

## 2.3. Ranking the regions by innovation subfactors

Regions	Innovation drivers				Knowledge creation		Entrepreneurship	
	Formal and non-formal education	Personnel involved in RTD activities	Personnel involved in promotion, marketing, prognosis and monitoring the business environment	Innovation support at the level of public authorities	Public	Private	Innovation	Cooperation and collaboration
Bucharest - Ilfov	1	1	2	5	1	1	2	1
South-East	5	7	1	4	6	8	3	5
North-West	7	3	5	3	3	6	1	4
North-East	2	6	3	6	2	7	6	5
Center	3	5	4	7	5	5	8	2
South	6	2	6	2	7	2	5	3
West	4	8	8	1	4	4	4	6
South-West	8	4	7	8	8	3	7	6

Regions	Applications				Intellectual property			
	Producing new-to market products/technologies or new/updated services or implementing new/updated technologies	RTD activities	Consultancy activities (services)	Promotion, marketing and distribution activities	Techno-economic documents	Patents	Protected industrial patterns and designs	Others (copyright, trade marks, recipes, geographical indications, vegetation and animal species)
Bucharest - Ilfov	4	1	4	6	1	1	1	1
South-East	1	6	2	2	2	6	4	8
North-West	7	8	7	1	5	4	7	7
North-East	5	5	1	7	7	3	3	3
Center	3	7	5	5	6	2	2	2
South	6	3	6	8	8	7	8	5
West	2	4	8	3	4	5	6	6
South-West	8	2	3	4	3	8	5	4



**Figure 5** The Bucharest–Ilfov Region-General Chart

### 3. Conclusions

The Innobarometer actually reflects the innovation degree in Romania.

Regarding this analysis, the Bucharest- Ilfov Region is by far, in top of all innovation.

This phenomenon can be explained through the concentration of a large number of Research and Development National Institutes in this area. Also, here is located one of the greatest technical universities in Romania, “Politehnica Bucuresti”, followed by a large number of small and medium innovative enterprises.

Also in this area of development is mostly done in the country GDP. Based on this datum, each development region, can analyze the facts of the phenomenon and also see all barriers in innovation development regions.

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# The importance of the business environment for the liquidity of SMEs and Entrepreneurs – case of Serbia

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The small and medium enterprises (SMEs) have a critical role in stimulating economic development, especially in less developed countries and therefore there is expressed interest of the government to strengthen this sector. The SMEs are facing many problems in business threatening their survival and development. There are numerous factors from the external environment within the company cannot influence, but must accept their effects and adapt to their business. In transition countries that are not enough economically developed there is a problem of "chain of insolvency", where companies owe each other mutually, credit periods are any longer and the collection is uncertain. In these business conditions SMEs and entrepreneurs tend to realize the main goal and reason of its business, i.e. to be profitable and at the same time liquid and able to pay payables on time. This situation is particularly burdened SMEs and entrepreneurs, who have weaker financial resources. This paper will mainly analyze the economic environment for business of SMEs and entrepreneurs in Serbia, a country which is not fully completed the transition process.

## Key words:

Economic environment, liquidity, SME, entrepreneur

## 1. Introduction

Small and medium enterprises (SMEs) have an important role in the economies of many countries, especially developing. Government of those countries should be focused on the development of the SME sector as leverage in economic growth promotion. Globalisation and day-to-day changes in technologies, availability of information, strong competition on the global level, especially pressure of competitors from Chinese and Indian markets, make the role of SMEs become more important. Importance of SMEs can be observed through the increasing of employment, diversification of economy structure, boosting of innovation, technological progress and benefits for the whole society. Depending on the development and characteristics of the national and local environment within SMEs exist and operate, their nature and forms will differ. SMEs can be classified as micro, small and medium-sized enterprises. All of them need all kinds of support (institutional, financial, political, etc.) in order to survive first start-up years and to develop their business. The aim of this paper is to explore how business environment could help or burden business of SMEs, considering their endeavour to be liquid and solvent. Here will be especially described business environment of Serbia and position of SMEs within.

## 2. Typical characteristics of SME sector in EU and Serbia

One of the main challenges facing the European Union (EU) Member States is the need to boost entrepreneurship. That is one of the ambitious objectives set by the Lisbon European Council in March 2000, with a view to improving performances in terms of employment, economic reform and social cohesion within the EU. The role of SMEs in the European economy has been studied at the highest political level. In the March 2008 European Council gave important support to an initiative for further strengthening SMEs' sustainable growth and competitiveness, named the "Small Business Act" [1, p.4].

Diversity of SMEs forms and special characteristics of their business requires careful recognition of their needs in order to achieve full potential through different instruments of support. SMEs are particularly sensitive and vulnerable in the first couple years and many of them do not survive. There are 23 millions of SMEs in EU, they represent 99 % of all enterprises in the EU, provide around 90 million jobs, and employ 2/3 of total number of employees in private sector. SMEs are socially and economically important and contribute with 60 % to GDP of EU. Similar situation is in USA and Japan. SMEs sector is the most important instrument for the dynamic development of economy.

**Table 1:** Criteria for classifying SMEs in EU and Serbia

Enterprises	European Union			Serbia		
	Headcount	Turnover	Balance sheet total	Headcount	Turnover	Balance sheet total
medium-sized	< 250	≤ € 50 million	≤ € 43 million	50-250	€ 2,5 -10 million	€ 1,5 – 5 million
small	< 50	≤ € 10 million	≤ € 10 million	5	≤ € 2,5 million	≤ € 1 million
micro	< 10	≤ € 2 million	≤ € 2 million	< 5	-	-

Source: European Commission [http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index\\_en.htm](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm) and Serbian Business Registry Agency

Table shows comparison of criteria for classifying SMEs in EU and in Serbia. An enterprise qualifies as an SME if it meets either the turnover ceiling or the balance sheet ceiling, but not necessarily both [2].

Numerous studies explore key reasons and factors for starting-up own business and decisions on self-employment. According to the European Commission Flash Eurobarometer for year 2007 [1, p.10], Europeans still prefer employee status, while citizens of USA usually opt for self-employed status. The main argument for preferring employee status is the desire for a regular, fixed income (46% of European respondents and 34 % of American respondents) [1, p.12]. Other reasons for preferring employee status are: fixed working hours, benefits of social security, lack of an ideal business opportunity, lack of finances and the lack of skills required for self-employment, administrative difficulties regarding self-employment [1, p.14]. On the other side, according to the research the most important reason that citizens prefer to be self-employed is self-fulfilment due to interest in the job (in EU 66%) and in USA personal independence (45%) [1, p.19].

Researching the main important obstacles for being self-employed are: lack of finances (25 % of EU respondents), lack of skills and lack of a business idea and administrative difficulties [1, p.52]. At the same time the greatest fears and risks of being self-employed are the possibility of going bankrupt or losing their property (51%) by Europeans, while Americans' greatest fear is the uncertainty of a regular income and spending a lot of time and energy on the start-up project [1, p.85]. Common problems, fears and obstacles by Europeans and Americans are lack of finance, complexity of the process, lack of information and risk of failure [1, p.90].

In developed countries categories that prefer being self-employed are men, the youngest citizens, those who are still in education, those who are self-employed, and those whose parents are also self-employed. On the other side women, citizens between 40 and 54 years of age, those who completed their education between the ages of 16 and 20, manual workers and those whose parents were both employees will rather be in status of an employee [1, p. 10].

**Table 2:** Typical profile of entrepreneur in Serbia

Criterion	Description	%	Description	%
Age of entrepreneur	36-55 years	65 %	under 35 years	16 %
Age of entrepreneur in time of starting business	under 35 years	67%	under 25 years	25 %
On the top of hierarchy	men	80 %	women	20 %
Education	high school	47 %	higher education	44 %

Source: Serbian Employer Union

In Serbia the situation is different. Entrepreneurs are usually citizens that already have some experience in business and that are not young as entrepreneurs in EU or USA. More than a half of them have experience in own business more than 11 years, while SMEs have longer continuity in doing business. Main reasons for self-employment by Serbian entrepreneurs are recognized business chance, personal independence and possibility for business in the same branch within they worked earlier. Some characteristics of entrepreneurs in Serbia are similar with entrepreneurs in EU and USA, as developed regions, but there are still more fears, uncertainty and obstacles for entrepreneurship in Serbia.

**Table 3:** The level of development of SME sector in Serbia, period 2004-2008.

	Year				
	2004.	2005.	2006.	2007.	2008.
Number of SMEs	285.139	276.695	268.515	296.086	304.017
Number of employees	752.740	810.862	870.979	906.669	940.159
Share of SMEs in the total number of enterprises (in %)	99,7	99,7	99,8	99,8	99,8
Share of SMEs in the total number of employees (in %)	54,7	59,0	63,1	65,5	67,2

Source: Serbian Employer Union

Data in table indicate that number of SMEs and number of employees grew constantly until the 2008, year of starting global financial crisis. Share of SMEs in the total number of enterprises was higher than 99 % in each year. It should be added that micro enterprises participate with 87 % in total number of enterprises and they employ about 15 % of total number employees

**Table 4:** SME sector in Serbia in year 2009

Share of entrepreneurs in total number of enterprises and entrepreneurs	66 %
Share of employees in SME sector in total number of employees	42 %
Share of SMEs in GDP	33 %
Share of SMEs in total export of Serbia	49 %
Share of SMEs in total import of Serbia	58 %
Change of number of SMEs and entrepreneurs 2009/2008	- 45 %
Productivity index 2009/2008 (Gross Value Added/Number of Employees)	- 4,3 %
Profitability index 2009/2008	- 15,5 %
Average Investment / Enterprise (in EUR)	9.200

Source: Business and Finance Journal, [www.bifonline.rs](http://www.bifonline.rs)

There are 222.301 entrepreneurs (66%) out of 334.262 enterprises and entrepreneurs in Serbia in year 2009 [3]. SME sector has accepted big number of employees from big companies, which were included in the privatization process. Most of them are directed to micro enterprises, whose number marked growth rate of 32 % It is the first time that number of entrepreneurs who closed their business is bigger than number of start-ups. The number of start-ups is also reduced and for the first time is under 10.000 for the year. It signals unenviable situation in SME sector in Serbia that is affected by

global economic crisis and reflects accumulated problems in real sector of Serbian economy. Productivity index of SMEs marked negative value, as well as profitability index. Due to high production costs SMEs have problems with competitiveness.

### 3. Characteristics of business environment for SMEs in Serbia

The key problems of Serbian economy are low rate of economic growth, high rate of unemployment and high import dependence, followed by low and insufficient export inflows. The unemployment rate increases continuously and current rate is about 26%, while between 200.000 and 400.000 people (the newest data published by IMF) lost their jobs since the beginning of the global financial crisis and more than 60 % belong to the SME sector. The following rate of poverty is also high and it is estimated to 8,8 % [4]. In the period 2001-2009, GDP grew by the average yearly rate of 4,8 %, but due to the global crisis marked negative growth of 3 % in year 2009. In the third quarter of year 2010 was noted positive growth of GDP, by rate of 1,5 %. Business activity of SMEs in 2009 compared to 2008 decreased for 14,7 %, as well as profitability of entrepreneur sector, that fall down to 40 %.

Administrative procedures in starting-up new business act still burdening and disincentive to many potential entrepreneurs. European Commission make efforts to simplify procedures and reduce cost of starting a business and in year 2010 average time and cost to start-up a private limited company is 7 days and cost is € 399, compared to 8 days and € 417 in 2009 or 12 days and € 485 in 2007 [2]. According to data for Serbia in year 2008 was needed 23 days compared to 18 days in 2006, for procedures of starting business. Modern and responsive public administrations can make a major contribution to the success and growth of SMEs by saving them time and money and hence freeing resources for innovation and job creation. E-government and one-stop shops, in particular, have the potential to help improve service and reduce costs and some institutions in Serbia have implemented e-government in order to reduce costs, simplify procedures and establish easier availability of public services to citizens.

SME sector in Serbia have positive impact on neutralising negative effects of transition, but still is not driver of economic development of Serbia. Problems are insufficient number and weak economic power of medium-sized enterprises, the lack of relationships between SMEs and scientific and research institutions, small possibilities for emerging and competition of domestic SMEs on international market. Some barriers for boosting entrepreneurship and innovations in Serbia are underground economy, tax burdens, unavailability of public procurement, long average collection period, existing of monopolies, complicated and expensive administrative procedures. Represent of SME and entrepreneurs identify some main problems in doing business. They are lack of finances and market information, lack of certain profile of employees, lack of knowledge and experience in implementation of standards, difficult access to new technologies. All of these problems require considerable support and engagement of government institutions in order to overcome problems of SMEs.

Serbian government supports development of SME sector through different funds and programs, especially for start-ups, unemployed, innovators, undeveloped municipalities. Some of programs support clusters and business incubators establishing, as well as internalisation of business. Although, main problems for SMEs and entrepreneurs in Serbia are primarily lack of finances, lack of management and technical skills, difficulties in access to information and technologies, low level of cooperation with big systems and companies, barriers in entering markets of developed countries due to strong international competition. Banking credits are still too expensive and unavailable to the most of the interested SMEs and entrepreneurs and in disproportion to the real capabilities of this sector. Banks have high provisions and transactions costs that are not proportional to the small amounts of micro credits, designed for SMEs and entrepreneurs. Micro credits are at the same time high risk credits and for them are also required reserves in order to keep stability of financial and monetary system. All of these facts make micro credits too expensive, but often the only financial source for entrepreneurs and micro enterprises.

## 4. Liquidity problem and importance of supportive role of economic environment

In developed countries too is noted that SMEs are facing to higher regulatory and administrative burden in comparison to larger businesses. It has been estimated that where a big company spends one euro per employee because of a regulatory duty, a small business might have to spend on average up to EUR 10 Euros [5]. Worth of public procurement markets are estimated to billions of Euros and it account for 16% of the European Union GDP. However, because of complicated and long procedures, lack of experience and information SMEs, especially young enterprises, are discouraged to participate in the public procurement procedure. Big companies are usually awarded by contracts in public procurements. The same situation is in Serbia, where SMEs cannot overcome administrative and other burdens and have greater participation in public procurements.

Government should reduce complicated and expensive administrative procedures in order to improve economic environment and make better conditions for business of entrepreneurs and SMEs. It will encourage entrepreneurship and innovations and result in great number of start-ups. European Commission defined a set of 10 principles in four essential fields for SMEs in order to promote economic environment in across the EU member states. SMEs should have easier access to the financial resources, especially to micro credits and venture capital. Financial support should help them to pay timely their trade payables and other liabilities and manage liquidity successfully as well as to develop new products and services. EU gives considerable financial support to SMEs and entrepreneurs through different programmes, such as the Competitiveness and Innovation Framework Programme (CIP) that channelled finances via European Investment Bank (EIB). There is also European Agricultural Fund for Rural Development that supports entrepreneurship in rural areas.

Weak and unstable financial position of SMEs is additionally burdened by problems of invoice payment and average collection period. In Europe SMEs usually have to wait between 20 and over 100 days on average to get their invoices paid. One of the four main reasons for insolvency is the problem with the late payment. It results in the loss of 450 000 jobs and of €25 billion every year across the Europe [6].

The term liquidity can be considered as the ability to pay liabilities timely and on the other hand as the speed of turning assets into the cash. Cash is the most liquid assets but holding cash without investing is the least profitable. Having a cash reserves can be particularly useful by purchasing new equipment needed for producing product or services that can improve profitability of enterprises. Between enterprises as lenders and their potential creditors exists information asymmetry and that is one of the reason why enterprises cannot borrow when and in the amount they need (Myers, 1984). Managing enterprise's finances especially working capital includes a permanent trade-off between liquidity and profitability [7]. Being illiquid in the longer period can have dangerous consequences, mainly in the form of bankruptcy or insolvency.

Liquid assets can be converted to cash quickly without having to reduce the asset's price very much [8]. Managing liquidity of SMEs implies question how liquid they should be to ensure timely payment of their liabilities, but at the same time to invest cash budgets profitably. Full liquidity analysis requires the use of cash budgets, but by relating the amount of current assets to current liabilities it can be calculated two commonly used measures of liquidity or liquidity ratios. One of them is *current ratio* calculated by dividing current assets by current liabilities. If enterprise is getting into financial problems, it pays off its liabilities with delay, borrows more from the bank and so on. Current ratio is the most commonly liquidity measure, because it indicates are the liabilities to short-term creditors covered by current assets, that can be quickly converted into the cash [8]. Another liquidity ratio is *quick or acid test* calculated by deducting inventories from current assets and then dividing by current liabilities. Inventories are usually the least liquid position of current assets, they turn slowly into the cash and are exposed to losses in the case of liquidation. Hence, acid test is more rigorous liquidity measure and indicates firm's ability to pay off short-term liabilities without relying on the sale of inventories [8]. Many enterprises compare their liquidity ratios to benchmark or an industry average, and it is useful in managing finances. There is significant relationship between size of an enterprise and its liquidity, i.e. smaller enterprises have lower level of liquidity.

According to theory, current ratio should have value of 2, i.e. current assets amount should be at least twice bigger than current liabilities. Average current ratio in Serbian enterprises in the period 2007-2009 was 1,128 and it amounts only one half of required ratio value. Average acid ratio in Serbia represents 70 % of required value. Serbian Employer Union estimates that average collection period for more than 60% of enterprises is about four months, and one/tenth of receivables has never been

paid. In the conditions of illiquidity chain in Serbian economy, the least chance to survive have actually SMEs and entrepreneurs. Due to effects of global financial crisis and constant liquidity problems, many SMEs that have growth potential, but not enough financial resources to survive long collection period, will become a part of big systems and companies. Additional problem is disproportion between periods of assets mobilisation and time availability of financial resources. In other words, enterprises invest short-term financial resources in fixed assets that also finally results in illiquidity. Due to long average collection period and time disproportion between assets and their sources, enterprises are forced to borrow capital from the bank that has price in the form of interest on capital. Interest rates in Serbia are higher than in EU members or other developed countries, due to higher country risk and fact that banks in Serbia mostly supply capital on international financial market. Serbia has external debt of EUR 23 billion and bank participation in external debt amounts to EUR 4,8 billions, that indicates great dependence of banks in Serbia on international capital. Average weighted interest rate on capital borrowed from Serbian banks (September, 2010) was 12 % and one out of four borrowers. In Serbia should be applied experience of many European countries where are defined measures for reducing average collection period, especially for public sector liabilities. European Parliament and EU Council are aware that due to their weak financial potential, business of SMEs is the most sensitive and exposed to highest risk of insolvency. In „Small Business Act“ there is one directive that defines the longest collection period in relationship to SMEs and it must not be longer than 30 days.

**Table 5:** Average Collection Period in European countries, 2010.

Country	Germany	France	Spain	Croatia	Greece	Slovenia	Bulgaria	FYR Macedonia	Serbia
ACP* (in days)	18	24	32	34	37	39	44	76	128

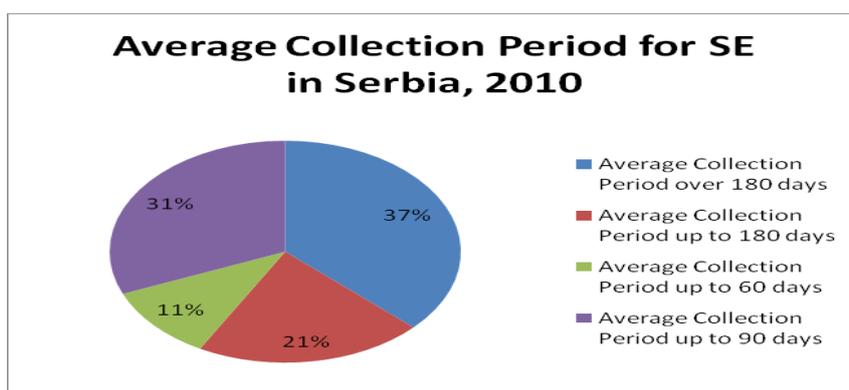
\*ACP – Average Collection Period for all enterprises, not only SMEs

Source: Eurostat, Centre for European Economic Research, European Investment Bank (EIB)

From the table can be concluded that the most developed countries have the shortest average collection period. Enterprises in South East Europe (SEE), that passed through privatization process have longer average collection period, are faced to liquidity and survival problems and exposed to higher risks, especially SMEs.

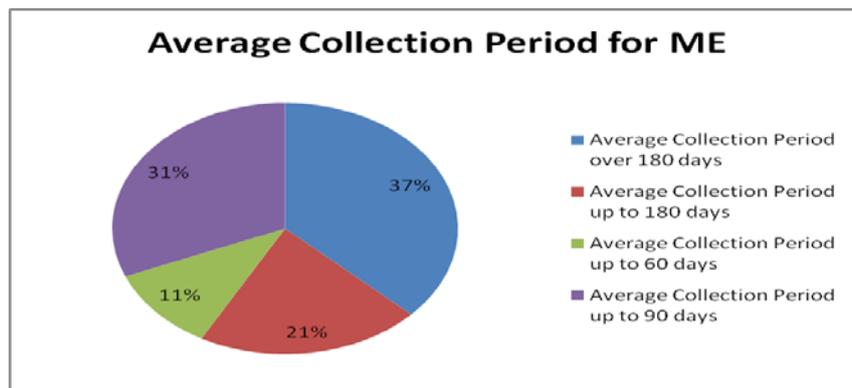
Serbian Employer Union conducted research of average collected period by SMEs and entrepreneurs in 2010. It is processed sample of 10636 small, 714 medium enterprises and 7984 entrepreneurs. Results are shown on the next figures.

**Figure 1:** Average Collection Period for Small Enterprises (SE) in Serbia, 2010.



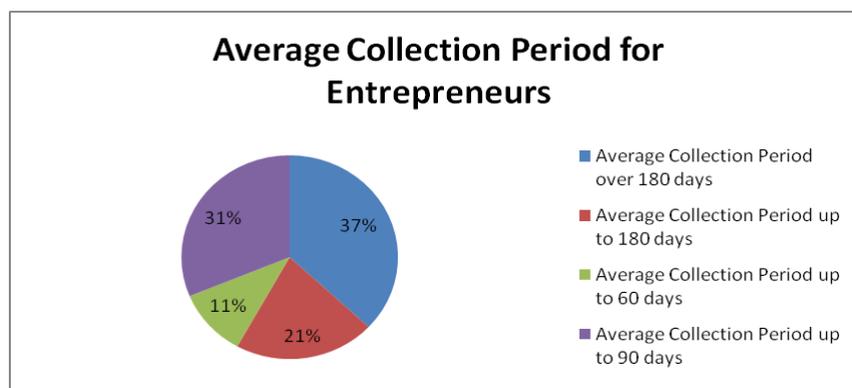
Research has shown that 791 out of 10636 small enterprises (SE) faced collection period longer the 180 days, 2415 SE waited between 90 and 180 days, while 1356 SE collected receivables up to 90 days and only 436 SE collected receivables in period shorter than 60 days.

**Figure 2: Average Collection Period for Medium Enterprises (ME) in Serbia, 2010.**



Research has shown that 26 out of 714 medium enterprises (ME) faced collection period longer than 180 days, 157 SE waited between 90 and 180 days, while 101ME collected receivables up to 90 days and only 32 ME collected receivables in period shorter than 60 days.

**Figure 3: Average Collection Period for Entrepreneurs in Serbia, 2010.**



Sources for Figures 1,2,3: Serbian Employer Union, calculations by authors

Research has shown that 1207 out of 7984 entrepreneurs faced collection period longer than 180 days, 687 entrepreneurs waited between 90 and 180 days, while 1019 entrepreneurs collected receivables up to 90 days and only 350 entrepreneurs collected receivables in period shorter than 60 days.

## 5. Conclusions

The development of entrepreneurship has important benefits from the economic and social aspects. Entrepreneurship is on the one side driving force for the jobs creation, competitiveness and growth and on the other side it contributes to personal fulfilment and achievement of social objectives. There are numerous factors important for starting up a company, like having idea or opportunity, financial resources and needed knowledge and skills, existence of unsatisfied market segment or niche, as well as economic environment conditions. Complicated, time- and resource-consuming administrative procedures are great obstacles in encouraging entrepreneurship and innovativeness. In EU and other developed countries there is significant support to SMEs and start-ups, that contributes to economic growth and employment. Due to smaller financial potential SMEs are more exposed to risk that comes from economic environment. One of those risks is unwilling prolongation of collection period, that can turn down liquidity of every enterprise, especially of SMEs. In Serbia as underdeveloped country at the end of transition process, is especially expressed illiquidity problem. Economy is characterised by chain of illiquidity that threatens survival of many enterprises. Government and institutions of Serbia should encourage SMEs through different programmes, make more friendly and supportive economic environment and take efforts to shorten average collection period in the national economy. Regulation

of illiquidity problem on institutional level should results in greater number of start-ups and successful SMEs, higher rate of employment and benefits for economy and society as a whole.

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# The supportive role of investment funds and insurance companies to entrepreneurship and innovations

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Entrepreneurship and innovations are capital intensive activities and they usually cause above average exposures to risks. Financial systems of developed economies facilitate financial savings transfers to most profitable investments, among which special place belongs to entrepreneurship and innovation. Previous experience in Serbia and other countries in the region had demonstrated primarily orientation to foreign financial sources, either through donations, foreign direct investments or foreign banks' loans. However, without mobilisation of domicile financial savings it is impossible to achieve long-term and sustainable ability for realisation of entrepreneurship and innovation ideas and thus economic development. This paper analyses the role of institutional investors, investment funds and insurance companies, as sources of long-term financial resources of entrepreneurship and innovations.

## Keywords

entrepreneurship, investment funds, insurance companies

## 1. Introduction

Institutional investors are financial institutions that institutionally invest collected capital and at the same time join the individual risks of small investors. This helps ensure a better balance between risk and return than is generally available through direct investments of individual investors. Institutional investors have a number of common characteristics, but that does not mean that they are homogeneous. The subject of this paper is the role of institutional investors – insurance companies and investment funds as a financial support to entrepreneurship and companies. The aim of this paper is to explore and point out the role and importance of institutional investors as long-term financial sources on the less developed financial markets of Serbia and other former Yugoslav republics. The expected outcome of this paper is to present and clarify reasons and advantages of including institutional investors in financial supporting on micro level – to the entrepreneurs and companies.

## 2. The role of insurance companies

### 2.1 Insurance as a form of risk protection

The key role of insurance in the economy is the protection from risk. Insurance realize this role by the associating risks, i.e. by associating economic subjects exposed to the same type of risk. Compensation and risk joining encourage entrepreneurial activities and increase credit supply given that it enables compensation claims and risk management that otherwise might not be diversified. Especially are considered non-life commercial insurers such as property insurance against fire, flood, and machinery breakdown, various types of liability or downtime. The link between economic activity and insurance has existed since the early days of industrialization. A typical example is the United

Kingdom, a country where the insurance had a very important role in stimulating economic activity, development of innovation and economic development. For example, in the period between the years 1790 and 1862 the rate of industrial growth and rate of growth of demand for providing insurance cover for assets and production capacity were almost equal.

From the perspective of individual entrepreneurs, insurance implies periodic payment of relatively small amounts of insurance premiums in exchange for providing coverage from the uncertain but potentially significant damages that may occur if insured cases are realized. The most important contribution that insurance coverage has for entrepreneurs in the field of risk management, which is a fundamental aspect of all entrepreneurial activity, is enabling entrepreneurs to take greater risk than they would be able without insurance. Entrepreneurs often make the effort, to reduce the risks to a minimum. It could mean giving up lucrative opportunities, or cancel the entrepreneurial and innovative activities. For example, a local manufacturer could give up export-oriented enterprise without the existence of transport insurance, due to concerns that its goods could be completely lost. Empirical studies indicate that insurance has a strategic importance for the companies. For example, Seog [2] considers the case when buying insurance affects the strategic behavior of companies and individuals in product markets. The same author discusses the hypothesis that companies buy insurance coverage in order to improve competitiveness [3]. It is proven that a higher level of commercial insurance makes companies more aggressive. Therefore, insurance as a key form of risk management, affects encouraging entrepreneurial activity.

## ***2.2 Insurance as a financial source for financing entrepreneurship and innovations***

From a financial point insurance is a creating of cash reserves in the form of insurance funds. Financial assets accumulated in insurance companies get the characteristics of a specific capital, depending on the type of insurance. On the other hand, life insurance is the most advanced form of savings, it is a long-term savings. Therefore, the insurance industry is an important source of funds for capital investment and accumulation, and thus represent a significant opportunity, particularly in developing countries, for financing real continuity and expansion of social reproduction. Interest of every society is that funds raised in the reserves of insurance companies become larger.

Premiums are collected in advance and reserves that are not required for compensation of current losses and costs can be invested to companies. Insurance companies as institutional investors invest these reserves in government and municipal bonds as well as in corporate stocks and bonds, which supports the construction of shopping centers, hospitals, schools, factories, apartments, and new machinery and equipment. Investments increased stocks of capital goods, and promote economic development, which indirectly contribute to employment. In addition, the total supply of funds available for loans is increasing due to insurance premiums paid in advance, so that the cost of capital in the form of interest rate becomes less for the economy than it would be without insurance industry. Also by mobilization of financial savings insurance and reinsurance companies improve the efficiency of the financial system in three ways [4]: a) help to reduce transaction costs by connecting lenders and borrowers of financial savings, b) create liquidity - the insured have immediate access to financial sources based on compensation and savings and users of insurance funds have possibility to return borrowed funds in the more future periods and c) provide economies of scale in investment because they mobilized huge resources from the accumulation of small amounts of individual insurance premiums, which provides support for large investment projects and promote economic efficiency.

According to European Association of insurance and reinsurance companies total investments of European insurers to the economy in year 2005 amounted to EUR 6371 billion, while investments of the insurance industry in year 2004 were on average 53% of GDP (gross domestic product) of European countries [5]. Total investments of insurers in Europe were reduced from EUR 7,200 billion in year 2007 to EUR 6500 billion in year 2008 due to financial crisis, but in year 2009 they increased by 8% and amounted EUR 6800 billion [6].

## ***2.3 Insurance sector in the former Yugoslav republics***

Economic growth together with liberalisation, privatisation, and the increased presence of foreign companies that brought substantial financial strength, new products, and advanced risk and asset liability management practices, have had the strongest impact on the development of regional insurance industries. Although the role of insurance activities is still relatively modest in all countries

of the region with the exception of Slovenia, there is strong growth potential especially for life insurance. In general life insurance is less developed compared to non-life insurance, and accounts for a relatively modest share of the countries' insurance market in terms of gross written premiums.

**Table 1** Comparative review of the key indicators of the insurance sector in Serbia, countries of the region and the EU

		Number of insurance companies	Total insurance premium (in 000 EUR)	Life insurance premiums (in % of total premiums)	Insurance density (premium/p.c. in EUR)	Insurance penetration (premium share in GDP)
Serbia	2008	20	588994	12.16%	78.55	1.87%
	Change compared to 2007 (in %)	110.00%	104.22%	114.88%	104.22%	100.00%
European Union	2008	4783	1001812000	61.04%	1805	8.01%
	Change compared to 2007 (in %)	100.89%	88.88%	83.19%	79.48%	87.82%
Slovenia	2008	21	2018960	31.83%	1027.96	5.44%
	Change compared to 2007 (in %)	110.53%	106.60%	105.48%	106.60%	99.09%
Croatia	2008	27	1388767	26.30%	312.96	2.98%
	Change compared to 2007 (in %)	117.39%	112.22%	104.15%	112.22%	103.11%
Bosnia and Herzegovina	2008	26	231663	14.55%	60.96	1.85%
	Change compared to 2007 (in %)	100.00%	112.65%	120.98%	112.65%	99.46%
Macedonia	2008	12	104565	4.15%	51.70	1.61%
	Change compared to 2007 (in %)	100.00%	104.76%	155.76%	104.76%	93.60%

Source: calculations by the authors, Insurance Supervision Agency, CEA Statistics, Croatian Financial Services Supervisory Agency, National Bank of Serbia, Insurance Agency of Bosnia and Herzegovina, National Bureau for insurance of Macedonia

On the base of these comparative data it is obvious that the insurance market of Serbia is underdeveloped. This is indicated primarily by the fact that the share of life insurance in the total insurance premiums is only 14.88% while the average in the European Union is over 83%. Also, the two most developed markets in the region of former Yugoslavia, measured by the size of insurance premiums, the share of life insurance in the total premium amounted to 31.83% in Slovenia and 26.30% in Croatia. Measured by the size of the total insurance premiums and insurance premiums per capita, the Serbian insurance market is in front of the insurance market in Bosnia and Herzegovina and the insurance market in Macedonia. Therefore, it is evident that there is the lag of the insurance markets in the region in comparison to the insurance market of the European Union. Although Slovenia is the only country from the former Yugoslavia as EU member (since the year 2004), their insurance market also marked results under the average of European Union.

### 3. The role of investment funds

#### 3.1. Investment funds on the European and world financial market

Investment funds, usually in a form of mutual funds, are financial intermediates that collect the savings of individual investors and raised funds invest on the financial market. According to the Gitman and Joehnk [7] when investors buy shares in a mutual fund, they become part owners of a widely diversified portfolio of securities. Mutual funds are the most appropriate form of capital mobilization. They appeared much later than the banks, but as financial institutions they contribute significantly to the deepening of capital market and its development. Investment funds are also useful in terms of a whole society because they represent an attractive mechanism to attract capital of small individual investors, putting it at the disposal of businesses. Otherwise, individual owners of capital would be rather chose consumption than savings, or would deposit funds in bank accounts, with much lower returns. Investment funds offer a rational way for small investors to involve and increase the rate of savings in a national economy.

Data of the European Funds Assets Management Association – EFAMA [8] for year 2009 show that the European investment funds industry comes to recovery. There has been marked positive growth in net assets value (NAV) and net sales of funds, in accordance with the equity market recovery, recovery of capital markets and restore of investor confidence. Across Europe net assets of investment funds increased by 15.6% and from EUR 6 to 7 billion in year 2009. When we look at investment funds worldwide, at the end of the third quarter of year 2009 has marked an increase in their net assets value for 10% to the amount of US\$ 22.38 trillion, or US\$ 23.0 trillion at year-end 2009 [9].

**Table 2** Worldwide mutual funds net assets in EUR billions, June 2010

Region	June 2010 (in bn EUR)
USA (mutual funds)	9.150
Europe (UCITS and non UCITS)	7.492
Asia and Pacific	2.242
America (excl. USA)	1.640
World	20.623

Source: Investment Company Institute [www.ici.org](http://www.ici.org)

According to the newest published data from June 2010, data on worldwide fund assets in EUR billions can be noted that the sector's investment funds in the European financial market by net assets value of the funds coming close to the U.S. financial markets as the most developed in terms of fund numbers, net asset value, net inflows and others indicators of funds performances. Net assets value of investment funds in the financial markets of USA represents approximately 45%, while assets in European funds (UCITS and non-UCITS) represents about 36% of total worldwide fund's net assets value. Regarding that total net assets value of investment funds represents half of gross domestic product (GDP) of the European Union, it is clear that investment funds have an important role in the European economy and European financial market. Investment companies manage by long-term savings, invest in the European financial market, buy shares and provide short-term financial sources for European companies and employ many workers.

Statistical data collected from 45 countries around the world shows that the total number of investment funds is about 66,000, while approximately 26,000 funds (or 38% of fund net assets) is invested in shares [9]. These data support the fact that it is very important to the company to raise needed capital for finance its business and encourage innovation through issuing securities, especially shares. More than 1/3 of all investment funds in the world invest in shares. Therefore, companies need to attract the attention of potential investors, by issuing shares that will be publicly traded on the stock exchange. Transparent and successful business is the best way to attract capital owners, who are interested to invest in a company, idea or project. By issuing securities and initial public offer (IPO) companies are becoming visible to the capital owners who could financially support

companies' development. It is important to notice that emerging markets experienced significantly larger gains in stock prices than occurred in the United States and other developed countries.

### 3.2 Investment funds in Serbia and former Yugoslav republics

Investment funds sector is the most developed in Croatia and Slovenia, where funds first appeared 15 years ago, after the realisation of mass voucher privatization process (MVP). In Croatia are dominated money market funds and in Slovenia equity funds that primarily invest in shares of foreign issuers. Investment funds in Montenegro, Macedonia and the Republic of Srpska appeared later and their numbers in the financial market was drastically lower, with the lower transparency and weaker performances. It can be seen in the table below.

**Table 3** Investment funds in former Yugoslav Republics

Country	Number of investment funds	Net Assets Value (in €)
Croatia	128 open-end 4 close-end 4 real estate	2 billions
Slovenia	130 open-end	1,98 billions
Montenegro	7 mutual	n.a
Macedonia	9 open-end 13 private	n.a
Serbia	15 open-end 3 private 2 close-end	8,7 millions
Republic of Srpska	3 open-end 14 close-end	67 millions

Source: Securities Commission Republic of Serbia, Securities Commission of FYR of Macedonia, Croatian Financial Services Supervisory Agency, Securities Commission of Republic of Srpska, Securities Market Agency of Slovenia, Securities Commission of Republic of Montenegro n.a – not available

The first investment funds have emerged in Serbia in early 2007 and after the initial successful performances; they were affected drastically by the global financial crisis. The effects of the crisis had extremely negative impact on the shallow and volatile financial markets not only in Serbia, but in all countries of our region. It happened a decline in demand and prices of securities on the stock exchange, which is consequently reflected in the decline in value of investment units of all funds and negative returns over a long period of time. Today is the same situation where the value of investment units is lower than their value at the fund establishment. The total net assets value of the funds in Serbia in February 2011 is RSD 920 million or about EUR 9 million [10].

## 4. Importance of institutional investors as financial sources on micro level

The need for more intensive presence and successful performances of institutional investors in the Serbian financial market, can be observed in the context of the economic environment and business conditions for enterprises and entrepreneurs. In the last decade after democratic reforms in Serbia, total external debt is constantly growing, and the end of 2010 the amount reached as high as EUR 23.1 billion [11] and has a share in the gross domestic product (GDP) of 77.1%. It is slightly below the high indebtedness according to the standards of International Monetary Fund (IMF) and the country is highly indebted when external debt exceeds 80% of GDP).

**Table 4** External debt of Serbia, total and by sectors, in EUR billions, 2006-2010.

Sector	September 2006 (EUR billions)	September 2008 (EUR billions)	September 2010 (EUR billions)
Public sector borrowing	7	6,3	8,3

Sector	September 2006 (EUR billions)	September 2008 (EUR billions)	September 2010 (EUR billions)
Private sector borrowing	7,6	14,2	15,2
		3,5 banks 10,7 enterprises	4,8 banks 10,4 enterprises
Total external debt	14,6	20,5	23,5

Source: National Bank of Serbia <http://www.nbs.rs/export/internet/cirilica/80/index.html>

From the table it can be seen that in all observed years more than half of total external debt is private sector borrowing, particularly medium- and long-term borrowing of enterprises. Often it is the purchase of plant and equipment from foreign producers or sellers financed through the credit lines of foreign banks. Based on the amount of short-term private sector borrowing, it can be concluded that the enterprises usually borrow short-term from domestic banks in order to maintain liquidity. The total amount of loans granted by banks to entrepreneurs is about EUR 1.5 million.

Privatization in Serbia began over a decade, but has not yet been fully completed. The problem becomes more pronounced as the privatization process is nearing completion and inflows are reduced, while simultaneously the level of foreign direct investment per year decline.

**Table 5** Foreign Direct Investment (nett) in Serbia, in US\$ millions, 2000 – 2010

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
50,0	165,0	475,0	1.365,0	966,0	1.550,0	4.264,0	2.523,2	2.716,9	1.864,8	1364,1

Source: European Bank for Research and Development (EBRD) - *Transition Report*

From the above table can be seen that the level of FDI since the beginning of democratic change in Serbia in year 2001 were continuously increasing until the year 2006 (with the exception of year 2004) but then begins to decline.

After the reform of the banking sector, most banks in Serbia are become members of foreign banking groups, but were established as domestic legal entities and the large financial sources that place to businesses and citizens of Serbia banks supply on the international financial market. It speaks of the great dependence of domestic banks and their placement on international financial sources. Higher country risk in Serbia in comparison to economically developed countries increase interest rates as the price of borrowed capital. One of the reasons for the higher price of borrowed capital is tight monetary policy of central bank that is trying to keep inflation and credit expansion under control, by increasing the effective interest rate, required reserves and other financial instruments. It should also be added a high bank margins that all causes high price of borrowed capital and a great burden for enterprises and entrepreneurs. With the strengthening of competition among banks and the more significant role of institutional investors (investment, pension and insurance funds) on Serbia's financial market can be expected a reduction in price of borrowing. Average weighted interest rate on bank loans (September, 2010) amounted to 12% [11]. The global financial crisis has contributed to increasing the number of problematic loans in the banks' portfolio, which together with the constant depreciation of the domestic currency makes difficult paying out the loans by enterprises and citizens. It forced all market players to take very conservative credit policies, making it difficult for enterprises to access to financial sources needed for financing their business and development.

Global financial market is gradually recovering, but the Serbian financial market is still shallow and underdeveloped, and reflects the problems in the real sector of the economy. Companies in Serbia are hesitant and do not have sufficient information regarding the implementation of the Initial Public Offer – IPO, although this may be the cheapest and very effective method of financing enterprises' development. IPO represents issuing and the first public trade of shares on the primary market. In this way, the company offers its shares to a wide range of potential investors and acquired capital necessary for financing its development. If the Serbian companies more often decided for an IPO, the number of investors would be increased and large institutional investors such as investment funds and insurance companies would be more interested to invest capital to the enterprises whose securities are on the stock exchange. As a consequence of the lack of qualitative securities on the stock exchange and the underdevelopment of financial market in Serbia, there is only one stock exchange - Belgrade Stock Exchange (BSE), which the only five share issuers on the prime market [12] and 3 share issuers on the standard market. Most of the other about 1600 companies are on the unregulated market and its shares are not publicly traded.

We should also bear in mind the fact that savings in foreign currency as deposits in commercial banks in late 2010 amounted to around EUR 7 billion [11] and it is estimated that there is additional EUR 1

billion savings that it is not mobilized by banks or institutional investors. In such circumstances it is very important that mutual funds and insurance companies mobilize small amounts of individual owners' capital and form capital funds that will be invested in stocks and corporate bonds, municipal bonds and other securities of different issuers. This increases the efficiency of using capital as a limited resource and promote its rational allocation in the national economy, but also provides significant financial support at the micro level. Without strengthening the capital market and the greater presence of institutional investors can not be immobilized capital of domestic and foreign owners required for financing the real sector of economy and providing financial support to the development of entrepreneurship and innovations. We should also bear in mind that because of above-mentioned country risk and high dependence of international financial market, there is a high price of capital borrowing capital needed by companies and entrepreneurs for financing business. By including institutional investors as long-term financial sources, it is encouraged development of capital markets and increases the supply of capital, facilitates the access to the capital in the real economy and consequently reduces the price of capital borrowing. It is therefore important that companies through their transparent and successfully business attract institutional investors to invest capital in home issuer's securities.

In the markets of Serbia, Macedonia and Montenegro for several years has operated an investment fund SEAF South Balkan Fund BV Fund [13] , as a part of the global investment company SEAF - Small Enterprise Assistance Fund. This fund invests in companies that have excellent growth and development potential, to them can be added value in different ways and they needed additional capital to achieve faster growth rate. SEAF Fund provides capital and operational support to companies that can not access traditional sources of capital, and operate in markets that are still developing. SEAF provides access to alternative sources of capital, linking the selected companies with reputable strategic partners and investors on a global level, the active management support in improving finance, strategic and operational management. Although by investing in selected companies SEAF becomes co-owner, the advantage for the enterprise is that there is not high borrowing costs (as by the traditional bank loans). Financial resources for financing development of private companies could be in the amount of EUR 300,000 to EUR 2,000,000. SEAF invests primarily in medium-sized private companies, but also Start-up Company if the owner has relevant experience and is willing to share financial risk with SEAF. It is important that private companies are majority owned by domestic owners (min. 51%), that the management team is experienced and has a clear vision of the future development of the company and a strong ambition to achieve rapid growth of the company. Regarding that after several years fund sells its shares in the company and withdraw from the ownership structure, achieving higher rates of return, in accordance with the taken risk, it's needed to exist a clear vision of exiting the investment through the sale of shares in the capital to the existing owner , management, financial or strategically partner, or through IPO. More of these funds on the underdeveloped financial markets could be very useful for many small or newly established enterprises with solid development potential, a unique product or service, and the deficit of capital, management experience and contacts for easier emerging on foreign markets.

## 5. Conclusions

Investment funds and insurance companies as institutional investors could be an important support to small and medium enterprises (SME) and entrepreneur by participating in long-term financial sources of companies, as the majority or minority owner, for a limited or unlimited period. This would contribute to increasing efficiency of enterprises, strengthening existing market positions and capturing new market segments, improving the quality of products and services and financing new developing ventures. It is important that there is a common interest between management of an enterprise and fund management, which is primarily profit. Additional motivation may be sectoral or regional economic development. The decision on the institutional investors' participation in the capital of SMEs will primarily be made on the base of the financial statements, plans and projections, prospectus, and enterprises should try to attract institutional investors as a quality long-term financial sources through corporate governance, transparent business and continuous improvement of performances. Incentives for institutional investors for investing in the enterprises will also be finishing the privatization process, when ownership structure will be clearly defined and profitable business, business goals and development orientation of the enterprises will be factors which help in making decisions about investing in specific enterprises. All this should be observed in the context of growing total external debt of Serbia, especially private sector borrowing. Due to the more and more difficult

debt servicing from the point of state as well as of a company, alternative sources of capital should be more used instead of traditional banking credits.

The more institutional investors on the domestic financial market and the more accumulated capital will ensure that they in accordance to their investment objectives invest in various sectors, branches, companies that have already proven their business or those are yet to develop. In this way, institutional investors are becoming co-owners of enterprises, but they also allow easier and cheaper access to long-term financial sources which are usually scarce. Because of intensive competition and taking the traditional credit activities from banks, institutional investors contribute to increasing the more quality and fewer prices of financial services and capital.

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# Comparison of Innovative Two Models for Estimation Production Times and Costs

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**Robust regression analysis model as a possible approach to time/cost estimation is used for the estimation of requested results based on the previous stochastic results and experiments. The requests for classification consideration of the product shape and process sequencing are important conditions for designing a general model for the estimation of production times. In fact, it means development of a technological knowledge base. As a result of our analysis, we have created eight regression equations with the obtained index of determination, with the most important independent variables different for 2D and 3D model. The observed level of subjectivity, constraints and errors were the reasons to use neural networks as the second approach to estimate production time. According to the presented results, we can conclude that the assumption on the use of a neural network for the production time estimation in relation to a robust regression analysis model is justified. For all experimental models the applied backpropagation neural network gives better values of key performance indexes (R, R<sup>2</sup>, RMSE, NRMSE).**

## Keywords

Estimation of Production Times, Technological Database, Stepwise Multiple Linear Regression, Neural Network

## 1. Introduction

An experienced process planner usually makes decisions based on comprehensive data without breaking it down into individual parameters. So, as the *first phase* it was necessary to establish a technological knowledge base, define features of the 2D drawing (independent variables), possible dependent variables, size and criteria for sample homogenization (principles of group technology) for carrying out analysis of variance and regression analysis. The *second phase* in the research was to investigate the possibility for easy automatic, direct finding and applying 3D features of an axial symmetric product to the regression model. The *third phase* in the research was to investigate the possibility for the application of neural networks in production time estimation and to compare the results between the regression models and neural network models. As it can be seen from references there are different approaches for data receiving from AD (STEP) [1], integration of CAPP, CAD/CAM and business activities [2], development of database system of mechanical components [3,4], and integrated product engineering [5] for costs estimation and rapid cost estimation [6], application of neural networks in estimation of production time [7], connection from CAPP, CAD, CAM; DFx to DFA through product development [8] etc. The most important characteristic of our approach presented in this paper is estimation of production times using group technology, regression analysis and neural networks [7], [9, 10, 11].

## 2. Drawing Features and Technological Database for Production Time Estimation

Very frequently (especially in the case of SMEs) it is necessary to respond quickly to some important requests for offers, generated for individual or batch production

It must be noted that technological knowledge and speed of process planning are often more important than the technological level of equipment, skills and knowledge of people who implement the technology. So, very often in practice we can be faced with the following:

1. A great amount of time spent on planning of the technological process for a product without any specific contract being made concerning the order for manufacturing of the product,
2. Signing of a contract without estimated precise production times/costs necessary for product manufacturing and realization in accordance with contracted production.

Technological processes are basically based upon product drawings with adequately defined dimensions, tolerances (dimensional and geometrical), surface roughness, batch size, shape and kind of material, heat treatment, requested delivery, disposable equipment, tools, etc. The fundamental idea in the approach [10, 11] to production time estimation is investigation of the existence of some kind of relationship between the shape and data from the drawing and the process type, process sequencing, primary process, way of tightening, selection of tools, machine tools, production times, etc. As one of the *first steps in our project research*, we defined possible shapes of raw material and 30 potential basic technological processes.

## 3. Development of Stepwise Linear Multiple Regressions

As the result of previous research, sample homogenization, classifier selection and stepwise multiple linear regressions, we obtained: 8 regression equations, percentage of explained effects, relative error (7-30%), etc. (Table 1). The lowest relative error 8.01% (Table 2, for grinded discs, AC102 No. 5) and the highest index of determination  $r^2 = 0.9851$  for the grinded discs group are the consequence of the simultaneous action of logical operators (round bars, discs and fine machining – i.e. diameter tolerance better than IT7). Thus, with the simultaneous action of several operators, a lower scattering of production time values has been achieved, i.e. better homogeneity of the created group.

The *second phase* in the research was the investigation of the possibility for easy automatic, direct receiving of 3D features of the considered axial symmetric product into the regression model. The defined requirement resulted in the development of the process for the transfer of parameters from 3D models with a low level of subjectivity. It is a very fast and reliable process via CAD report to the regression model [12]. As the possibility to improve our precision for forecasting production times of “new unknown products” in our research we choose, in the next phase of our research, neural network to compare validity two method: linear multiple stepwise regression and neural network model.

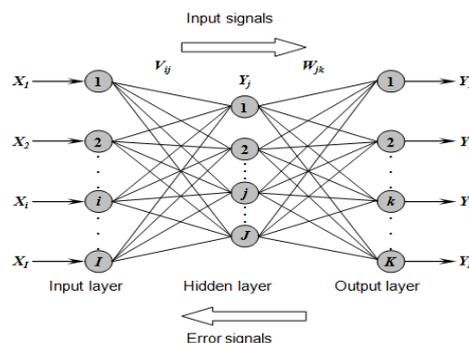
**Table 1.** Explanation of the meaning of used symbols

Symbol	Physical unit	Meaning of the symbol
$f_{ea}$	-	Features of 3D
K	-	Coefficient of time
$K_s$	-	All dimension lines
$r^2$	-	Index of determination
t	(min)	Machining time
$x_1$	(IT)	Order of tolerance outside diameter
$x_2$	(mm)	Outside diameter of material
$x_4$	(mm)	Width of material
$x_6$	(mm)	Length of material
$x_8$	Class h	Roughness of open areas
$x_9$	HRC	Hardness of product
$x_{10}$	(mm)	Outside diameter of product
$x_{11}$	(mm)	Inside diameter of product
$x_{15}$	-	Number of product perspectives
$x_{16}$	-	Number of descriptions of product
$x_{18}$	-	Number of location marks (geometry)

Symbol	Physical unit	Meaning of the symbol
X <sub>19</sub>	-	Number of dimension line tolerances
X <sub>20</sub>	-	Number of special dimension lines
X <sub>21</sub>	-	Number of usual dimension lines
X <sub>22</sub>	(1/class)	Roughness request Ra
X <sub>23</sub>	(1/mm)	Location request (geometry)
X <sub>24</sub>	(1/mm)	Dimension request
X <sub>25</sub>	(1/IT)	Diameter request
X <sub>26</sub>	(mm <sup>2</sup> )	Area of sketch
X <sub>29</sub>	(N/mm <sup>2</sup> )	Ultimate tensile strength of material
X <sub>30</sub>	(m <sup>2</sup> )	Requested area of sketch
X <sub>31</sub>	-	Mass strength of material
X <sub>32</sub>	(mm)	Thickness wall of products
X <sub>33</sub>	-	Ratio of diameter and length
X <sub>39</sub>	-	Number of all dimension lines
X <sub>40</sub>	-	Product complexity
X <sub>42</sub>	(Class h)	Difference in roughness
X <sub>43</sub>	(dm <sup>2</sup> )	Difference in superficial areas of material
X <sub>44</sub>	(cm <sup>3</sup> )	Volume of material
X <sub>45</sub>	(kg)	Mass of material
X <sub>46</sub>	(mm)	Difference in outside diameters
X <sub>47</sub>	(mm)	Difference in outside diameter of products
X <sub>49</sub>	(mm)	Difference in thicknesses
X <sub>50</sub>	(mm)	Difference in lengths
Y	(min)	Production time

## 4. Neural Network Model

Artificial neural networks (ANN) are inspired by the biologic neural system and its ability to learn through examples. Instead of following a group of well defined rules specified by the user, neural networks learn through intrinsic rules obtained from presented samples. The most commonly used ANN architecture is the multilayer *backpropagation neural network*. Backpropagation was created by generalizing the *Widrow-Hoff* learning rule to multiple-layer networks and nonlinear differentiable transfer functions [13]. Input vectors and the corresponding target vectors are used to train the network until it can approximate a function, associate input vectors with specific output vectors. Standard backpropagation is a gradient descent algorithm, as is the *Widrow-Hoff* learning rule, in which the network weights are moved along the negative of the gradient of the performance function. The term *backpropagation* refers to the manner in which the gradient is computed for nonlinear multilayer networks. *Backpropagation* neural networks often have one or more hidden layers of sigmoid neurons followed by an output layer of linear neurons. Multiple layers of neurons with nonlinear transfer functions allow the network to learn nonlinear and linear relationships between input and output vectors. There are numerous variations of the basic algorithm that are based on other standard optimization techniques, such as conjugate gradient and Newton methods. The one used in this paper is the *feedforward backpropagation* training algorithm designed to minimize the *mean square error* (MSE) between the actual (estimation) output ( $a$ ,  $A$ ) and the desired (target) output ( $d$ ,  $T$ ). Figure 1. shows the principle of the *feedforward backpropagation* training algorithm.



**Figure 1** Principle of the feedforward backpropagation training algorithm

Where is:  $V_{ij}$  - weight between the input layer and the hidden layer,  $W_{jk}$  - weight between the hidden layer and the output layer,  $X_i$  - input signals (value of chemical composition),  $i$  - number of neurons of the input layer,  $l$  - number of inputs of neuron  $j$  in the hidden layer,  $Y_j$  - output of the hidden neurons,  $j$  - number of neurons of the hidden layer,  $J$  - number of inputs of neuron  $k$  in the output layer,  $Y_k$  - output signals (mass of eluted ions per gram of samples),  $k$  - number of neurons of the output layer. For the estimation of performance of the learning algorithm in solving the specified task, performance index was defined. Performance index enabled comparison of the applied neural network algorithm with other learning algorithms. The most frequent performance index is the normalized root mean square error –  $NRMSE$  (1).

$$NRMSE = \frac{\sqrt{\frac{\sum_{n=1}^N (d_n - a_n)^2}{N}}}{\sigma_{d_n}} \quad \sigma_{d_n} = \sqrt{\frac{1}{N} \sum_{n=1}^N (d_n - \bar{d})^2} \quad \bar{d} = \frac{1}{N} \sum_{n=1}^N d_n \quad (1)$$

Where is:  $N$  is the total number of patterns,  $d_n$  is the desired (target,  $T$ ) outputs,  $a_n$  is the actual (estimation,  $A$ ) outputs,  $\sigma_{d_n}$  is the standard deviation.

**Table 2.** Presentation of created regression equations

No	Shape of product representative of product group	Regression equations	Index of determ. $r^2$	Relative error [%]	Comment on regression equation
1	Whole sample <b>A0000</b>	$t = -11.69 + 16.95x_{45} + 1.22x_{40} + 0.54x_{47} + 127.47x_{22} - 3.24x_{18} + 0.15x_{32} + 0.03x_6$	0.736552	30.74	Model is developed with procedure in advance. Three independent variables are omitted $x_8$ , $x_{19}$ and $x_{33}$ .
2	Round bars <b>A00B1</b>	$t = 55.47 + 22.43x_{45} + 1.162x_{40} + 0.43x_{11} + 1.61x_{50} - 5.41x_8 - 3.26x_{18} + 1.78x_{42}$	0.74285	30.95	Model is developed with procedure in advance. Two independent variables are omitted $x_1$ and $x_{26}$ .
3	Shafts <b>AB101</b>	$t = 6.13 + 0.83x_2 + 1.27x_{39} - 3.30x_8 + 5.51x_{46} - 6.86x_{18} + 0.09x_6 + 124.33x_{22}$	0.807626	25.90	Model covers more narrow field of rotational parts. It gives better results than No.2.
4	Discs <b>AB1C1</b>	$t = -5.17 + 0.73x_{47} + 0.93x_{40} + 5.25x_{20} + 0.52x_{24} + 139.11x_{30} + 0.23x_{32} - 0.51x_{33}$	0.809405	24.24	Similar results as in No.3.
5	Discs-with fine machining <b>AC102</b>	$t = -60.78 + 0.59x_{47} + 0.47x_9 + 0.74x_1 + 0.25x_{10} + 0.84x_{39} + 291.07x_{25} + 5.9x_{15}$	0.985057	8.01	Model covers more narrow field of rotational parts. It gives better results than all the previous models.
6	Rotational parts <b>AB103</b>	$t = -37.11 + 0.94x_{40} + 0.03x_{29} + 319.22x_{26} + 0.13x_{23} + 114.67x_{43} - 80.98x_{45} - 0.46x_6$	0.893321	27.06	Model is better than No. 2 as a result of higher degree of homogenization of data. Solution is better with omitted variables $x_2$ and included variables $x_6$ , $x_{23}$ , $x_{43}$ and $x_{45}$ .
7	Flat bars <b>A0004</b>	$t = -10.96 + 0.58x_{40} + 34.50x_{45} + 218.42x_{22} - 5.48x_{50} + 185.03x_{26} + 0.39x_9 - 0.50x_{49}$	0.900332	15.92	Constraints are greater for all variables so results are better.
8	Sheet metals <b>A0005</b>	$t = 0.47 + 1.27x_{40} + 137.45x_{45} - 13.23x_{43} - 0.70x_{43} + 0.28x_4 + 0.05x_6 + 3.91x_{16}$	0.900823	24.04	Model is characterized with the presence of complex variables $x_{40}$ , $x_{43}$ , $x_{45}$

## 5. Experimental Results

As a better method for solving the problem of production time estimation, we proposed a three-layer backpropagation neural network the simplified structure of which is shown in Figure 2. Presented input parameters (LM, NG, sl, SOK, mM, DUP, lZH) refer to the model A0000. Output parameter (TO) is the estimate of time in minutes. Parameters  $n_2=20$  and  $n_3=15$  represent the number of neurons in the second and third layer of the network. Between the layers the following transfer functions are applied: *tansig-tansig-purelin*. Data important for neural network training are: Performance goal: 0.0001, Learning rate-0.01, Ratio to increase learning rate-0.5, Maximum performance increase: 1.04, Maximum performance gradient:  $1e-10$ , Momentum constant: 0.9, Number of layers: 3, Number of neurons: 20-15-1, Transfer functions: *tansig-tansig-purelin*, Number of epoch to train: 15000. For neural network training the available experimental data are divided in three sets: training set (70%), validating set (15%), and testing set (15%). The same model of experimental data division is applied to all models. The following parameters are selected as *key performance indexes* of the neural network model (*NNM*) in relation to the regression model (*RM*): R (correlation coefficient),  $R^2$  (determination coefficient), RMSE (root mean square error) and NRMSE (normalized root mean square error). Below in Figure 3. through Figure 6., for each experimental model the graphical presentation of parameter R values and tabulated values of parameters R,  $R^2$ , RMSE and NRMSE are given.

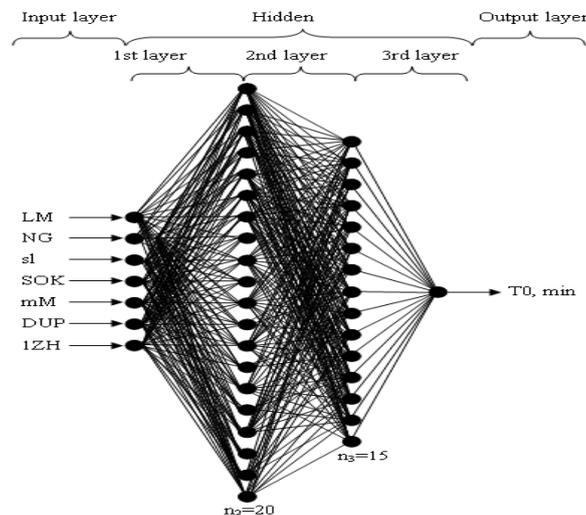


Figure 2 Simplified model of the used neural network of A0000 model

## 6. Conclusion

According to the presented results (Figure 3. through Figure 6.), we can conclude that the assumption on the use of a neural network for the production time estimation in relation to a classical robust regression model is justified. For all experimental models (A0000, A00B1, AB1C1, AC102, AB103, A0004, A0005) the applied backpropagation neural network gives better values of key performance indexes (R,  $R^2$ , RMSE, NRMSE). The biggest difference between the key performance indexes for *NNM* and *RM* estimation models is in the case of model A0005 (input set of 35 data), and lowest in the case of model AC102 (input set of 25 data). The next differences in key performance indexes of individual models ranged from the highest to the lowest values are as follows: AB103, A0004, AB1C1, A00B1 and AC102. The lowest difference between the *NNM* and *RM* estimation model in AC102 (finely machined discs) follows from the nature of the model independent variables and their values that are from a relatively narrow range. The reverse is true for the biggest difference in A0005 (sheets), because of the relatively wide range of independent variables. The key performance indexes in *NNM* estimation models are significantly better than those in all proposed *RM* models, especially in the case of A0005. The reason for this is the proper selection of transfer functions (*tansig - tansig - purelin*) within the backpropagation neural network layers which provide approximation of linearities and nonlinearities within independent variables, as opposed to the regression model whose approximation is only linear. It should be also noted that the estimation by the *NNM* model would be even better if the experimental data had not been divided in three sets (training set, validating set, and testing set), and thus the estimation made by *NNM* model is based on 70% of presented data in contrast to the *RM* model where for obtaining of the regression function all experimental data are always presented.

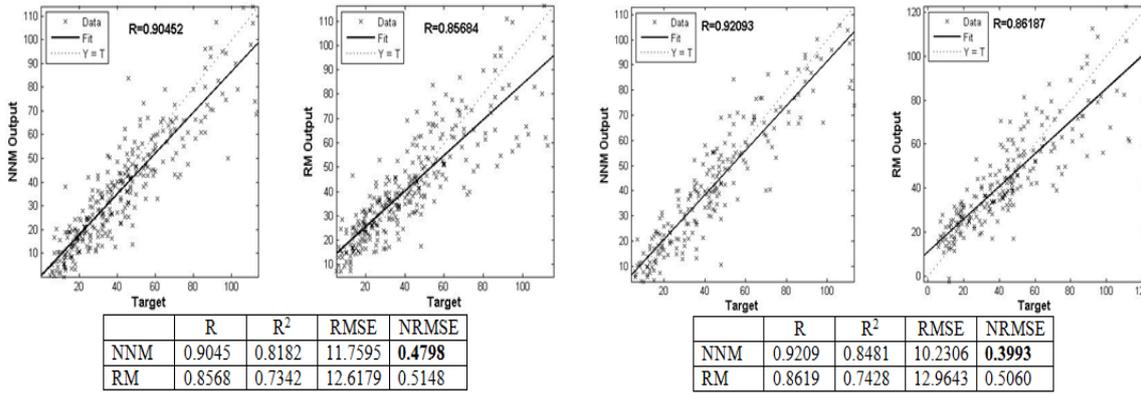


Figure 3 Models: A000 and A00B1

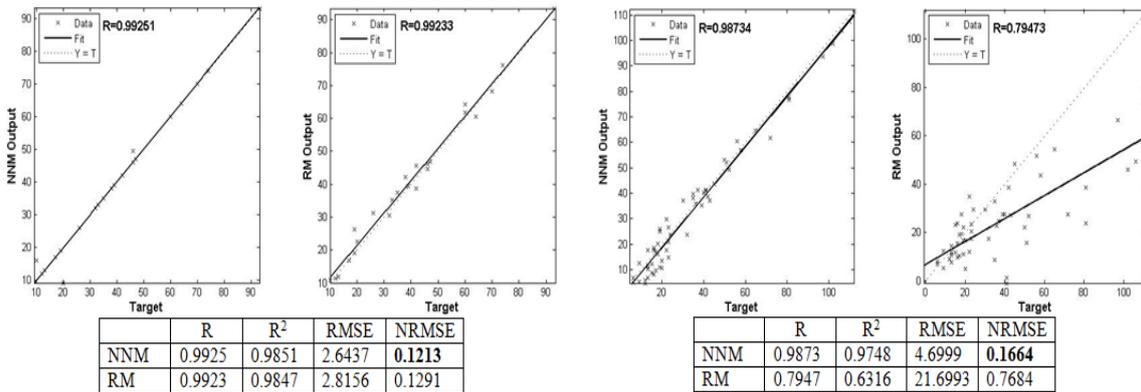


Figure 4 Models: AB101 and AB1C1

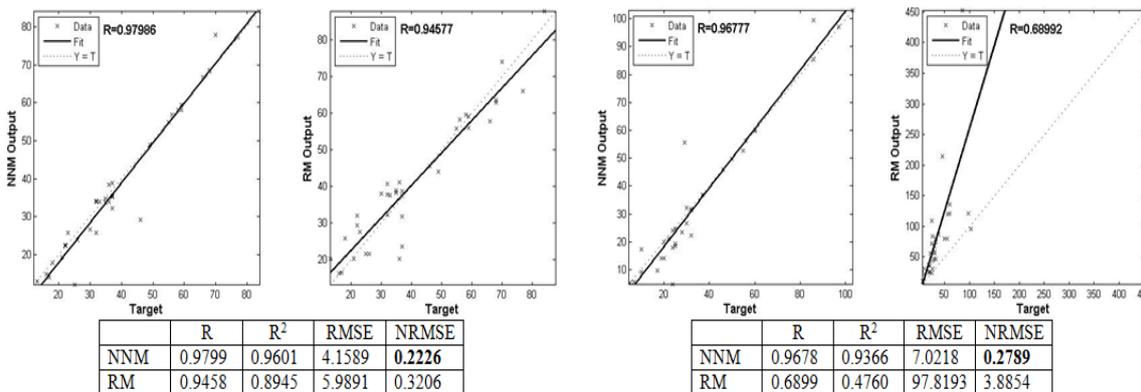


Figure 5 Models: AB102 and AB103

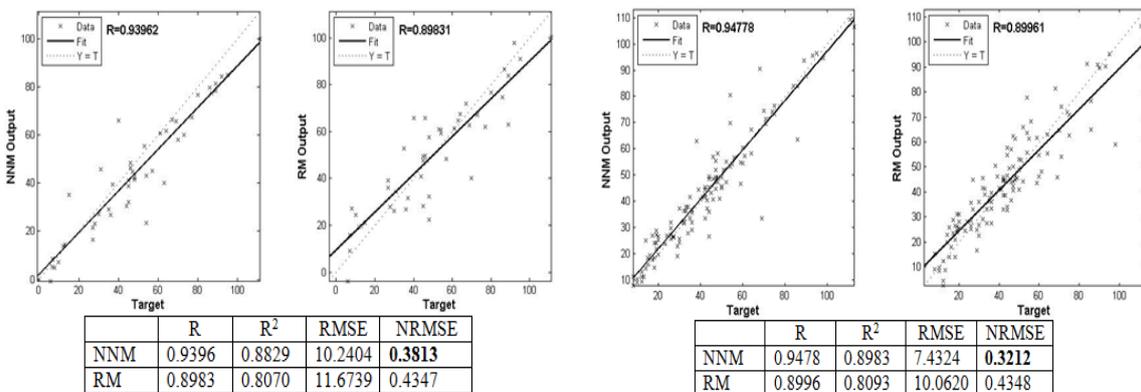


Figure 6 Models: A0004 and A0005

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# Technology Transfer Through Spin - off Companies - from academic research to commercialization in the Life Science Sectors

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## 1. Introduction

Technology Transfer (TT) is a complex process involving the shift of codified knowledge, know-how and management techniques. TT is defined as the transfer of the results of basic and applied research to the design, development, production, and commercialization of new and improved products, services or processes. Knowledge embodied in products is precursor for transfer of technology. The transfer process emphasizes the value and protection of the intellectual product of the researchers.

In knowledge-based industries, the transfer of product and process technology from development to manufacturing might be an overlooked component of the product development effort. Many companies make the mistake of simply tying this transfer to manuals and data rather than actual knowledge. The companies that excel are those that realize that the ability to develop and scale up a robust, cost-effective manufacturing process for each new product is critical to new product commercialization. Companies that have this ability realize many benefits, including reduced time-to-market; optimal product cost at launch, effective manufacturing scale-up, improved product quality, and increased development efficiency [1].

Universities have long been recognized for their excellence in education and research. However, over the last few years they have increasingly been taking on the function of innovation drivers. By translating their intellectual assets into useful products and services, universities can take on a new role as engines of economic growth.

Spin-off Company refer to new established firms as result of cooperation between entrepreneur(s) and existing firm(s) who team up and start new venture together based on group findings.

Spin-off companies confront to idea of entrepreneurs as solitary actors who challenge the existing status quo. Spin-off entrepreneurs build their companies on existing structures and knowledge.

Funding of spin-off companies is based on initiatives for undertaking a risk for venturing and investing by individuals and by compelling incentives of other existing organizations i.e. companies which do start new companies: entry to new markets, employment schemes or rejection of non-profitable divisions [2]. Hence, spin-offs pay a role in creation of industrial clusters and the spatial distribution of knowledge [3].

TT and commercialization of innovations resulting from university research are increasing sources of business development and economic diversification. When a university-developed technology is identified as having commercial application and business potential, it may be transferred via a license of the intellectual asset to an existing company. However, for a variety of reasons, including the lack of a receptor company, the commercialization route may begin with the formation of a new start-up company ("university Spin-off Company") which, via a license agreement or assignment of the technology from the university, becomes the receptor.

## 2. Organizational structure of spin-offs and how TT does takes place in spin - offs

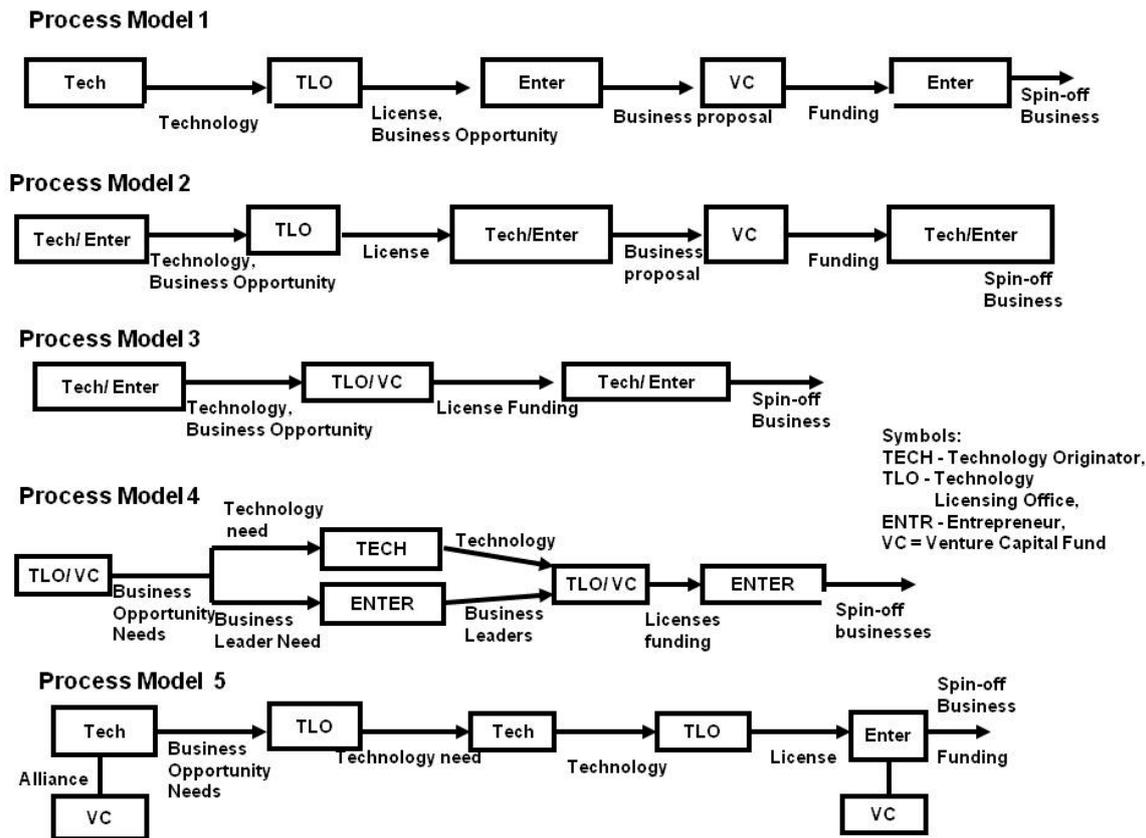
Spin-offs are separate business entities that are founded by using investment funds. The parent organizations usually provide the technological base, supplemented on occasion by some risk capital, in return for equity. Some R&D organizations have their own Venture Capital (VC) whereas others depend on outside sources of VC. In the corporate setting spin-offs appear to be most pursued when the parent organization is not very familiar with either the new technology or the new market. The corporate spin-off seems to provide a good way to establish a new technology or get into a new market and for this reason holds some attraction for R&D-based organizations. The choice to the organization between licensing and spinning off is not always available as different technologies or innovations and different circumstances may favour one method over the other.

Technologies that emanate from university can be transferred toward two modes. The first is direct transfer from university(s) to industry and encompasses consulting services that professors offer to industry, collaborative research, out-licensing of technology and spinning-off new companies. Second, indirect, mode is referred to creation of graduates who bring knowledge, skills, and an entrepreneurial attitude to their latter jobs and their communities. In Study issued by Bank of Boston in 1997 is underlined that from 4000 spin-offs founded by Massachusetts Institute of Technology (MIT) graduates 1 000 are located in Massachusetts. These companies employ 1,1 million people and realize over \$ 232 billion in sale, and share 5% of the employment and 10% of the economic base, as well [4]. Comparing to US (United States), one of the main barrier in Europe to successful entrepreneurship, innovation and product development is the lack of variety in forms of finance along the "Venture Capital chains". According to Peter Schintlmeister from EUROTRANS-BIO Europe currently have over 1,600 biotech companies, which all have the potential to become key drivers of public welfare and economic growth, but which also have high requirements in terms of capital, business environment, people, as well as public and political support. In 2004, under Dutch Presidency the following strategic priorities and argumentations for EU Life Science Sectors have been underlined [ 5, 6]:

- Sub-optimal and unbalanced funding at different stages in the business life-cycle and exacerbated imbalances by geographical and stock-market fragmentation cause restricted competitiveness of Europe's life science sectors;
- By helping to offset some of the commercial risk involved with incentives and benefits Council/Member States and Commission to examine the creation of a specific status for "young innovative companies", to provide schemes to entrepreneurs, employees, investors and companies across Europe to reward innovation.
- Council and Commission should regularly monitor the evolution of the various sources of capital and their impact on the European biotech industry's global competitiveness.

## 3. Key Roles in the Spin-Off Process

In spin-off process four principle groups are involved: the technology originator, the entrepreneur, the R&D organization itself, and the Venture Capital (VC) funds i.e. investor. Vibrant interaction are essential among all those participants in process of transfer a technology from R&D organization where it was developed to industry where it will be incorporated into usable products and services. Surveys made at several universities and R&D organizations that have attempted to spin-off new companies indicate five different models of interactions showed in Figure 1 [7].



- Model 1: Technology push with independent principal groups
- Model 2: Technology push/business pull with an entrepreneurial technology originator
- Model 3: Technology push/business pull with an entrepreneurial technology originator and an internal venture capital fund.
- Model 4: Business pull with internal venture capital funds.
- Model 5: Business pull with an entrepreneur/venture capital fund alliance.

**Figure 1** Models for formation of spin-offs

Model 1 is the most basic of the five and from this model derives Model 2 and Model 3. The existence of an entrepreneurial technology originator in Model 2 markedly increases the degree of business pull in this model compared with Model 1 [8]. This model applies to about one-third of the MIT spin-offs and most of the Stanford spin-offs. Model 3 is more likely to be successful in the case where a R&D organization is itself inactive so far, as spin-off activity is concerned but the community in which the organization exists is one where spinoffs, entrepreneurs and venture capital funds are common. By using an internal venture funds, organizations spur the spinning-off process on the marketplace. The GE, Kodak and Xerox approaches in their foundations are variants of Model 3, with their own internal financing generally restricted to seed stage and initial product development financing. Model 4 is a more likely outcome than Model 3 when a R&D organization chooses to develop a venture capital fund to increase spin-off activity in an environment that is not rich in venture capital and where spin-offs are uncommon. Harvard Medical School created its Medical Science Partners fund consistent with the Model 4 approach. The alliance perceived in Model 5 is based on the venture fund's belief in the capabilities of the entrepreneur to succeed with a spin-off opportunity that is, at that stage, in turn the entrepreneur trusts that the venture fund will provide the funding if a suitable opportunity is discovered. Generally the technology licensing office of the R&D organization takes an active role in finding suitable technologies to satisfy the entrepreneur's need. The entrepreneur will not have any involvement in the invention process (This model is used at Harvard and MIT).

All those five models outline the basic objectives of the interactions that occur between the parties:

- TT from R&D organization is performed in a controlled manner, usually through licensing agreement. The technology that is provided establishes the initial core competences of the new company;
- Identification of business opportunity and creation of business based upon this opportunity. This makes balance between technology and established the other functions required by business to interact with customers, such as a product and supply chains;
- Providing the management resources for the company that give the direction and control necessary for it to succeed;
- Investing funds in the business that will be urged for additional growth. This growth can potentially meet the demands of the principal parties involved in TT through financial and other less tangible means.

The five process models emphasis the sequences of interactions between the parties and the objectives of these interactions.

The main criteria to determine the commercial potential for TT deal and the questions relating to requirements that have to be met are shown in Table 1.

**Table 1** Criteria to determine the commercial potential for TT deals

Benchmark	How to meet specified banchmarks
Strength of the intellectual property	Is the IP right protected? What are the barriers to entry? Is there scientific merit or other validity to the work? How quickly and inexpensively can it be presented as a product that has the right physical and technical specifications, the right price, and achieve the right level of market penetration? <i>For life sciences:</i> strong pre-clinical data, animal studies, ADME and toxicity data are required.
Technology platform	Will the technology spawn more products later, or is it a one-trick pony? What is the value added to the R&D chain? Will other companies be willing to pay for it?
A sense of the regulatory pathway and the cost of going down it	For life sciences, what are the clinical trials going to look like? Has the FDA worked with this type of technology or product before?
An idea of the size and timing of the market	Is this serving an unmet need? Are people actually ready to pay for it? What are the competing products or technologies? What is the reimbursement potential? For medical devices, treatments or vaccines, is it something that will be reimbursed through the current (and future) medical payment system? Does the technology readily lend itself to being produced in quantities that are economically attractive? In other words, are there impediments to using semi-skilled assembly technicians to build the product? Does it require special materials or components that are particularly expensive or have a difficult procedure or are hard to handle?"

There is a general consensus that licensing is most effective if it directly involves the inventor and the inventor's institution. According to Jill Sorensen, director of the Office of Technology Management at the University of Illinois at Chicago, the university sector in US has been highly successful in its technology transfer efforts since it was given the right to own and license university inventions under the Bayh-Dole Act in 1980. Prior to 1980 when university patents were generally owned by the federal government, no more than 10% of those patents were licensed to industry for commercialization. Data for FY98 on university licensing activities show that universities are filing in excess of 4,000 patent applications a year and issuing more than 3,500 licenses or options to license annually. Trend data show a cumulative total of licenses and options issued since 1991 standing at over 20,000 and that the percentage of licensing activity has doubled between 1991 and 1998.

## 4. Conclusion

Successful spin-offs are not built on one product, but on the ability to use their research and technical advantages in an adaptive manner which keeps them ahead of their competition. When evaluation of technology is undertaken for possible spin-offs formation, following elements must be considered:

- Understanding of the long-term technology commercialization;
- Opportunity (its scalability, manufacturability, applications, and marketability);
- A focus on commercializing the benefits of a technology rather than the technology itself;
- A clear plan of what the next generation product will be, or needs to be, in order to remain competitive.
- Business planning, (clear business plan, sound management, budget forecasting and a financing strategy, and marketing and production plan);
- Recognition of the needs and priorities relative to the commercial plans of the company – and a strategy to keep them clearly delineated;
- Clear lines of reporting and obligation, and an awareness of the risks of conflict of interest and conflict of commitment;
- A well understood development program with recognition of the progression needed from the research focus to the commercialization focus – with an emphasis on the critical nature of the time to market;
- Communication on a regular basis to keep all parties informed;
- Management with proven experience in the particular high technology sector, an experienced board of directors and the ability to access experienced R&D personnel and facilities;
- An understanding of the market opportunity;
- Access to financing at all stages (technology development, seed capital, venture capital, and public markets);
- A solid, well-understood and protected technology.

Therefore, it is necessary to create environment that will spur the process of technology transfer toward the spinning-off of new companies from university and launching them on the marketplace. Also, the pragmatic communication should be focused more on the coordinating strategic alignments, target technology essences, and a shared vision to where the technology transfer project will guide both (all) involving partners; more than just routine-typed work communication.

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# The Role of Human Resources and Education in Regional Development

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**Creativity and innovation are closely related concepts. Creativity is the act of creating new ideas, approaches or actions, while innovation is a process that involves the application of creative ideas in a specific context. But the basis is knowledge (learning or education). This brings us to link education-creativity-invention-innovation.**

**One of the main forces that direct the new economy is knowledge. Knowledge employees use to make decisions or take actions important for the organization and therefore the people with adequate intellectual capital are strategic resources in modern companies. Modern business is characterized by globalization. It affects the work force in the world in two fold: greater mobility of capital affects the growth or reducing unemployment rates in some countries, and on the other hand, globalization affects the increased mobility of labor. Countries are looking to attract foreign capital, because it provides a further development, while companies are trying to ensure timely development of new skills already employed or they are trying to attract new qualified workers. Considering the decline in birth rate, particularly strong in Europe, it is obvious that in the future will be present the struggle for human resources, especially those educated.**

**Holders of development are young, competent people. The modern world is developing knowledge-based economy, in which the basis is education. While a growing number of experts said that the Serbian education should be aligned with market demands, it is true that a large percentage of the population has only primary school. The percentage that is set aside in the national budget for education is the lowest in the region, while adult education is almost not subject of thinking. However, through changes in the education system Serbia is trying to fit into the European educational space, create pre-conditions for its own development and development of the region.**

## **Keywords**

Creativity and innovation, Education, Work force and intellectual capital, Knowledge-based economy.

## **1. Introduction**

The rapid development of technology, transportation and communication enabled the process of globalization. The main feature of globalization is that national borders are not important in economic terms, because free trade and mobility of labor and other resources led to the destruction of borders and the creation of global markets. In such environment, the fastest and the most adaptable to the changes ones survive [1].

Globalization creates a higher degree of competitiveness between companies. Company must have the right people in the right place. It is necessary to recruit competent and talented people, to be successful. However, this is just the first step that needs to take a successful organization. It first has to attract quality employees, and further to invest in their development and retaining, in order to keep them in the company. Organizations and countries must have educated and competent people in order to adequately respond to the demands imposed by globalization process.

In the era of machine people were not so important, and things were at the center. In the era of information technology, things are secondary, and knowledge is in the center. The company's value comes not from things but from the knowledge, skills, intellectual property, competence, and everything of that are contained in people [2]. But, there is no knowledge without education. So the basis of knowledge-based economy is a formal education and further lifelong education.

However, poor educational structure is what appears as a problem in Serbia and in the environment.

## 2. The characteristics of the modern business environment

The basic forces that drive the new economy are:

- Knowledge - intellectual capital that is seen as the source of competitive advantage of modern organizations,
- Change - which is becoming a normal phenomenon in the organization, given that organizations must adapt to constant, rapid and complex changes. Those changes reduce the certainty and predictability in organizations,
- Information technology - that allowed the process of globalization,
- Globalization - which affect the flows of capital, change the organizational structure of the company, encourage networking and the creation of various partnerships.

However, if globalization is considered as a basic characteristic of today's business environment, then we can say that it is enabled by information technology (which allows companies to operate in remote locations compared to the parent company), and that it has as a consequence different types of changes that are constant, and that require a higher degree of knowledge of all employees and participants in the global competition. Those changes are necessary in organization, in order to adapt to a new business conditions, take advantage of some chances as well as power and to avoid the threats and weaknesses.

Internet and information technology have changed the nature of the business and competition, because the information can be freely and easily exchanged, there is electronic commerce, it is possible to conduct meetings, although participants of the meeting are not in the same place, companies can be managed without a physical presence of managers, and there is more and more (especially in areas of services) virtual organizations.

Power of buyers has increased. They influence the reduction of prices, demand higher quality or better service and they are turning competitors against each other. Their power is even greater if they are concentrated or buy large quantities of products that are important to the sell of seller. Also, if the products that customers buy are standard and undifferentiated, customers are assured that they can find alternative suppliers and they are turning companies against each other, etc.

Knowledge and continuous learning are critical elements of success today. New economy led by those who effectively manage knowledge - who create, discover and combine the knowledge in order to create new products and services faster than competitors. Because of that companies require special skills of employees. The state borders are not a problem for companies looking for the best employees so here we can talk about the global labor market. All this increases the mobility of employees. Various aspects or segments of the environment that should be analyzed are: demographic, socio-cultural, political-legal, technological and economic segment.

## 3. Educational and age structure of population in Serbia

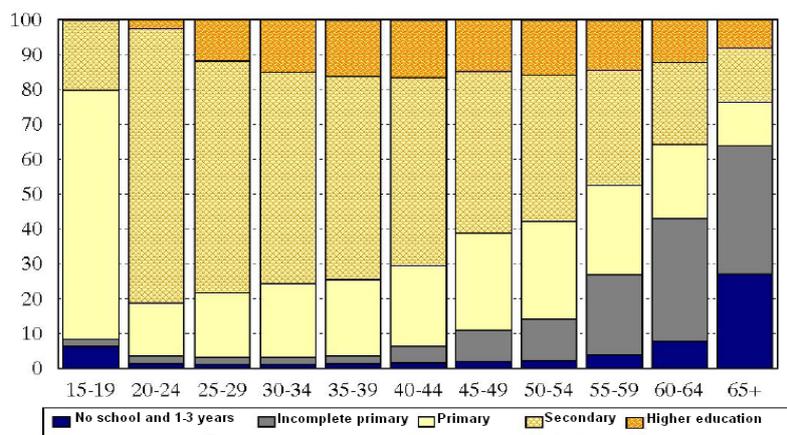
Given the global movement of capital and labor, for one country to attract foreign capital, is important educational structure of unemployed in the labor market as well as employees. Highly-educated workforce attracts sophisticated technology, while new investments into the country provide new jobs, higher living standards and thereby keep the existing highly qualified people in a country. All this creates a space for new investments in education.

Total educational structure of population in Serbia is quite unfavorable. According to the latest census from 2002 the 21.9% of the population older than 15 are without completed primary education, 23.9% of the population has completed primary school, 41.4% had secondary education while only 11% of the population has a university and college education. In accordance with this data, it means that nearly 46% of the population have a minimum education.

**Table 1** Population aged 15 and over by educational attainment in Serbia, according to the 2002 census [3]

	Number of residents	Participation in the population (15+), %
No school and 1-3 years of primary school	483679	7,7
4-7 grade of primary school	896847	14,2
Primary education	1509462	23,9
Secondary education	2596348	41,1
Higher education	285056	4,5
High Education	411944	6,5
Unknown	137895	2,1

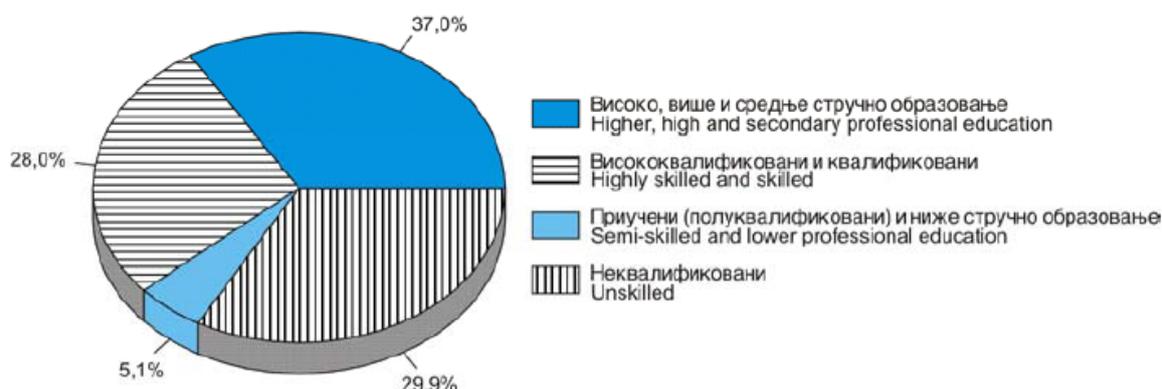
If we look at the structure of the population over 15 years by educational level and age, we can see that the largest percentage of illiterates are in category of the population over 65, but what is worrying is that the large number of illiterate people and those with secondary education are in category of the population between 15 and 24.



**Figure 1** Population older than 15 years by educational level and age (share in total population in 2002) [4]

Structure of unemployment is not so good as well, but a large percentage of unemployed in the category of high, higher and secondary education, giving hope to investors that on the labour market is possible to find quality and competent people that could be employed.

**UNEMPLOYED ACCORDING TO LEVEL OF PROFESSIONAL EDUCATION  
- Annual average, 2009 -**



**Figure 2** Unemployed persons by level of education, annual average 2009 [5]

Demographic aging is a fundamental and general feature of the Europe population. People in Serbia are between the oldest demographic groups of population in Europe. Among the countries of former Yugoslavia, Serbia has the highest aging index while among the countries of Southeast Europe (Balkans) a higher aging index have only Bulgaria and Greece.

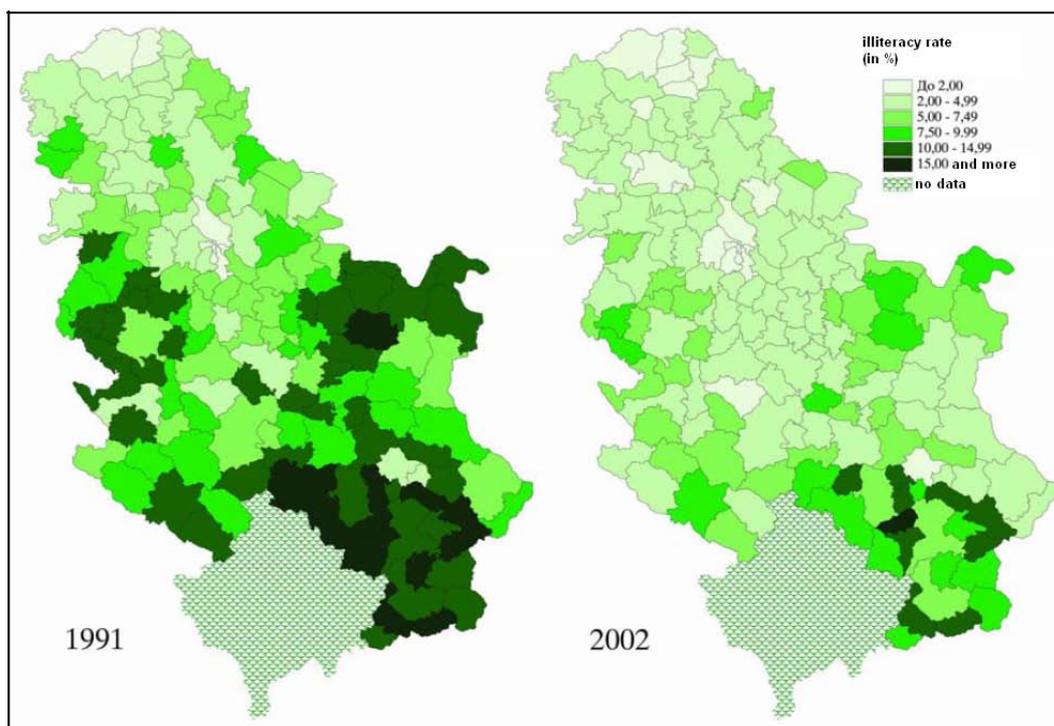
**Table 2** The aging index for some countries in the region [4]

Country	Year	Total population	Average age	Share in total population (%)			Ageing index (65+/0-14)
				0-14	15-64	65+	
Serbia	2003	7481245	40,4	15,7	67,5	16,8	1,07
Slovenia	2003	1995033	39,6	15,0	70,2	14,8	0,99
Croatia	2003	4442200	39,8	16,6	67,1	16,3	0,98
Bosnia and Herzegovina	2002	3828397	37,3	18,3	69,5	12,2	0,66
Montenegro	2003	618407	35,7	21,1	67,1	11,8	0,56
Macedonia, FYR	2002	2038651	34,8	21,5	68,0	10,5	0,49
Bulgaria	2003	7845841	40,7	14,6	68,4	17,0	1,17
Greece	2000	10554404	40,3	15,2	67,6	17,3	1,14
Hungary	2003	10142362	39,7	16,1	68,5	15,4	0,95
Romania	2003	21772774	38,0	17,0	68,8	14,2	0,83
Albania	2001	3069275	30,7	29,3	62,2	7,5	0,26

#### 4. Perspectives for development of Serbia and the region

Although the situation regarding education of the population in Serbia is not so great, encouraging is that there are positive trends and the desire to improve this situation.

When we compare the situation in 1991 and 2002 it is notably the reduction of Serbian municipalities with high percentage of illiteracy (over 10%). This trend is present today, and probably will continue in future.



**Figure 3** Rates of illiteracy of the population older than 10 years - Serbia in 1991 and 2002 (by municipalities) [3]

According to the UIS (UNESCO Institute of Statistics) the average enrollment rate in Central and Eastern Europe is 50%. In region of Central and Eastern Europe, Baltic countries and Slovenia are the only ones approaching to the average enrollment in North America and Western European countries, which have a rate of 67%. Albania is lagging behind the countries of region, while Croatia and Serbia are typical representatives of the region [6].

**Table 3** Gross enrolment ratio for some countries in the region [6]

Country	Gross enrolment ratio (%) for 2002
Albania	15,8
Montenegro	Not available
Croatia	35,8
Slovenia	66,7
Serbia	43,0

source: UIS (UNESCO Institute of Statistics)

These countries must make further efforts to catch Slovenia, Western Europe and North America, although since the early nineties to the school year 2006/2007 the total number of students in these countries has doubled. The upward trend in student enrollment is steady over the past decade but it is necessary to ensure that investment in higher education and student standard are harmonized with the increase in number of students also.

Since 2002 universities in Serbia every year produces increasing number of graduates, masters of Science, PhDs.

Graduates, Masters of Science, and PhDs					
Year	2002	2003	2004	2005	2006
PhDs	303	359	394	468	401
Masters of Science	835	1,101	978	1,154	1,038
Graduates	12,099	13,224	14,968	19,678	20,872

Source: Statistical Office of the Republic of Serbia

**Figure 4** Graduates, masters and PhDs in Serbia [7]

Many believe that education reform is crucial for the modernization of Serbia, and therefore it should be accelerated, because the further development of the education system fastest approach to the European Union. The implementation of accreditation procedures in higher education institutions in Serbia meant the introduction of a range of standards, which higher education institutions had to comply with in order to be accredited. Introduced standards have to ensure quality of education and comparability and evaluation of higher education institutions. What would also be useful to educational institutions is to follow the path of their students, in order to determine how they are successful in employment, notice possible problems and implement some improvements in their curricula.

We can say that from the education can benefit individuals, organizations and the wider community as well. Education brings to individuals better business opportunities, higher income, better quality of life, better social status. If we look at the organizations, educated individuals more easily acquire new knowledge and have less resistance to change, reduce the need for retraining, provide flexibility to the organization more than necessary today and the like. If we look at the wider community, educated people are informed, active, rarely lose their jobs and when this happens these periods are lasting less and they are less reliant on social welfare.

One can no longer learn enough to be a fully functioning member of a society in one's youth. Extended life expectancy coupled with dramatic changes in economic, social and cultural situations mean that both individuals and societies must continue to learn – or be left behind and become marginalised [8]. Lifelong learning aims to increase employment rates and to strengthen the competitiveness of the economy of a country.

The education system in Serbia must comply with the requirements of the labor market. The link between education and the labor market is obvious, given that those who are students today, tomorrow will be those who will be on the labour market and look for a job [9].

The annual review of the most competitive countries of the World Economic Forum (WEF) for 2009-10, covered a 139 economies, including all countries of South East Europe. Some of them improved and some deteriorate its position relative to 2009-10. Serbia has dropped three places, from 93 to 96. In fact, each country is assigned a rank based on a wide range of competitiveness factors, divided into 12 groups. Groups included health and basic education, higher education and training and labor market efficiency, among others. In the report are given also opinions of more than 13,500 business leaders, which opinions are collected through surveys conducted in countries that were surveyed.

From countries in the region Serbia, Greece, Croatia, Romania and Slovenia have the worse rank than in previous (2009-10) year. Montenegro (which joined the group of 50 the most competitive economies in the world), Bulgaria, Macedonia, Albania and Bosnia and Herzegovina occupied a better position in 2010-11 as compared to the previous year, while Turkey is the only country in the region that has retained its position.

Among the most problematic factors for doing business in all countries in the region are inefficient government bureaucracy (the first place in Croatia, Greece, Macedonia and Turkey) and corruption (on the first place in Serbia and Bulgaria), access to finance (on the first place in Albania, Bosnia and Herzegovina, Romania and Slovenia) and inadequate infrastructure (on the first place in Montenegro). Other factors included restrictive labor regulations, policy instability, tax laws and so on. These are also the factors on which these countries must work in order to improve their own competitive position.

**Table 4** Global Competitiveness Index (GCI) 2010–2011 and 2009–2010 [10]

Country	GCI 2010–2011 Rank	GCI 2009–2010 Rank
Slovenia	45	37
Montenegro	49	62
Turkey	61	61
Romania	67	64
Bulgaria	71	76
Croatia	77	72
Macedonia, FYR	79	84
Greece	83	71
Albania	88	96
Serbia	96	93
Bosnia and Herzegovina	102	109

(according to: The Global Competitiveness Report 2010-2011, World Economic Forum)

According to assessment of business leaders in the field of education system quality ahead of Serbia are located, in the region, Montenegro, Slovenia, Albania, Macedonia, Romania and Bulgaria. According to the quality of scientific research institutions, Serbia is on the fourth place, behind Slovenia, Montenegro and Croatia, while by the cooperation between industry and universities in research and development, in front of Serbia are only Slovenia and Montenegro.

**Table 5** Competitiveness in quality of the educational system, quality of scientific research institutions and university-industry collaboration in R&D, among Balkan countries [10]

Quality of the educational system		Quality of scientific research institutions		University-industry collaboration in R&D	
(1 = not well at all; 7 = very well)					
Country rank	Mark	Country rank	Mark	Country rank	Mark
37 Montenegro	4.4	27 Slovenia	4.7	37 Slovenia	4.2
47 Slovenia	4.2	36 Montenegro	4.4	52 Montenegro	3.8
54 Albania	3.9	51 Croatia	4.0	71 Serbia	3.5
59 Macedonia, FYR	3.9	56 Serbia	3.9	74 Macedonia, FYR	3.5
84 Romania	3.4	71 Macedonia, FYR	3.5	75 Croatia	3.4
85 Bulgaria	3.4	73 Bulgaria	3.5	82 Turkey	3.4
86 Serbia	3.3	83 Romania	3.3	103 Romania	3.1
89 Croatia.	3.3	88 Greece	3.3	110 Bulgaria	3.0
95 Turkey	3.2	89 Turkey	3.3	112 Greece	3.0
102 Bosnia and Herzegovina..	3.1	104 Bosnia and Herzegovina	3.0	117 Bosnia and Herzegovina	3.0
118 Greece	2.9	128 Albania	2.5	138 Albania	2.2

(according to: The Global Competitiveness Report 2010-2011, 2010 World Economic Forum)

All of factors that are listed as bad for the competitiveness of countries in the region should serve as indicators of what needs to be changed. However, competent and educated individuals are that which would be missing in the global economy and on what it will be based. Because of that, all countries should be oriented on improving the situation in the education system and encouraging lifelong learning.

## 5. Conclusions

Countries that would have trained and equipped staff in global economic conditions will be those who will benefit. However, there is a critical investment in the education system. To be good, education system must be compatible with the chosen development strategy of the country, as well as being able to quickly respond to labor market [9].

Serbia, together with countries in the region must work to raise the educational level of the population. Over time, due to globalization wages will globally equalize, so the competence of employed and unemployed in the labor market, will be the comparative advantage of some countries. These countries will be in a position to attract capital, as well as clean and sophisticated technology.

Despite previous opinion, that Serbia have a cheap labor, the latest researches show that in the environment we have a countries with cheaper workforce, but foreign investors in Serbia attract labor force flexibility, willingness to quickly learn, adaptability to the new business culture, but also motivation and loyalty [11].

Balkan countries should benefit from the reports, as the report of World Economic Forum. This type reports discuss what is poor in these countries and what should be done. What are the indicators of developed countries, those that are among the top 50 economies of the world, can show what should be targets, and benchmarking with the best and analysis of those who were in a similar situation but have advanced, could show what to do.

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# Conceptual Approach on Bioleaching of Cu-Zn-Pb-Ag-Au Concentrates

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Polymetallic or complex Cu-Zn-Pb-Ag-Au sulphide concentrates can be treated by bioleaching combined with proper hydrometallurgical processes. Likely, thermophilic bacteria would be used aiming to get efficient copper bioleaching from chalcopyrite. Indirect bioleaching of Zn-Pb-Cu-Ag-Au sulphide concentrates is based on applying ferric leaching of the polymetallic concentrates by means of bio-regenerated ferric sulphate solution.

Indirect bioleaching is a biotechnology that presents important advantages when apply to bioprocessing of zinc and zinc polymetallic concentrates such as high metals recovery, fast kinetic of 4-5 hours to get full metals extraction, sulphur oxidation to elemental sulphur (avoiding sulphuric acid generation, while pyrite mineral remains untouched), and use of conventional reactors (aeration is not required) and normal process equipments.

On the other hand, the development of high-efficiency bioreactors for ferrous iron bio-oxidation based on flooded fixed-bed model has opened the way to succeed in the potential commercial application of this innovative bio-hydrometallurgical technology, being especially attractive to benefit zinc and lead bulk or polymetallic concentrates containing other valuable metals like copper, silver and gold.

In addition, a great variety of concentrates is feasible to be processed, e.g. in the range of 15% to 60% Zn and rest Cu-Pb-Ag-Au metals content, and concentrates in the range of 15% to 25% Cu and rest Zn-Pb-Ag-Au metals content. By biotechnology applied on polymetallic concentrates will be produced electrolytic copper and zinc plates via solvent extraction and electrowinning of bioleach solutions.

## Keywords:

Biotechnology, Metal bearing sulfide minerals

## 1. Introduction

All mineral processing technologies have an effect on the environment. Therefore, the development of innovative, environmentally friendly technologies will be extremely important, and minimising waste generation and using wastes to produce useful by-products maintaining economic viability is a goal for the process, and biotechnology is one of the most promising solutions to deal with those mining problems compared to pyrometallurgical routes [1].



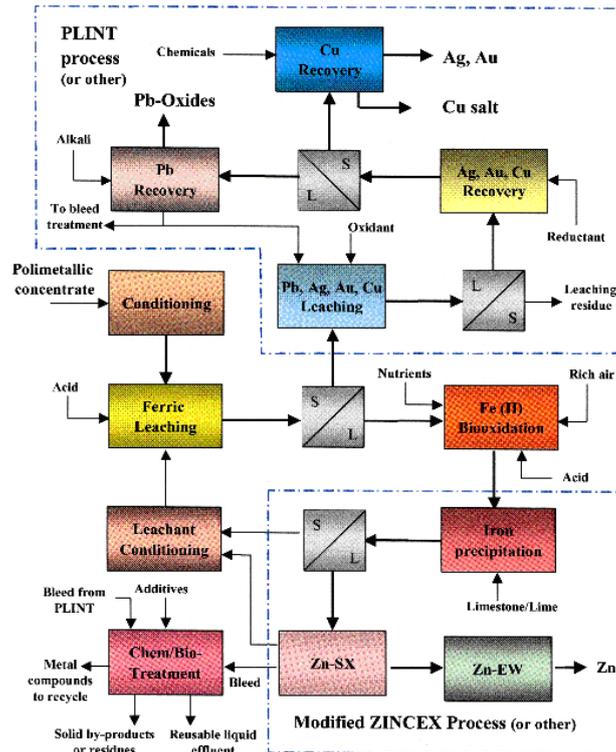


Figure 2 Indirect bioleaching of Zn-Pb-Cu-Ag-Au sulphide concentrates

## 4. Process Description

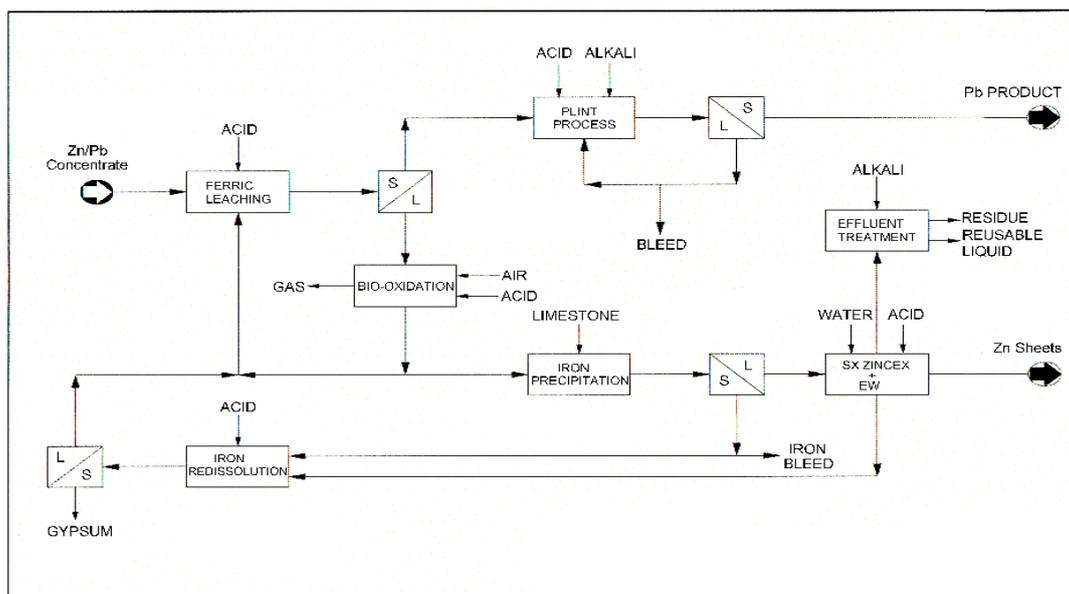
A descriptive diagram of the process can be seen in previous Figure 1. The indirect bioleaching processing route for Zn-Pb-Cu-Ag-Au concentrates, starts with a chemical leaching step where the zinc is extracted from the solid to the aqueous phase by means of the chemical oxidation process using ferric sulphate as main reaction. Major areas shown in the diagram are: Ferric leaching, Biooxidation, Iron precipitation, Iron redissolution, Solvent extraction and electrowinning (Modified Zincex™ process), PLINT process (lead, silver and gold recovery), Effluent treatment.

The process flowsheet for the indirect bioleaching of Zn/Pb concentrates that contain Cu-Ag-Au is shown in next Figure 3. As a conceptual block diagram it shows the main steps and streams for the zinc and lead recovery [2].

- Ferric Leaching
- Biooxidation and Iron precipitation
- Iron redissolution
- Zinc Solvent Extraction
- Zinc Electrowinning
- Effluent treatment
- Lead and silver recovery

### 4.1 Ferric Leaching

According to flowsheet for the indirect bioleaching of Zn-Pb-Cu-Ag-Au concentrate presented in Figure 3, the indirect bioleaching processing route for polymetallic bulk concentrates starts with a chemical leaching step.



**Figure 3** Indirect bioleaching block diagram.

Zinc is extracted from the solid to the aqueous phase by means of the chemical oxidation process using ferric sulphate according to the following main reaction.

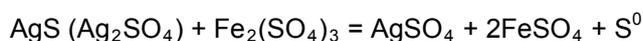


Lead sulphide is transformed in lead sulphate remaining in the solid phase due to the low solubility of this compound in sulphate media.

Lead sulphide is transformed to lead sulfide according to chemical reaction:



Silver follows a similar pathway. Under conditions of high temperature, low acidity, and high ferric ion concentration, silver precipitated as insoluble silver jarosite ( $\text{AgFe}_3(\text{SO}_4)_2(\text{OH})_6$ ) [3]:



The ferric leaching step is composed of stirred tank reactors arranged in cascade so that the pulp passes from one tank to the next by overflowing.

The feed is made up of a high density pulp of the Zn-Pb/Cu-Ag-Au concentrate and a part of the leaching residue. The feed flow is mixed at the leaching reactors at a ratio corresponding to 7-8 % solids with ferric solutions coming from the biooxidation and iron redissolution steps. Flow of ferric solution is set so as ratio of ferric ion to zinc and lead in the concentrate is in excess of 25 %.

The temperature is set at 90°C. The pH is regulated at 1.25 by adding  $\text{H}_2\text{SO}_4$ .

## 4.2 Biooxidation and iron precipitation

The biooxidation step is composed of one stage in biooxidation pool arranged in parallel. Air is injected through a system of membrane disk diffusers installed in the bottom of the pools.

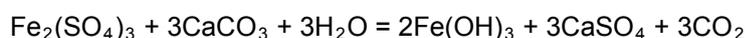
The clarified ferrous solution from the previous stage enters the bioreactors at a temperature of 30°C. The air flowrate to the bioreactors is  $20 \text{ Nm}^3/\text{hm}^2$ . Conversion efficiency of ferrous to ferric ion is high, Fe(II) concentration at the outlet is 0.5 g/l.

Biooxidation step is presented as chemical reaction:



The bio-solution which is not recycled back to ferric leaching, is sent to a precipitation step. Iron precipitation step is performed in reactors arranged in cascade.

Iron precipitation step is presented as chemical reaction:

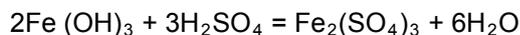


Iron is precipitated by means of limestone addition at pH 4. Addition of a small amount of  $\text{H}_2\text{O}_2$  is needed to assure all iron is ferric.

### 4.3 Iron redissolution

The iron precipitation step is composed of reactors arranged in cascade. Iron is redissolved by means of sulphuric acid addition at pH 1. Part of the acid needed comes from the acid aqueous raffinate produced at solvent extraction.

Iron redissolution is presented as chemical reaction:



Rest of acid needed to reach the pH setpoint is supplied as concentrated sulphuric acid.

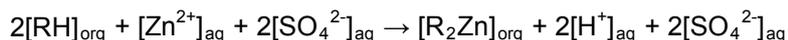
### 4.4 Zinc Solvent Extraction

Solvent extraction Unit consists of the following stages:

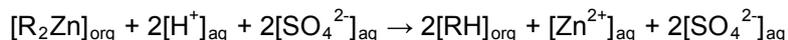
- Extraction
- Washing
- Stripping
- Depletion
- Bleed neutralization
- Organic regeneration

At solvent extraction, through a series of extraction/stripping stages, a zinc sulphate purified solution is obtained using ZINCEX process technology (TR).

Extraction:



Stripping:



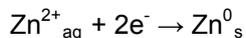
The extraction step is composed of conventional mixer-settlers. The pregnant liquid solution enters this stage with a determined zinc concentration. Then it is contacted with the organic solution (D2EHPA diluted in kerosene) coming from the depletion stage preloaded with zinc. As a result, the zinc is loaded in the organic while the aqueous phase exits as an acid raffinate.

Next, the organic phase enters the washing stage to avoid impurities to enter the next step, the stripping stage, where it is contacted with spent electrolyte from the electrowinning unit producing high quality electrolyte.

Finally the organic raffinate is sent to the depletion stage in order to recover the zinc content in the extraction aqueous raffinate.

### 4.5 Zinc Electrowinning

This purified Zn loaded solution is sent to the electrowinning step to obtain SHG Zn cathodes.



The zinc deposition on the cathodes is carried out with a current efficiency of 91 %. No significant side reactions (except from hydrogen evolution) are considered since experience shows that SHG zinc is obtained with the MODIFIED ZINCEX™ process.

### 4.6 Effluent treatment

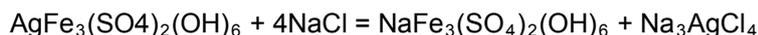
In order to produce a final effluent free of metals it is necessary to implement a bleed treatment stage. No design parameters and flowsheet is given for this area since it is considered as conventional technology.

## 4.7 Lead and silver recovery

The leaching residue can be treated by means of different techniques to get efficient extraction of valuable metals, namely precious metals, lead and copper. The PLINT process is very flexible and adaptable to process conditions required by the feed materials. For instance, acidic conditions, oxidant addition, etc., can be used to attack jarosite matrix if convenient.

The process route of lead recovery from the leaching residue follows a first step where it is leached in a hot brine solution and a second one, a precipitation step where lead in solution is recovered in form of carbonate concentrate.

Chemical reactions involved in the leaching process of lead and silver are.



Finally, the silver and gold are recovered from solution using a proper reductant, e.g. lead powder, producing metallic cement that is purified to obtain silver/gold bullion for the market. Lead is precipitated with an alkali to produce pure lead oxides or carbonate concentrate ready to be commercialised and able to be processed at any primary or secondary lead smelter without generating any waste or slag.

## 5. Conclusions

To date, biohydrometallurgy has been industrially applied to recover copper and gold from ores and concentrates; while copper is recovered through heap bioleaching, gold is extracted using stirred bioreactors. Within *BioMinE* [4] project, an European consortium composed of industries and top experts in biohydrometallurgy have developed an innovative indirect bioleaching application dealing with zinc concentrates and zinc polymetallic concentrates; hopefully, the achieved successful results will open the way for bioprocessing of a wide variety of zinc and lead polymetallic or complex minerals deposits that are abundant and can be found in Europe and worldwide.

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# The Role and Importance of Investment Banking in the Financial Industry and Innovation

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Investment banking is among the important subjects in the agendas of politicians, financial regulators, manufacturers, local and global market participants and students. Great and enhanced expansion of this sector in terms of size and geographical coverage, undergoing changes, and impact on the structure of the economy and financial system in recent years are topics that are processed constantly. To understand this position in investment banking, you need to develop the main characteristics, basic functions and development of this industry, the factors responsible for the development of investment banking, as well as the relationship between the activity of investment banks and the activities of institutions part of this category of business. Major role in laying the foundations of the investment banking play the evolution of investment banking in major industrial countries, as well as the position and influence of investment banking in the broader context on the development of the financial industry as a whole.

## Keywords

financial innovation, transformation, expansion, economic development, bank evolution

## 1. Introduction

Among the most specialized segments of the finance industry, with the basic function to bring together ultimate savers and saving collection institutions with those who wish to raise additional funds for investments, is the investment banking. Also, this type of banking helps the holders of accumulated wealth to reallocate their assets in accordance to the preferences using the combination of the risk, reward and liquidity attributes of financial assets. Taking in consideration these functions, we can observe the institutions involved in investment banking as financial intermediaries. So, there is a significant distinction between commercial banks and saving institutions that gather and decide themselves on the allocation of savings in comparison to the investment banks. The progression and development of the financial markets is directly connected with the development of the investment banking because the use of financial market is in the basis of the operations made by the institutions acting as investment banks.

Investment banker acts as an intermediary between corporations that need money and those who have assets such as pension funds or investment funds. Of course the investment banker charge fee from the corporation that sells securities, and this fee depend on the size of the offer, the risk of the company and the type of the security.

The role of investment banker is critical for the distribution of securities in developed economies. Investment banker emerges as a signatory or taker of the risk through purchase of the securities from a corporation which sells and their redistribution to the public. He can even continue to maintain market distributed securities long time after their distribution in the public.

As the corporations became bigger and global, they will have a need for bigger investment banks, which will provoke consolidation in the investment banking industry in developed economies. The biggest investment banks which can take the significantly bigger blocks of securities are dominating in the developed financial markets. That is why the development of investment banking is crucial for the development of the financial markets in the developing countries or countries that are on their way to become part of the developed countries. The investment bankers are important advisers of the corporation, advising the companies for strategic mergers and acquisitions, or even going out on the international financial markets.

## 2. Reasons and causes for the progress of investment banking

The progress of investment banking is in fundamental nature linked to the development of capital and allied financial markets on which its activities are centered. The expansion of capital and allied markets is, in turn, a manifestation of the interaction between underlying economic forces on the one hand, and the regulatory framework on the other. In addition, must be mentioned that the institutional and social factors that relate to the distribution and exercise of property rights in financial assets and the way that these affect the structure and changes in the character of industry. Basic economic forces affect and influence the evolution of investment banking in two ways. First, by increasing real per-capita income and they alter the nature of demand for financial services, causing ultimate savers and financial intermediaries to seek the most attractive mix of financial assets in terms of risk, reward and liquidity attributes in relation to their preferences and constantly changing evaluation of individual financial assets. This factor leads to a rise in demand for investment banking services, compared with services offered by commercial banks' activities. Furthermore, those wishing to obtain additional external funds for investment and/or consumption (deficit units) are able to select more easily the most methods and financial instruments they believe suitable for their needs. Secondly, fundamental economic forces directly and favorably affect investment banking services – all of which use and rely on financial markets (and above all capital markets) – by increasing their appeal. They achieve this by lowering relative costs and enhancing the attraction of investment. Both these influences are propelled by technological advances. Thus, in terms of cost and other attributes, economic forces improve the relative position of the demand for, and the supply of, investment banking services. The regulatory framework (depending on the bias it has) can either accelerate or decelerate this progress by altering the relative position of investment banking services at any particular time vis-à-vis commercial banking services, and by changing the relative attraction of the mix of attributes of financial instruments linked to the operation of capital and allied markets. The regulatory framework affects the development of investment banking through its impact on financial innovation. If it has an anti financial markets prejudice, especially anti capital markets bias, it will delay financial innovations designed to improve the efficiency and effectiveness of markets and investment banking services linked to them. If it has anti commercial bank prejudice, it will speed up and stimulate financial innovation, improving the competitive position of market transactions offered by investment banking, as compared with bilateral transactions between financial intermediaries counterparties. The anti-financial-market bias can assume the form of prohibiting the issue of some securities on capital markets, making them very complex and expensive and in effect raising the relative attraction of bank loans compared with capital market instruments, to providers and users of funds.

Apart from economic factors and the regulatory framework, the development of investment banking is affected by the distribution of property rights and the way that they are exercised. This is part of the issue of corporate governance. The transformation of first stage of capitalism-when owners of assets also manage them and there is no conflict of interest between them to management capitalism-when owners delegate the power to manage and decisions about the distribution of cash flow generated by the assets they control to financial capitalism- when the rights to manage assets and decide on the distribution of cash flow is delegated by owners to saving-collection financial institutions favors investment banking activities over traditional banking. It favors investment banking (and financial and especially capital markets) because the spread in ownership and delegation of the power to manage by owners places increasing importance on the ability to obtain, interpret and act on the basis of comparative information relating to the appeal and the combination of risk, reward and liquidity attributes of individual assets. This is only possible because of the expansion of financial and allied markets, which enables those who have powers delegated to them by owners of assets to initiate corrective action resulting from changes in the perception of the relative attractions of competing assets and opportunities as shown by basic capital markets indicators. Thus the move from direct to indirect ownership, and then the delegation of powers to financial intermediaries, favors a switch to instruments linked to financial markets, which are at the heart of investment banking and its development.

## 3. Investment banking in major countries

The differences in the present position of investment banking in major (and other) countries can be attributed to the different impact of, and consequently interaction between, economic, regulatory and social factors responsible for the evolution of investment banking and the financial system.

In the United States the development of investment banking has been significantly faster, more pervasive and widespread than in other countries. This has been so because the rise in per-capita income and wealth in the United States has been more rapid, the advance in technology specific to investment banking and finance has been faster and the regulatory framework has always had a marked anti-commercial-bank bias. Also the social and institutional factors have favored and still favor investment banking and capital and other financial markets by supporting and reinforcing the trend toward rising importance of collective savings, with their reliance on financial markets: in other words the spread of institutional (financial) capitalism through the popularity of mutual funds and above all the rapid growth of pension funds. The US regulatory framework has discriminated in favor of investment banking in the background of rising demand for external funds needed for industrialization until World War II (and reflecting the rapid growth first of utilities in the second half of the 19th century, and then of industry and commerce accompanied by a rise in the size of organizations), it constrained bank branching and limited the size of individual bank loans by linking them to bank capital. This increased the demand for external funds in the form of securities issued on capital markets at home and overseas, as well as the demand for investment banking services and the use of capital markets in the financial centers. The demand for investment banking services relating to the restructuring of the US economy in the successive waves of mergers and amalgamation that began in the last two decades of the 19th century has reinforced the momentum behind the growth of investment banking. The US Glass-Steagall Legislation and the Great Depression, while reducing the demand for underwriting, added to the demand for restricting. The post- World War II period was accompanied by the emergence of institutional investment, especially by pension funds, in addition to the continued expansion of underwriting and corporate restructuring. Alongside the capital markets, there emerged a market for corporate control, reinforcing investment banking's extraordinary ability to create new financial instruments- extended recently to those concerned with the pricing and trading of risk (ie, on the derivatives markets), which started gaining momentum from the mid-1970s.

In the United Kingdom the development of banking (as in the United States) has been propelled by a rapid rise in income and wealth, by a neutral regulatory framework and by positive changes in social and institutional factors. The emergence of capital markets in the 18th century and their rapid growth in the 19th century were the foundation for the expansion of investment banking, which until World War I was concerned predominantly with the raising of funds for foreign borrowers (who drew on the rapidly growing level of savings in Britain linked to the growth in income). In the period between the wars, demand for external funds also came from domestic industry and was accompanied by demand for industrial restructuring services. At that time, alongside closed-end investment funds, there emerged open-end investment funds. After World War II, there was increasing demand for underwriting and for industrial restructuring, which grew rapidly as the United Kingdom entered a period of de-industrialization. Accompanying this trend was explosive expansion of public and private pension funds and open-end investment funds.

The regulatory framework in the United Kingdom has been neutral. There are not, nor have there been, any formal or informal constraints on commercial banking activity or on underwriting and other investment banking activities. While after World War II there were some restrictions on commercial banks, these were accompanied by limitations on the use of capital markets. Thus the UK development can be said to reflect the impact of natural forces.

In Germany the main factor affecting the development of investment banking has been the anti-capital-market character of the regulatory framework, the very slow evolution of social and institutional arrangements and, until after World War II, a slower pace of economic growth than in the United States and the United Kingdom. The anti-capital market nature of the regulatory framework assumed the form of prohibiting the issue of certain types of securities and, prior to World War II and until recently, very complex authorization procedures and a heavy securities transfer tax on bonds and equities, as well as other restrictions. Linked to this is the very slow progress as regards the dispersion of wealth. The ownership of wealth is still heavily concentrated in family units, which until now have been unwilling to reduce their holdings and prefer to raise additional funds in the form of loans from banks with which they have worked in the past. Thus banks- although they are and have been universal and free to offer all types of services, including investment banking services – had until recently no incentive to extend their services to underwriting.

The proprietarily capitalism characterizing the German economy was accompanied until recently by pension arrangements that involved the use neither of financial or market intermediaries nor financial (and especially capital) markets, in that funds set aside by companies were used by them for investment. Although the German economy has experienced very rapid economic growth in the last 40 years, and its regulatory framework has been shifting from an anti- capital- market to a neutral stance, its social and institutional pension arrangement lag considerably behind those in the United States and

the United Kingdom. As a result, investment banking in Germany is still in the first (bank - oriented) phase of development and at the beginning of the second (where the open financial market become more important), while the United States and United Kingdom are both in the third, market oriented phase.

In Japan investment banking has specific features linked closely to the system of corporate governance, which is centred on industrial and financial groups. These groups are successors to similar groups that existed prior to World War II and were centered on family units. At the centre of these groups were banks with a controlling stake in other group members. The banks at the centre, together with other financial institutions, provided external funds to the members in the form of bank loans, and to a much smaller extent, loans raised through capital markets. Associated with and supporting this structure of corporate governance was, until recently, an anti- capital- market biased regulatory framework. This imposed demanding conditions on the issue of bonds, domestically and overseas, and also imposed, until recently, wealth taxes on transactions in equities. Until 1987 the issue of commercial paper was also banned. As a result, investment banking in Japan can be said to be in the early stage of development and moving ahead rather slowly.

#### **4. The provision of investment banking services**

While the growth in demand for investment banking services is determined by the interaction of economic, regulatory and social factors, the institutional structure of supply depends entirely on the regulatory framework and the capacity and willingness of individual financial units to supply services and products.

Without the legal separation of investment banking – or some or all of its three main components (ie, underwriting, restructuring and management of funds) – from commercial banking and other financial activities (such as life and non-life assurance), this activity tends to be in the hands of commercial banks, which either engage in it directly or set up special subsidiaries or affiliates. Thus in the United States until 1929 over half of underwriting and restructuring activity is estimated to have been in the hands of commercial banks operating through affiliates. It was only after the Glass- Steagall legislation that underwriting became concentrated in the hands of separate investment banks, now, though, it is beginning to drift into the hands of commercial banks. The United Kingdom is the only country where until recently there was a ‘voluntary’ separation between investment banking business and commercial banking, with the important proviso that ‘accepting houses’, which were responsible for the bulk of this business, also engaged in a highly specialized type of commercial banking linked to the acceptance business.

Thus as a broad generalization it can be said that investment banking tends to be offered by universal banks as a service to their clients or by specialized securities firms operating on a global, regional or domestic stage. The question of how best to offer investment banking, traditional banking and insurance services is a very important one, the answer to which is relevant to regulators and members or the industry alike.

#### **5. The influence of investment banking on the financial system**

In as much as investment banking enables the financial system to prefer some of its basic functions better and more efficiently, its evolution is one the important factors propelling the development of the financial system as a whole. The fundamental functions that the financial system must perform are: first, to run and manage the payment, clearance and settlement system; secondly, to provide liquidity; third, to transfer savings from surplus units to deficit units and to allocate these according to respective risk, reward and liquidity preferences; fourth, to monitor and discipline units using externally raised funds; and finally, to price, transfer and trade risk.

Investment banking can be said to stimulate the system's pace of transformation in that it helps to move the system from the blank- oriented phase, where all five functions are performed by commercial banks by way of bilateral agreements, to the market- oriented phase, where markets pay an increasing in the performance of the last three functions, and then to the securitized phase, where markets and investment banking dominate the financial system. This path of progress is economically beneficial as it: reduces the resources employed to perform some of these basic functions; improves quality in that it improves the risk- evaluation, risk- sharing and risk- diversifying functions, substituting joint market judgement based on jointly shared information for bilateral judgment; and finally, by increasing scope, enhances the ability of an economy to carry more risk, to respond more rapidly to

changes and to take remedial action in relation to the performance of units using externally raised funds.

Seen from this perspective, investment banking and its involvement in 'marketisation' are propelling factors in the economic improvement and development of the financial system as a whole. Investment banking is thus one of the crucial elements in the expansion and extension of the division of labour associated with better and more comprehensive financial information collection, processing and communication, which is at the heart of economic progress.

## 6. Conclusion

Looking ahead, both economic and social and institutional factors are likely to continue extending their influence in favor of expanding investment banking, and changes in the financial system's regulatory framework will inevitably follow. The globalization of the world economy can be expected to lead to a rise in the relative importance in other countries of investment banking, and to the convergence of the financial system and regulatory approaches. The attention paid to, and the need to contain, systemic risk are likely to accelerate this trend, placing financial markets and investment banking even more firmly at the centre of finance and banking.

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# Values and Innovative Behaviour: Evidence from Bulgaria

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**Most of the research on innovation in organizations has been conducted in Western countries and there is a lack of understanding of the innovative behaviour of firms operating in CEE. Therefore, the research objective of the present study is to examine the impact of entrepreneurs' values on innovative behaviour in a sample of 200 Bulgarian organizations. Our empirical results demonstrate that some work values of entrepreneurs and managers are significantly associated with the innovative behaviour of the organization. Further, the fit between organizational values and work values of employees is related significantly to innovative behaviour. Findings from the present study may benefit owners and managers in Bulgaria and may have practical implications for policy makers, consultants, educational institutions and training providers.**

## **Keywords**

Values, Innovative behaviour, Bulgaria

## **1. Introduction**

Innovation in organizations is a contemporary topic, which has attracted increasing research attention due to rapidly changing business environment. Organizations must continuously introduce innovative products and processes in order to gain competitive advantage in the marketplace. It was acknowledged that innovation is context-specific and context-sensitive activity [1]. Transition economies in Central and Eastern Europe (CEE) have been going through profound economic, political, and institutional changes. Private firms have increasing role for innovation, employment, and gross domestic product in this region. Entrepreneurship in transition economies in CEE has attracted significant research attention, but the role of entrepreneurs' values for innovative behaviour is still largely neglected. Most of the research on innovation in organizations has been conducted in Western countries and there is a lack of understanding of the innovative behaviour of firms operating in CEE. It was acknowledged that organizational culture plays important role for innovation management [2]. Organizational culture influences the support and implementation of creative solutions [3]. Empirical studies reveal that values distinguish innovation-supportive culture [2]. Martins and Terblanche (2003)

suggest that shared values and beliefs of the members of organizations affect innovation in the following ways:

- Through the socialization process which allows individuals to learn acceptable behaviours and the forms of activities;
- The values and beliefs are enacted in established forms of activities and behaviours and are reflected in structures, policies, practices, and procedures, which influence directly creativity.

Therefore, the research objective of the present study is to examine the impact of the values of entrepreneurs and managers on innovative behaviour in a sample of 200 Bulgarian firms. Findings from the present study may benefit owners and managers in Bulgaria and may have practical implications for consultants, educational institutions and training providers.

## 2. Research Methodology

### 2.1 Sample

This study uses a sample of 200 entrepreneurs and managers responsible for innovation management in Bulgarian companies. The sample was extracted from a database with information about organizational culture in Bulgarian enterprises containing more than 1000 respondents. The information was gathered by the means of a structured questionnaire in 2009. The questionnaire includes questions about the characteristics and elements of organizational culture of the company, characteristics of the respondents, and characteristics of the company. Table 1 presents the characteristics of the sample.

**Table 1** Characteristics of the sample.

	<b>Number</b>	<b>%</b>
<b>Respondents' sex</b>		
Male	106	53%
Female	94	47%
<b>Respondents' age</b>		
Less than 30	79	39,9%
Between 30 and 50	102	51%
More than 50	19	9,1%
<b>Respondents' level of education</b>		
University degree	187	93,5%
other	13	6,5%
<b>Respondents' tenure (years)</b>		
Less than 6	140	70%
Between 6 and 10	38	19%
More than 10	22	11%
<b>Company's size</b>		
Less than 101	132	66%
Between 101 and 500	30	15%
More than 500	38	19%
<b>Sector</b>		
Manufacturing	42	21%
Trade	44	22%
Services	114	57%
<b>Location</b>		
Sofia	161	80,5%
Other	39	19,5%

The sample contains roughly equally men and women. 47% of the respondents are women, while men represent 53% of the sample companies. Almost 40% of the respondents are less than 30 years old. More than half of the respondents are between 30 and 50 years old. The great majority of the respondents possess a university degree (93,5%). Most respondents (70%) have spent less than 6 years in the company, while only 11% of the respondents report tenure of more than 10 years. Almost 60% of the sample companies operate predominantly in the service sector, while about 21% of the sample companies are manufacturing businesses. Enterprises (SMEs) with less than 101 employees represent 66% of the sample firms, while enterprises with more than 500 are 19% of the sample. More than 80% of the studied companies are located in Sofia. The great majority of the sample firms (84%) are private enterprises, while the rest of the sample firms are either state-owned enterprises (6,5%) or enterprises with mixed ownership (9,5%). More than 43% of the sample firms have Bulgarian owners, while 34% are foreign ownership. About 22% of the sample companies report having foreign legal entities or individuals among owners.

## 2.2 Variables

The variable INNOVATIVE\_BEHAVIOR describes the innovative behaviour of the sample companies. It is composed by 6 items measured on a 5-point Likert scale. The Cronbach's alpha of the scale is 0.613. In this study we asked respondents to rate the importance of the following 13 work values on a 5-point Likert scale (1- of utmost importance to me; 2 – very important; 3 – of moderate importance; 4 – of little importance; 5 – of very little or no importance): challenging work, desirable place, high earnings, cooperation, training / improving skills, social insurance, appreciation for work, working conditions, independence, security, advancement and promotion, skills / abilities, personal / free time. The empirical indicators for identifying the significance of the work values are the following (these indicators are based on [4]): HOW IMPORTANT IS IT TO YOU [4]:

- Have challenging work to do – work from which you can get a personal sense of accomplishments? (CHALLENGES);
- Live in an area desirable to you and your family? (PLACE);
- Have opportunity for high earnings? (EARNINGS);
- Work with people who cooperate with one other? (COOPERATION);
- Have training opportunities (to improve your skills or to learn new skills)? (TRAINING);
- Have good fringe benefits? (FRINGLE BENEFITS);
- Get the recognition you deserve when you do a good job? (RECOGNITION);
- Have good working conditions (good ventilation and lightening, adequate work space, etc.)? (WORK\_CONDITIONS);
- Have considerable freedom to adopt your own approach to the job? (INDEPENDENCE);
- Have the security that you will to work for your company as you wants to? (SECURITY)
- Have an opportunity for advancement to higher level job? (ADVANCEMENT);
- Fully use your skills and abilities on the job? (SKILLS);
- Have a job which leaves you sufficient time for your personal or family life? (FREE TIME).

In order to assess the fit between organizational values and the values of employees (VALUE\_FIT) we asked respondents if the organization hires employees whose values coincide with organizational values. The respondents had to give answers on a 5-point Likert scale (1= agree completely, 5= disagree completely). Chi-square test was used to determine whether the work values and the extent of value fit are systematically associated with innovative behaviour.

## 3. Empirical results

### 3.1 Description of respondents' values

Table 2 reports the mean of the importance ratings of the studied work values for the sample and the percentage of the respondents, which have rated the respective values of utmost importance. More than half of the respondents have rated the values challenges, earnings, and advancement as extremely important. About 45% of the respondents perceive cooperation, training, skills, and recognition as extremely important. Less than one third of the respondents have stated that fringe benefits, working conditions, independence, security, and free time are of utmost importance for them.

The analysis of the work values of entrepreneurs and managers included in our sample allows establishing a hierarchy of values based on the average values for the whole sample, which comprises 3 distinctive levels of value priorities. The factors of the highest importance are security, fringle benefits and free time (at this level of interpretation they are important for all studied respondents). The second level comprises a group of 6 work values: place, cooperation, recognition, training, independence, and skills. At the lowest level of the value pyramid are the factors advancement, earnings, and challenges. The presented hierarchy of values represents the status of the respondents and can be considered as an indicator of his/her unsatisfied needs (deficits). In one of the main explanation schemes, high levels of significance (of a certain factor of labor situation) can be considered as an indicator of a strong deficit of a certain "good". It was acknowledged that the perceived level of significance depends on the extent of problemising (have / haven't attitude toward...), the evaluation of the real situation with regard to the desired situation, the selected specimens for comparison, the stable and situational aspects of the attitudes toward the evaluated phenomenon, etc.

**Table 2** Work values of respondents.

Values	Very important (%)	Average
CHALLENGES	59,5%	1,5
PLACE	40,5%	1,8
EARNINGS	51%	1,5
COOPERATION	44%	1,7
TRAINING	47%	1,7
FRINGLE BENEFITS	26%	2,0
RECOGNITION	45,5%	1,7
WORK_CONDITIONS	26%	2,0
INDEPENDENCE	31%	1,9
SECURITY	27,5%	2,1
ADVANCEMENT	56,5%	1,6
SKILLS	44,5%	1,7
FREE TIME	28%	2,1

## 2.2 Values and innovative behaviour

Table 3 presents the results of the chi-square analysis of the association between value fit, work values and innovativeness. Two work values (CHALLENGES and FRINGLE BENEFITS) are significantly associated with innovative behaviour. Not surprisingly, entrepreneurs and managers, who value highly work from which they can get a personal sense of accomplishments tend operate more innovative companies ( $p < 0.01$ ). The presence of the work value CHALLENGES among entrepreneurs and/or managers may be related to exerting more effort to solve difficult and challenging problems and tasks and searching for creative solutions and novel approaches. As key decision-makers in the company, they may require similar behaviour from their subordinates. In turn, such behaviour exhibited by entrepreneurs and managers may lead to highly innovative behaviour of the company as a whole.

As was expected, the entrepreneurs and managers, who value highly fringle benefits are more likely to operate highly innovative organizations ( $p < 0.05$ ). The provision of fringle benefits may be a significant stimulus for managers and entrepreneurs to be creative and proactive, to implement novel approaches and practices, to take risks, and to be flexible and adaptive in order to increase company's wealth and to secure fringle benefits for the future periods. Surprisingly, other work values examined in this paper do not have a statistically significant relationship with company's innovative behaviour.

**Table 3** Values and innovative behaviour.

Value	Chi-Square Test
CHALLENGES	86,9***
PLACE	59,8
EARNINGS	34,2
COOPERATION	47,2
TRAINING	56,3
FRINGLE BENEFITS	106,8**
RECOGNITION	64,0
WORK_CONDITIONS	55,6
INDEPENDENCE	46,2
SECURITY	50,1
ADVANCEMENT	32,3
SKILLS	38,0
FREE TIME	69,8
VALUE_FIT	130,0***

\* p < 0.1 \*\* p < 0.05 \*\*\* p < 0.01

The high degree of fit between work values of employees and organizational values exhibits a strong statistically significant association with company's innovative behaviour ( $p < 0.01$ ). It seems that the high degree of fit between work values of employees and organizational values may be related to exerting more effort to accomplish companies' goals and plans by managers and employees. As values are an important determinant of individual and organizational behaviour, the presence of such fit may lead to a better convergence of the behaviours of employees, groups, and the organization as a whole.

### 3. Conclusions

The innovative behaviour in organizations operating in transition economies in Central and Eastern Europe has not been given sufficient attention in the literature. This paper attempts to create a better understanding of the role of work values of entrepreneurs and managers for innovative behaviour in a sample of 200 Bulgarian companies. Our empirical results reveal that some work values of entrepreneurs and managers are significantly associated with the innovative behaviour of their companies. These findings reinforce previous empirical findings from Western countries about the role of values for innovation in organizations. Interestingly, the high degree of fit between work values of employees and organizational values exhibits a strong statistically significant association with company's innovative behaviour, which may be due to a better convergence of the behaviours of employees, groups, and the organization as a whole.

Several limitations of our study should be noted. First, our sample is not representative and the findings should be interpreted with caution. Second, data was collected through a self-reported survey and thus may be subject to cognitive biases and errors. Third, a number of other individual, organizational, and environmental factors, which are not included in this study, may be related to innovative behaviour. Forth, our findings may be influenced by specific features of the Bulgarian cultural and institutional environment and therefore may not be applicable to other transition or mature economies. Finally, due to the cross-sectional design of the research we cannot deduce causal relationships.

In order to enhance the understanding of innovative behaviour in companies operating in a transition context, future research needs to examine the following aspects. First, future research should examine other factors posited by theoretical and empirical literature as affecting innovative behaviour, which are not included in this study. Second, the proposed relationships should be verified in a representative sample of Bulgarian enterprises. Third, future research should also examine to what extent the findings of this study can be generalized to other transitional countries. And finally, a longitudinal analysis should complement the findings in this research in order to confirm causal relationships.

Our findings about the role of work values and the fit between work values of employees and organizational values for innovative behaviour have important practical implications for entrepreneurs, managers, policy makers, consultants, recruitment and selection specialists, and training experts.

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# The Regional GDP Inter-relationships: Macedonian Regions

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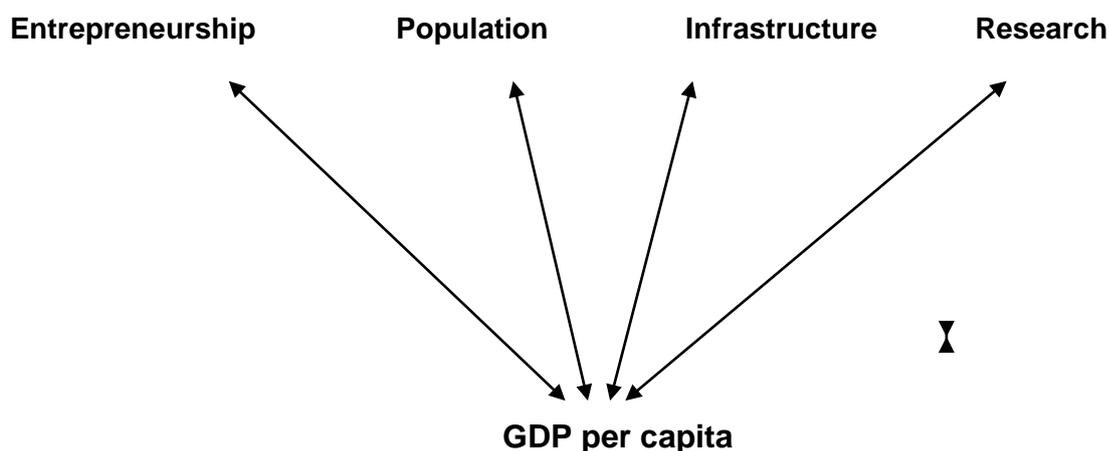
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Approaching a higher standard of living and well-being of the regional population in Macedonia is a condition sine qua non for sustainable, equal and polycentric model of regional development.

There is a general agreement, that Macedonian regions are characterized with huge economic, social and cultural disparities. In order to eliminate those disparities, one needs to know what the causes and the relationships of the regional disparities are. Accordingly, the empirical research among the Macedonian regions has to be done in order to determine some possible causes for those disparities in order to eliminate those disparities in the future.

The goal of this paper is to search for some of the possible relationships and causes of the regional development disparities by testing the relationship between regional GDP as an independent variable and the regional entrepreneurship, regional scientific research, regional infrastructure and regional population as dependent variables. An appropriate statistics will be calculated in order to determine the possible relationships between the variables.

For the purpose of testing the relationships, the below theoretical model is constructed. In testing the relationships, will be used the administrative regional databases that are gathered and stored by the State Statistical Office of the Republic of Macedonia. The existence of the purely theoretical model below will be empirically tested in the Macedonian regions.



## Keywords

Entrepreneurship, GDP per capita, Infrastructure, Macedonian regions, Research

## 1. Introduction

Balanced and sustainable economic development in the entire territory of the Republic of Macedonia is the main goal of the policy for the regional development which is characterized with high growth rate

and competitive regions with relatively low disparities among them, with effective utilization of natural, human and energy resources and with economic and social cohesion where the population enjoys good standard of living. Accordingly, the policy of balanced regional development is a very complex and lengthy process due to the fact that is multi-dimensional process with economic, demographic, spatial, cultural, social and many other development aspects. All these aspects require awareness and good understanding of the concept of regional development, very good coordination and full dedication of all the players in order to successfully coordinate the macroeconomic policy with regional and sectoral policies with a primary goal of reducing the disparities among the regions. Macedonia has already started several years ago to work intensively on development and implementation of the policy for the balanced regional development. [1]

The basis characteristics of the 8<sup>th</sup> regions indicate that they all have relatively equal natural resources potential, equal cultural and historical heritage. However there are still disparities in the level of the economic development among them. According to the decision of the Government of the Republic of Macedonia [2], on the Classification ranking of the planning regions based on their economic development, the most developed region is Skopje region, while the least developed is the North East region. The parameters that are used for this classification are the development index, economic-social index and demographic index. To estimate the socio-economic index the following parameters are used: gross domestic product per capita, budget revenues per capita and the growth of the added value of the non-financial sector. The development index is an average of the socio-economic and demographic index.

As a result, the three indexes are crucial in calculating the overall aggregate regional economic development index of the region. Furthermore, the variables that are involved or are in any relationship with the GDP per capita budget revenues or the growth of the non-financial sector are far more important in calculating the overall regional economic development index.

However, the goal of this paper is not describing and analyzing the regional disparities in the Republic of Macedonia. According the available data, there is no doubt that they exist. Instead, in this paper, will be test the role of regional entrepreneurship, regional population, regional infrastructure and regional research in maintaining sustainable regional development measured and expressed by the regional GDP per capita among the 8<sup>th</sup> planning regions in the Republic of Macedonia. In examining the possible relationships between the regional GDP (gross domestic product) per capita and regional entrepreneurship, regional population, regional scientific research and regional infrastructure, will be utilized the existing administrative data on regions that is collected, stored and provided by the State Statistical Office of the Republic of Macedonia. According the available data, the appropriate statistical tools and calculations will be applied.

What follows is a theoretical and empirical conceptualization about the five variables that are subject of analysis in this paper. The results and conclusions of the research can serve as a recommendation to all relevant institutions in the country that are dealing with the issue of regional development and for future same or similar research that can be done in the field of regional economic development, entrepreneurship, research and innovation.

## **2. Theoretical approach: Data and Model**

### **2.1 Regional GDP**

The economic development of a region is, as a rule, expressed in terms of its gross domestic product (GDP). This indicator is also frequently used as a basis for comparisons between regions. GDP measures the economic output achieved within national or regional boundaries, regardless of whether this was attributable to resident or non-resident employed persons. Thus the use of GDP per inhabitant is only straightforward if all employed persons involved in generating GDP are also residents of the region in question. Accordingly, the GDP value of the region will be deflated with the number of regional population residents. [3]

Taking all the above in consideration we will use the denar value of regional GDP per capita for the Macedonian regions. The data is provided in below Table 1 by the Macedonian State Statistical Office. [4]

**Table 1** Regional GDP per capita (in denars)

Region	Year/Total								
	00	01	02	03	04	05	06	07	08
Vardar	104226	114900	118014	128477	128453	137830	170187	184937	196028
East	89423	80494	83871	87518	92505	100654	115672	134114	173815
SouthW.	93072	86462	93420	82897	90475	93484	106970	115083	150771
SouthE.	99128	95993	100269	109073	115327	132375	141360	162758	168211
Pelagonia	131898	135129	150913	155602	148740	146867	154671	174589	208990
Polog	57701	51563	55029	62851	61616	67796	76968	84913	95277
NorthE.	75580	61948	65105	68765	66679	69789	82837	92566	122014
Skopje	180300	183497	188570	190383	210413	231053	254010	294884	314531

As it can be noticed from the Table 1, does not exist data for 2009 and 2010. That will diminish our research taking into consideration the fact that the State Statistical Office does not yet provide data for some years about the regional entrepreneurship, regional infrastructure, regional population and regional scientific research. In other words, like any other research, we are forced to make analysis and calculations on the available official data that exists at the moment.

## 2.2 Regional Entrepreneurship

The regional entrepreneurship in the Macedonian regions is best represented by the total number of micro, small and medium-sized enterprises. [5] They represent the entrepreneurial sector of the economy and are best indicator of the entrepreneurial activity in the respected region/s. In testing the relationships, will be used the data that is generated as a total sum of micro, small and medium-size enterprises for each region. The sum of each region will represent the total scope of the entrepreneurial activity for the respected region. The aggregated numerical data will serve as a measurement of the variable named *Regional entrepreneurship*.

As the below Table 2 shows, the data is not provided for 2007 and years before 2007 by the State Statistical Office. [4]

**Table 2** Companies according the number of employees

Region	Year					
	2008			2009		
	1-9	10-49	50-249	1-9	10-49	50-249
Vardar	3991	229	89	4695	237	95
East	4381	383	163	4916	377	160
SouthW.	5698	291	108	6301	316	100
SouthE.	4753	339	104	5221	377	110
Pelagonia	6489	318	131	7146	388	128
Polog	5417	210	79	5944	226	75
NorthE.	3218	202	66	3720	227	65
Skopje	18963	1379	437	21455	1558	426

## 2.3 Regional Population

Table 3 below provides data about the regional active population, employment and unemployment rate among the active population. Because the regional GDP represents the regional output of all products and services produced annually by the employed active population, the data of employed active population out of the active population rate will be used as empirical measure of the contribution of the population to the regional economy expressed by the deflated value of GDP considering the active population rate. Accordingly, the population employment rate will be used as an empirical expression of the variable named *Regional population employment*.

As with other data, the data for regional employment rate by the State Statistical Office is available just for 2007 and 2008. [4]

**Table 3** Employment, Unemployment and Active population rate

Region	Year					
	2007			2008		
	Active population	Emp	Unemp.	Active population	Emp.	Unemp.
Vardar	54.4	30.5	43.9	57.9	32.7	43.6
East	59.3	40.4	31.8	59.2	47.4	20.0
SouthW.	53.2	29.7	44.2	55.5	33.7	39.3
SouthE.	69.7	61.9	11.1	70.5	62.3	11.7
Pelagonia	62.3	40.6	34.8	63.6	41.6	34.5
Polog	45.2	32.9	27.2	43.9	32.3	26.4
NorthE.	60.4	23.6	61.0	59.5	25.0	58.0
Skopje	52.9	34.5	34.7	58.31	33.3	37.3

## 2.4 Regional Infrastructure

The regional infrastructure is represented by the total length of local and regional roads in the region. Accordingly, the empirical value of the variable named *Regional infrastructure* will be represented by the total length of transport infrastructure in the region.

Table 4 below represents the total length of regional infrastructure in km. [4] The total length of regional infrastructure is the measure of the scope of regional public investments and represents the business attractiveness of the locality present and future investments in the region.

**Table 4** Total Length of Regional Infrastructure (in km)

Region	Year			
	2006	2007	2008	2009
Vardar	1088	1120	1088	1089
East	1245	1183	1183	1183
SouthW.	1301	1303	1358	1247
SouthE.	902	910	920	919
Pelagonia	1165	1173	1180	1147
Polog	1193	1261	1303	1448
NorthE.	909	900	880	951
Skopje	1192	1305	1328	1274

## 2.5 Regional Scientific Research

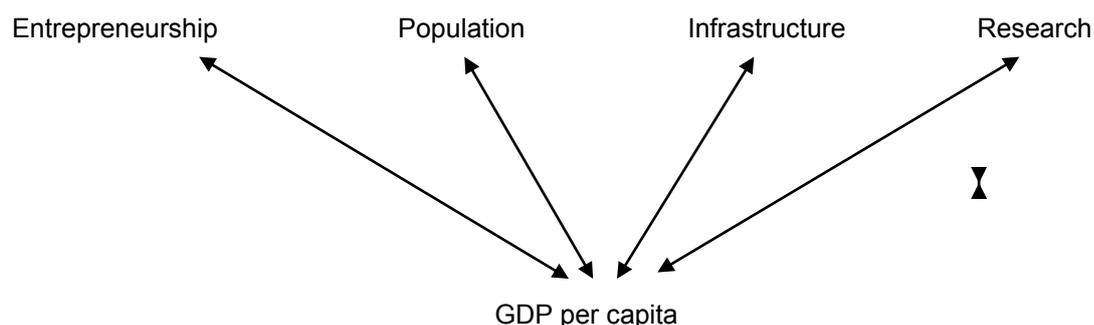
Finally, the research institutes and centres (within universities, non-governmental organizations, or foreign research institutions etc.) are very important factor for regional development. The Table 5 provides the data for the number of researchers on regional level for the 8 regions in Macedonia. [4] The number of researchers will be used as empirical data set for the variable named *Regional scientific research*. As other data, the State Statistical Office only provides data about the number of researchers for 2006 and 2007. Also, it can be noticed that for Vardar, Polog and NorthEast region for 2006 the data is not available. Thus the research will be oriented in analyzing 5 instead of 8 units of analysis for 2006.

**Table 5** Total number of employed/enrolled scientists/researchers

Region	Year	
	2006	2007
Vardar	0	37
East	55	55
SouthW.	68	58
SouthE.	25	9
Pelagonia	183	158
Polog	0	35
NorthE.	0	19
Skopje	2042	2079

## 2.6 Theoretical Modelling: Regional GDP Interrelationships in Macedonian Regions

As a result of the previous analysis, the below Figure 1 is depicting the possible theoretically defined interrelationships between the regional GDP per capita, on one hand, and regional entrepreneurship, regional scientific research, regional population and regional infrastructure on the other hand. In the following section the model will be empirically tested by using the previous described official available data provided by the State Statistical Office of the Republic of Macedonia.



**Figure 1** The Regional GDP interrelationships

## 3. Empirical approach: Testing the Model

In order to test the above theoretically assumed hypothetical relationships, the numerical data series were entered in SPSS (Social Package Statistical Software) for each of the variables. The alternative statistics, such as the Pearson correlation coefficient ( $r$ ) and statistical significance ( $\alpha$ ) was calculated for each assumed relationship, considering the limits of the available data. Because of data constraints, the regression analysis can not be calculated at this point because there is no data for all the variables involved at least for the last 10 years. As a result, the research has faced an objective limitation in order to be fully completed with calculating the regression coefficient and R-adjusted. The correlation results are displayed in Table 6 below.

**Table 6** Pearson Correlation and Statistical Significance (2-tailed) test

	<b>Regional Population Employment (2008)</b>	<b>Regional Infrastructure (2008)</b>	<b>Regional Entrepreneurship (2008)</b>	<b>Regional Scientific Research (2007)</b>
Regional GDP per capita (2008)	Correlation= .076 Sig.= .859 N= 8	Correlation= .274 Sig.= .512 N= 8	Correlation= .841** Sig.= .009 N= 8	Not available data
Regional GDP per capita (2007)	Correlation= .195 Sig.= .644 N= 8	Correlation= .269 Sig.= .520 N= 8	Not available data	Correlation= .846** Sig.= .008 N= 8
Regional GDP per capita (2006)	Not available data	Correlation= .103 Sig.= .808 N= 8	Not available data	Correlation= .834** Sig.= .010 N= 5

\*\**. Correlation is significant at the 0.01 level (2-tailed).*

As we can see from the Table 6, the regional GDP for 2008 is positively correlated with the regional entrepreneurship ( $r = .841$ ) for 2008 and regional scientific research for 2007 and 2006 ( $r = .846$  and  $r = .834^{**}$  respectively). The correlation is statistically significant ( $\text{Sig.} = .009$ ) and ( $\text{Sig.} = .008$ ;  $\text{Sig.} = .010$ ) respectively. In other words,  $p \leq 0.01$  significance level or  $p \leq t\text{-test}$ . [6] The Pearson correlation coefficient states that there exists a strong correlation between regional GDP per capita, regional entrepreneurship for 2008 and regional scientific research for 2007 and 2006.

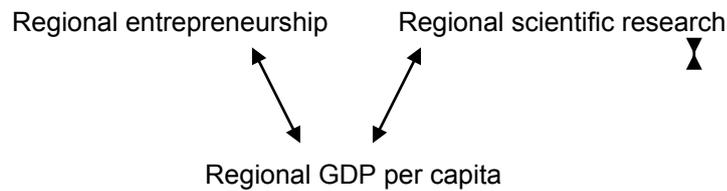
On the other hand, between the regional GDP and the regional infrastructure ( $r = .274$ ;  $r = .269$ ;  $r = .103$ ) and regional population employment ( $r = .076$ ;  $r = .195$ ) respectively, there is no correlation. The correlation is not statistically significant ( $\text{Sig.} = .512$ ;  $\text{Sig.} = .520$ ;  $\text{Sig.} = .808$ ) and ( $\text{Sig.} = .859$ ;  $\text{Sig.} = .644$ ) respectively. In other words,  $p \geq 0.01$  significance level or  $p \geq t\text{-test}$  of statistical significance of 0.01 which states that there is 1% confidence that or with 99% confidence level can be said that the relationship between the GDP per capita and regional entrepreneurship and regional scientific research is not occurring by incidence.

In other words: *Between the regional GDP per capita, on one hand, and regional entrepreneurship and regional scientific research, on other hand in the Republic of Macedonia there is a positive and strong relationship. That means that the higher the scope of the entrepreneurial activity in the region, the greater the value of regional GDP per capita and vice versa. In addition, the higher the number of researchers in the region, the greater the value of regional GDP per capita and vice versa.*

## 4. Conclusions

According the available data on regions in the Republic of Macedonia, the empirical research on Macedonian regions revealed that there is no relationship between the regional GDP and regional infrastructure and regional population employment. Without entering in a further discussion about the reasons for non-existing relationships, the results in this paper argue that all relevant institutions in the Republic of Macedonia that are dealing the issue of regional development and regional disparities must consider the role of entrepreneurial activity and research. By stimulating and even financing the entrepreneurial activity and scientific research, the Government of the Republic of Macedonia can successfully cope with the problem of Macedonian regional disparities in those regions that are less developed or are below the national development level. The higher entrepreneurial activity will alleviate the internal and external regional migrations by exploring the local resources and the new business ideas can open the doors for local businesses and new industrial bases. The scientific research is of extreme help for developing a direction in which way the entrepreneurial activities must go. In other words, entrepreneurship and scientific research go together, and can stimulate powerful innovation ideas for regional infrastructure development and regional employment growth. Without

regional research there are no innovation ideas and rich entrepreneurship activities in the region. As a result of the empirical test, the regional GDP interrelationships in the Macedonian regions gave the below empirically proven model that is displayed in Figure 2.



**Figure 2** Empirical model of the Regional GDP interrelationships in Macedonian regions

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# Collaborative production systems design through USIT method

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The Bulgarian industry is strongly focused on the EU markets. One of the most promising directions for development of the Bulgarian industrial enterprises is the development of business partnerships with industrial enterprises from the European Union. Most problematic for the development of such partnerships are the unsuitable characteristics of the production systems in the Bulgarian industrial enterprises. The present work suggests a process for development of the production systems characteristics, based on a Unified Structured Inventive Thinking method (USIT). The main characteristics which should be possessed by the production systems of the contemporary industrial enterprises are described. There is a description of the stages of the suggested process for elaboration of the production systems characteristics.

## Keywords

Production systems, small and medium enterprises, Inventive thinking, cellular manufacturing systems

## 1. Introduction

Manufacturing industries are under the economic pressure to compensate increasing cost and create added value. Under these conditions it is necessary to change the paradigms from former cost orientation to competition, added value and sustainability. Manufacturing is the key area which has the potential for change. But it is not only a question of research and engineering, it is even a question of business systems and activation of the human resources to implement innovation as fast as possible to change the practice from cost and profit optimization to competition, innovation and sustainability.

A revolutionary change from tayloristic to sustainable manufacturing is required to solve the coming problems in the industrial world: sustainability of enterprises and business; sustainable technologies in products and processes; global environmental and social standards of work.

## 2. Challenges for the Manufacturing Enterprise to Achieve Sustainable Development

Manufacturing enterprises are striving to achieve sustainability through changes in products, processes, and systems. Refocused efforts on the development of sustainable technologies can further aid continuous improvement and stimulate revolutionary advancements industry-wide. Current and future challenges facing the manufacturing industry are addressed in terms of manufacturing enterprise, product life-cycle design, and manufacturing processes and systems.

**Small and medium enterprises as subcontractors.** Small and medium-sized manufacturing companies (SMME) play a significant role in today's economy [1]. 99 % of the companies are SMMEs [2]. Many SMMEs are subcontractors to larger companies [3] and are therefore highly dependent on them. Historically, a subcontractor works for a limited number of larger customers [4]. Competitive advantages have been low price and whether the subcontractor is located near the customer [4]. This is however changing and more and more SMMEs are aware of this challenge and try to increase their customer base.

The challenges for the SMMEs have increased [4] during the last years. The challenges come from the increasing globalization and the increasing customer demands. The globalization increases the access to new technologies, to new knowledge, and to new markets, but the competition also becomes more severe.

**Supporting Function of Lean Production Systems in Small and Medium Enterprises.** Small and Medium-sized Enterprises are facing the hard competition of global markets and the more specific and higher requirements of the customers everyday. In order to cope with these challenges many enterprises implement a lean production system. For the implementation of a lean production system a continuous support of a well-structured qualification background is necessary.

Lean production systems do not only help to reduce waste in the production process but also allow the enterprise to focus on customer value [5], [6], [7].

### 3. Engineering Design Theories of creativity

Theories of engineering creativity draw on theories of creativity in general. However, limiting the focus to engineering domains enabled researchers in engineering creativity to present their theories in less abstract, more concrete terms.

**Creative Design as Case Based Reasoning.** The process of engineering design draws to a large extent on the retrieval of past designs or design principles which are then adapted to current requirements. Past designs can be stored in two different granularity levels, both of which can potentially give rise to creative designs: pieces of elaborate design solutions at a low granularity level, and first principles at a high granularity level.

**Creative Design as Increasing Dimensionality.** Cagan and Agogino [8] express a concept of creative design that is similar in view of the creative process in general: "Non-routine Design differ from routine designs in that the latter are derived from a fixed space while the former are characterized by an expanded design space". Based on their definition of non-routine design, Cagan and Agogino suggest a computation mechanism that uses optimization information to make decisions on how to manipulate and expand the design space by introducing new variables, thus increasing its dimensionality.

**Creative Design as Overcoming Contradictions.** According to Altshuller, a design is creative when it resolves a conflict but not through tradeoff or compromise [9]. Altshuller generalized his theory by observing a large number of engineering inventions and juxtaposing them with ordinary or routine solutions suggested for the same problem.

**Creative Design as Function Sharing.** Function sharing in mechanical design, according to Ulrich [10], is the simultaneous implementation of several functions in an artifact, by a single structural element. Ulrich states three main reasons for the importance of function sharing in engineering design: first, designs that exhibit function sharing are in most respects better than those that do not (fewer parts, easier assembly, less required maintenance, better performance due to decreased size and weight etc.); second, awareness of the process of function sharing allows the designer to think in a modular, decomposed fashion with the option of subsequently using function sharing to make the design more efficient; third, function sharing is one of the sources of novelty or interest in mechanical design.

### 4. Methods for Supporting the Creative Process

Four of the most popular, creativity enhancements methods are used currently by corporations. The methods differ in their underlying principles, reflecting the various theoretical approaches for the creative process presented in the former sections.

**TRIZ.** TRIZ a Russian acronym for Theory of Inventive Problem Solving (or *TIPS* in English) was developed by Altshuller [9] and is continually being developed and modified. TRIZ is composed of a few distinct problem-solving and problem-definition procedures and principles as well as a unifying algorithm called ARIZ.

**Brain Storming.** Brain Storming [11] is perhaps the most popular and most widely used creativity enhancement method. It is a group method that divides the thinking process into two main phases: idea generation, and idea evaluation. The strict rules of brain storming prohibit any sort of evaluation within the idea generation phase. In this stage, 'crazy' ideas are most welcome; producing as many ideas as possible is encouraged.

**Synectics.** Synectics means joining together of different and apparently unrelated elements. According to Gordon, who developed Synectics [12], problem-solvers often fail to discover a creative solution because the problem may be either too familiar or strange. Synectics uses analogies and metaphors as a means to turn the familiar into strange and the strange into familiar. Synectics, like Brain Storming, encourages suspension of judgment, and also 'play with apparent irrelevancies' during what is called the *excursion* stage. In the excursion stage, different analogies are used to view the problems from different directions and to direct the thoughts toward a creative solution.

**Morphological Analysis.** Morphological analysis [13] is used mainly to invent new products rather than solve problems. Using this method, the inventor first constructs a list of the properties of an existing product and the possible set of discrete values the property can assume.

## 5. Overall structure and overall procedure of unified structured inventive thinking method (USIT)

**Basics of Unified Structured Inventive Thinking (USIT).** USIT was developed by Ed Sickafus [14] in 1995 and intensively used at Ford Motor Co. At first he adopted Israeli SIT (Systematic Inventive Thinking) [15], which was a much simplified version of TRIZ, and then he introduced a new framework and built USIT. Nakagawa have introduced USIT in Japan since 1999 [16] and have extended it further by reorganizing TRIZ methods of solution generation into the USIT framework [17].

**Overview of USIT.** The goals and characteristic features of USIT may be summarized as follows[18]:

- USIT is a methodology concentrating in the "Concept Generation Stage", which is at the uppermost in the course of product/technology development.
- USIT intends to be applied to real practical problems for rapidly generating multiple conceptual solutions.
- USIT provides a clearly defined simple procedure for applying the methodology. The procedure is composed of three stages, i.e. Problem Definition, Problem Analysis, and Solution Generation.
- The technological system of the problem is described in clearly-defined terms of Objects, Attributes, and Functions.
- Elements of techniques in USIT are simple and well explained in guidelines. Especially, there are only four techniques used for the solution generation, and they are used in correspondence to the concepts of Objects, Attributes, and Functions.
- No outside knowledge bases and software tools are used in USIT.
- Engineering details, such as specifications, figures, numbers, costs, deadlines, etc., are put aside the consideration during the USIT procedure. This choice aims to make the concept generation as freely and widely as possible.

**Overall Procedure in USIT.** The Overall Structure of creative problem solving is realized in USIT by the use of Overall Procedure as shown in a Flowchart in Fig. 1.

**Problem Definition Stage:** The process for converting user's specific problem into Well-defined specific problem. This process is usually carried out through a group discussion in the USIT project team.

**Problem Analysis Stage:** In order to obtain the understanding of the present and ideal systems in the Well-defined specific problem, the following three analysis methods are carried out in sequence:

- **Function and Attribute Analysis of the Present System:** The present system in the problem is analyzed with the following two methods in sequence: Functional Analysis; Attribute Analysis.
- **Space and Time Characteristics Analysis:** Draw some diagrams for revealing characteristic features of the system/problem with respect to space and to time.
- **Particles Method:** A process for identifying Ideal Solution and imagining desirable actions and desirable properties is carried out in the following sequence: Sketch the present system; Sketch an Ideal System; Imagine an ideal result and draw it, without trying to draw any means to achieve the result; Draw 'Particles' with x marks; Draw x marks at the positions where the sketch of the Ideal System differs from that of the present system; Imagine Desirable Actions and draw them in a hierarchical diagram; Ask the magical Particles to achieve the goal of the ideal solution, and then break down the actions that the Particles are imagined to be doing for us; List up desirable properties

**Solution Generation Stage:** Process of generating many pieces of new ideas and then building up conceptual solutions for new system(s). Five solution generation methods in the form of USIT Operators are applied repeatedly without any fixed order: Pluralization of Objects; Dimensional Change in Attributes; Distribution of Functions; Combination of Solution Pairs; Generalization of Solutions.

These five USIT Operators are always applicable to the elements of the present and solution systems expressed in terms of Objects-Attributes-Functions, and to the known and newly-generated solutions.

**Implementation Stage:** Conceptual solutions are to be evaluated, experimented, prototyped, designed, manufactured, installed, tested, etc. so as to make them real into successful specific solutions for users. This stage needs technical and business capabilities and decisions, and hence is out of the range of USIT as a creative problem solving methodology.

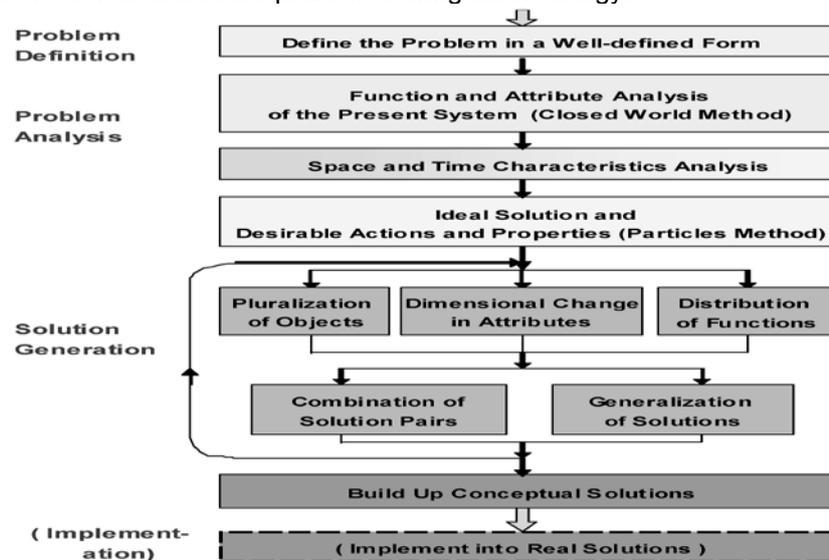


Figure 1 Overall Procedure in USIT

## 6. Case Study

This is a case study report of solving an everyday problem. Simplified and unified process USIT have been used in this study in a rather informal manner.

The present problem is related to the design of manufacturing system capable of supporting business partnership of SME in furniture industry.

For the solution of the problem, the author has led multiple discussions on the causes of the problem and on possible solution ideas with managers of Bulgarian enterprises from the furniture industry. The results of these discussions are documented in reports which were used as a basis for development of the requirements for the production systems in the furniture enterprises. Afterwards, the author has worked further to build up the conceptual solution. The whole process of analyzing the problem, generating ideas, and constructing a solution was described in the report of a pilot scientific-research project. The present paper is based on this report.

### 6.1 Setting the problem

**Start of the work.** A producer of furniture gets an offer for business partnership by a partner in Italy. The Italian partner possesses designer developments of furniture for dining rooms and bed rooms.

The conditions for the business partnership are very favorable but the industrial enterprise in Bulgaria has some doubts that its manufacturing system is not flexible and adaptive enough in order to produce the requested quantity of furniture within the deadlines required by the Italian partner. Concerned is a great variety of products, produced in small quantities of only several items.

**Confirming the focus of the problem.** The production system of the Bulgarian enterprise is equipped with contemporary computer controlled machines (CNC). These machines create at the Bulgarian market product portfolio similar in complexity and scope to the one in the Italian partner order.

The machine operators and the people responsible for the furniture assembling are qualified enough. However, a shortage of staff could be felt and therefore most of the operators have two or three working places. This is also the reason for the recent delays with clients' orders.

Another serious disadvantage is the relatively high amount of work in progress. The reason is the production organization as well as the bottle neck in the production system planned for the cutting machine.

Due to some organization problems, the rhythm of the production process is not satisfactory and overtime work is needed during the weekends.

This approach to the production organization has two negative consequences: considerable labor costs and unforeseen quality of the manufactured products.

Because of the insufficient skills of the technologist, production organizer and dispatcher the functionality of the production equipment is not fully exploited and the efficiency of some working centers (machines) is inadmissibly low.

Relatively high is the level of technological waste which is mostly due to technological problems.

A number of efforts have been put to elaborate the production system but up to the moment they are futile because of the excessive workload of the staff.

Important problems of the production system are the multiple motions of details and furniture units between the working centers during the manufacturing of the products. The reason is the close fitting area of job shop and the irrational location of the equipment.

**Problem definition.** USIT (Unified Structured Inventive Thinking) has been used as the main process for problem solving. The discussions at the initial stage may be summarized in the style of Problem Definition in USIT:

- **Unwanted effect.** In case of business partnership with the Italian party there is a risk of delay with the implementation of the orders and unstable quality of the manufactured products.
- **Task/goal.** To reconfigure the existing production system of the enterprise in order to increase its flexibility and consequently, to evade delays of the orders and instability in the products' quality.
- **Sketch of the problem situation.** The problem situation is displayed on fig.2.
- **Plausible root causes.** Inappropriate arrangement of work centers, incomplete and ineffective usage of the equipment, inappropriate system for shop floor control are the main reasons for the insufficient flexibility and adaptability of the production system. This, on its side, generates risk of undue implementation of the orders and unstable quality of the manufactured products. (e)
- **Minimum set of relevant objects.** Product portfolio; structure of business processes; manufacturing system; production planning and control system.

## 6.2 Analysis of the problem

In the stage of problem analysis, have been used various methods in a flexible way. The analysis processes are described in a logical way as follows:

**Space and time characteristics analysis.** A furniture manufacturer produces economical living room and bedroom furniture. Products include night tables, dressers, chests, entertainment units, headboards, wardrobes, wall units and a number of other products made of particle board, solid pine or oak. Approximately 112 unique products, considering color and style, are manufactured.

The production system is situated in one working premise on an area of around 630 m<sup>2</sup> and the system is composed of 14 work centers.

The five main operations for manufacturing the products include cutting, edge banding, drilling, pre-assembly and assembly. Typically, the required components for the parts are processed over two days.

**Current methods for product manufacturing.** The characteristics of the existing situation include a re-configurable building and a production system with straight line flow and layout designed for high volume production, components produced to intermediate stock, lower product delivery lead time due to an assemble-to-order production technique, doweled products which contribute to lower flow time, and simpler material handling with clearly de-marked work-in-process buffers at each section and at the machines.

Throughput satisfies the functional requirement for orders' deadlines and defines the process capacity of each operational section. The process capability and capacity at each of the five operational sections matches the total required throughput of the system.

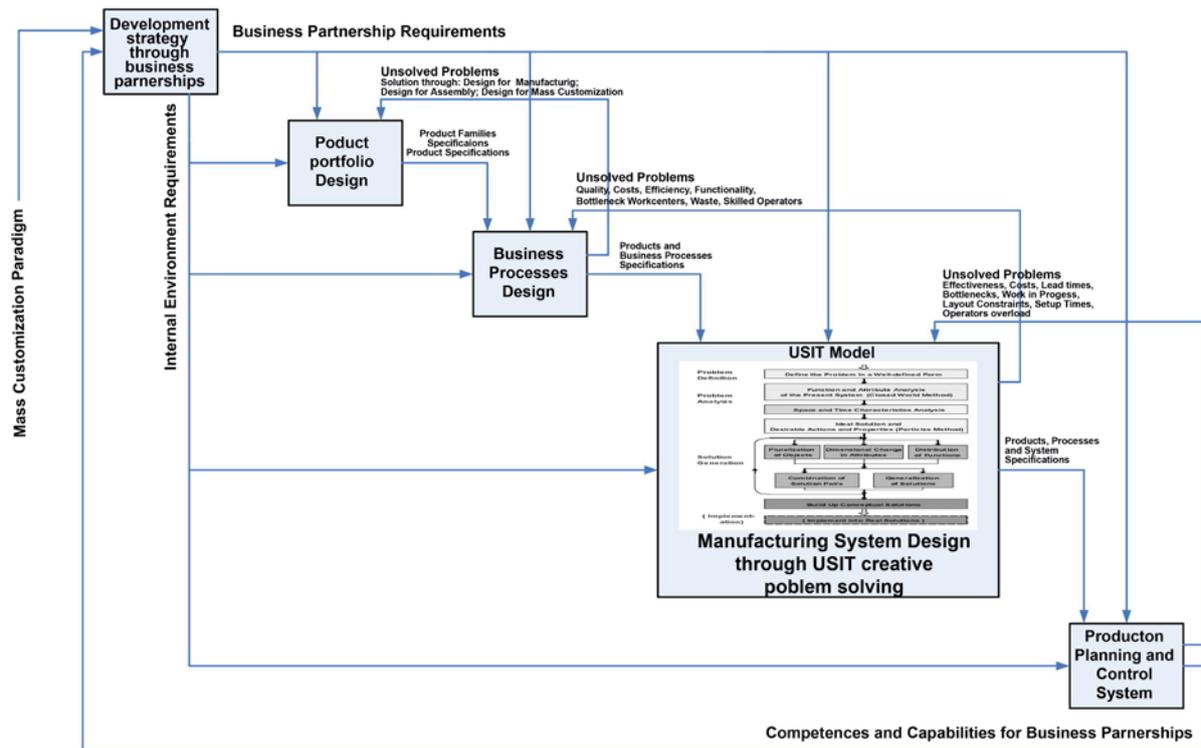


Figure 2 Problem situation

**Understanding the overall structure of the problem.** Throughout these analyses from multiple points of view, were memorized various facts, observations, views, solution ideas, etc. For the purpose of understanding the overall structure of the problem, first was applied the grouping technique.

On the basis of thorough literature research as well as the personal experience of the author, was reached the conclusion that for the solution of the problem should be created a new production system which corresponds to the requirement of providing customized production.

In order to come up to this requirement, the current production system should be substituted with cellular manufacturing system, possessing complicated structure of requirements. These requirements should be arranged in four main groups.

**Understanding the essence of the problem.** Summarizing the whole analysis, the essence of the problem can be described as follows: First and foremost, should be defined the functional requirements of the system at the highest level of its hierarchy in the functional domain.

At this stage many functional requirements should be established. Each functional requirement established at this stage should lead to a completely different manufacturing design. Therefore, close attention should be given to all functional requirements before a single functional requirement is adopted at this highest level. In this work the following has been selected as the highest functional requirement - Providing customized production.

The following lower functional requirements set is defined for decomposing the functional requirement of providing customized production, determined above.

- To classify and group products/parts and machines for simple material flow
- To develop resources capability based on product specifications
- To rearrange resources to minimize waste
- To provide production based on customer demand.

**Classification and grouping products/parts and machines.** This is a very important step for the success of transition from traditional manufacturing to cellular manufacturing.

The first step in this branch is to establish the high volume products through Product-Quantity (Pareto) analysis..

**Resources capabilities development.** In this stage, activities including waste elimination, for the design of a lean process, rearrangement of resources in agreement with the takt time, fixing training needs and motivation of the workforce are accomplished.

**Resource rearrangements.** At this stage lean manufacturing principles are the guiding principles of the design step. In this step, the focus is the waste elimination. Therefore, in rearranging the resources waste due to motion, material handling and imbalances between resources is minimized.

**Production control.** Satisfying customers by right amount and just-in-time production can only be accomplished through pull system. However, just-in-time systems require a steady pull on all products in the family. In order to ensure a steady pull, a leveled/mixed production schedule must be established.

### ***6.3 Generating ideas and constructing solution concepts***

As a next step, these ideas were examined more closely the range of solution ideas was expanded. During this stage were made efforts to figure out ideas so as to expand the current state of technology and to think of new approaches in relation to psychology and social behavior.

Design parameters, which satisfy the functional requirements, established in the previous step, were selected on the basis of the author's conclusions reached as a consequence of discussions with managers of furniture enterprises.

In order to make the correct design parameter selection, a design parameter set corresponding to the functional requirements set established before, must be exhaustively generated. The design parameter "Cellular manufacturing system design (CMS)" has been selected to satisfy the main functional requirements provided above – "Provide customized production".

The production system, which can answer customer's needs in an efficient way through elimination of waste, reduction of lead time and improved quality is a CMS designed with lean manufacturing principles in mind.

In satisfying the four functional requirements stemming from the main functional requirements provided above – "Provide customized production", the following design parameters are in response: Development of Procedure for defining product/part families and machine groups; development of Procedure for working out production resources capability; Design of Product oriented layout; Design of Pull production control system.

**Solution ideas to the problem of Classification and grouping products or parts and machines.** In this stage, final assignments of parts to cells are realized. Particular attention is given on eliminating of exceptional parts for decreasing inter-cell part movements. Furthermore, due consideration is also given to reassignment of machines to different cells for elimination of inter-cell movements.

**Solution ideas to the problem of Resources capabilities development.** In this stage, activities including waste elimination, for the design of a lean process, rearrangement of resources in agreement with the takt time, fixing training needs and motivation of the workforce are accomplished.

**Solution ideas to the problem of Resource rearrangements.** At this stage lean manufacturing principles are the guiding principles of the design step. In this step, the focus is the waste elimination.

**Solution ideas to the problem of Production control.** Satisfying customers by right amount and just-in-time production can only be accomplished through pull system. However, just-in-time systems require a steady pull on all products in the family. In order to ensure a steady pull, a leveled or mixed production schedule must be established. This leads to developing the appropriate Heijunka schedule and the necessary visual management tools including Kanban system for successful implementation.

### ***6.4 Conceptual solution of a new cellular manufacturing system***

On the basis of the ideas generated above, has been built a consistent set of conceptual solutions addressing the present problem. They are presented in details at the report of the pilot project.

## **7. Conclusion**

This paper has applied the USIT methodology to the problem of development of Cellular manufacturing system, which ensures providing customized production in the sphere of furniture manufacturing and allows to the analyzed Bulgarian industrial enterprise to accomplish fruitful business partnership with the Italian contractors.

The analysis of this problem has revealed that a simple technical approach is not suitable at all, but rather complex approaches are necessary and more appropriate. Thus the problem was analyzed from multiple aspects, including product families, business processes, production control etc.

A number of root causes and corresponding contradictions have been revealed and solved one by one to find basic directions for a new solution system.

The process of proceeding to the solution was described. Then, on fragments of such ideas, a consistent conceptual solution was built.

On the basis of this overall view, the new basic choice in the technical aspect is expected to have solved most of the problems.

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# Innovative methods for development of embedded software systems

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Development of embedded software systems is an innovative discipline of software engineering. However, creation of truly engineering methods in this field is a challenging task due to some important specific requirements of embedded software systems. Special attention should be turned to improvement of general purpose software engineering methods for development of software systems and adapting them to different domains of embedded systems development. It is generally accepted in embedded systems research community that different domains (spacecraft systems, automotive systems, process control systems, medical equipment systems, etc.) should have specific approach.

The focus of the paper is on development methods based on modular software architecture of the system. This means that one should look at it as a composition of interacting software components and the connections between them should have first class status. The goal of this paper is to analyze and evaluate usage of different architectural styles with respect to how they affect different non-functional requirements of embedded software systems. Styles represents a generalization of the best practices in architectural design of systems in this domain, which include configurations of typical software components and the connectors between them.

## Keywords

Architectural Styles, Embedded software systems, Software architecture

## 1. Introduction

A rapidly growing area of modern computing systems is formed by the so-called embedded systems. According to IEEE an embedded system is any *computer system that is part of a larger system and performs some of the requirements of that system; for example, a computer system used in an aircraft or rapid transit system*. A popular vision about is that an embedded system is nearly any computing system other than a desktop, laptop, or mainframe computer [4]. Throughout this paper we accept the following definition about embedded system: a mixed hardware/software system dedicated for a specific application and is part of and reactive to a larger, physical system to which it is at least logically connected.

Embedded systems cover a large range of computer systems: from very small computer-based devices to large systems monitoring and controlling complex processes. It is believed that major part of all computing systems today (more than 98%) belongs to the embedded systems domain.

Embedded software systems are possess some particular characteristics that distinguish them from general-purpose systems. Among them are [4, 14]:

- Limited functionality – this means that the system offers a same set of features to the users. Usually no additional programs may be installed to execute together with the initial software on the embedded system. This means that usually embedded systems do not have strict requirements for scalability.

- Tightly constrained – embedded systems have very high restrictions on available CPU performance, memory, power consumption and etc. These determine also high requirement towards software non-functional characteristics.
- Reactive and real-time – many embedded systems are designed to react to changes in system's environment and should produce output following some hard deadlines, i.e. – to work in real-time manner.
- Safety-critical – some embedded systems may be integrated into hardware, responsible for safety critical operations. Such systems have very high requirements for safety, availability, reliability and etc. Additionally in some of these systems the product life cycle is very long – in can stretch to several decades (for spacecraft software).
- Hard-to-change – Embedded software systems are usually tightly connected with the underlying hardware platform and written in low-level programming language, which makes them very difficult to change.
- The development machine architecture is often different from the target machine. The hardware for the target machine is often developed concurrently with the software, and therefore not available until late in the project.

Most of these characteristics fall into the area of non-functional requirements. The distinction between non-functional and functional requirements comes from the vision of functionality and the constraints that restricts execution of this functionality. While functional requirements define what software should do, non-functional requirements define how (in what way, under what boundaries) it should do this. Among the non-functional requirements fall reliability, availability, security, performance, time constraints, scalability, usability, maintainability and so on. Non-functional requirements are sometimes also referred as quality characteristics extra-functional properties or “-ilities”.

Examples of embedded systems that have all of the above-listed characteristics are applications in medical and life-support systems, automotive industry, control of industrial processes, aero and space systems and etc. It can be concluded that many of the most important requirements for embedded systems are related to these extra-functional properties. This also becomes a strong reason for raise in the cost of development and maintenance of such systems.

In this context, there is a strong need for application of software engineering practices to embedded systems. Currently many software engineering methods are successfully applied to different classes of embedded software applications. However, we have identified strong need for additional research on software architecture and for embedded systems [5, 6]. As software architecture is broadly recognized to be a crucial factor in satisfaction of non-functional requirements of software systems it is obvious that research on software architecture specifically oriented towards embedded systems is crucial for success of software development projects in this area. In this paper we analyze and evaluate usage of different architectural patterns, known as styles, in embedded systems.

The rest of the paper is organized as follows: Section 2 briefly describes the notions of software architecture and architectural styles; section 3 represent usage of architectural styles for embedded software systems and finally section 4 concludes the paper.

## 2. Software Architecture and architectural styles

Software architecture is an emerging software engineering discipline that concerns a high-level, abstract model of the software system. It has been subject of extensive research [8, 9, 11, 13] in recent years, but in terms of embedded systems there is still lack of support in the area. This is mainly due to the fact that software in most embedded systems is designed together with hardware.

As a new notion there is still some misunderstanding in its formal definition. For example, Bass defines architecture [2] as *the structure or structures of the system, which comprise software components, the externally visible properties of those components and the relationships among them*. Structures represent different views of the system like module decomposition, process view, deployment view and etc. Another definition is given by [7], which says that *software architecture is an abstraction of the runtime elements of a software system during some phase of its operation. A system may be composed of many levels of abstraction and many phases of operation, each with its own software architecture*. In our current research we focus on module decomposition view of the system, which encompass the following entities:

- Software components – these entities represent computational aspects of systems, aimed to fulfil the functional requirements towards software. They are usually regarded as black-boxes

that encapsulate certain functionality and may communicate only through their input/output interfaces. Components may represent abstractions either for on-site implementations developed on demand during realization of software project, or COTS (Commercial-off-the Shelf) components [1], purchased by third party in order to minimize the time and cost for implementation of certain functionality.

- Component connectors – aimed to abstract coupling, integration and communication between software components. Connectors should receive first-class status (equal to components) in software architecture in order to alleviate problems with integration of components. Such problems include interface or data mismatch, unsecure interactions, etc. Abstracting interconnections into separate modules also helps to decrease complexity of specification and to increase the level of reusability of connectors themselves.

Main goal of software architecture is to enable understandable and (most importantly) reusable fulfilment of non-functional requirements towards software systems. Software architecture serves many goals and is used in many software development related activities, including [2, 3] assessment and evaluation, configuration management, dynamic software architectures, and code generation.

Software architecture means nothing if it is not documented in uniform and understandable way and in order to achieve maximum benefit from the description of software architecture, it is needed to be able to formalize it. Software architecture should study the system beyond the algorithms and data structures of the computation. Instead it should provide means for reasoning about the software system at four abstract levels [12]:

- Functionality of components and connectors.
- Interfaces, exported by a component to the rest of the system.
- Interconnection and structure of the architectural elements (components and connectors). This interconnection is called architectural configuration.
- Rules for the architectural styles. Architectural styles capture past experiences with architectural design and represent previous attempts for construction of software architecture that have proved to be successful.

The list of currently known architectural styles is far from exhaustive and is an open area for research. In this paper we consider the following architectural styles:

- Layered style
- Pipe and filter
- Blackboard
- Client-server
- Service-oriented architecture
- Message-oriented style

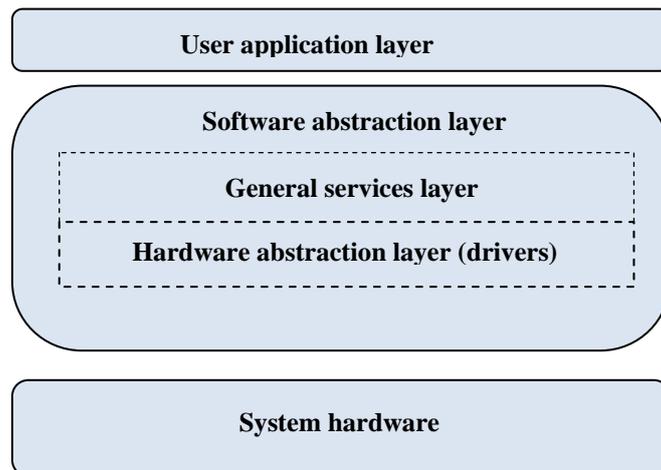
In next section we are going to scrutinize architectural styles with respect to their usage in embedded software systems.

### **3. Architectural Style for Embedded Software Systems**

In this section we consider some of the most popular architectural styles and their application to embedded software systems.

#### **3.1. Layered style**

This is the most widespread architectural style. The system built according to that style is divided into layers and each of them provides certain functionality. Only adjacent layers may invoke functionality and communicate with each other. This way it is easy to change something into a given level of the style, while this change affect minimal other parts of the software. Nearly every system implements it, as it represents a suitable abstraction which enables reuse and increase systems' scalability and modifiability. Embedded systems do not make an exception of this rule, as every embedded system has the following basic architecture (Fig. 1).



**Figure 1** Layered style for architecture of embedded software systems

Architecture shown on fig. 1 may vary, depending on different domain areas of embedded systems. One aspect is that each system should have hardware abstraction layer in order to achieve independence from the underlying hardware platform and increase reusability. Other aspects of the architecture concern for example the automotive domain. There exist hard requirements for real-time execution and the general services layer should be further divided into layers with responsibilities for resource allocation, task scheduling, time management and etc. However such specialization of architectural styles for specific domains is out of the scope of this paper and is a matter of further research.

### **3.2. Pipe and filter style**

This is one of the simplest architectural styles known, it suppose that the system is decomposed into modules, called that subsequently process some data, passed between them by connectors, called pipes (Fig. 2). Each filter just process the input information and then passes it through the pipe to the next filter, which process it in its own turn.

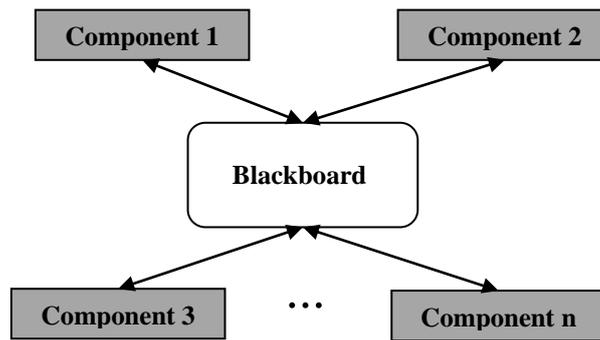


**Figure 2** Pipe and filter architectural style

This style is very appropriate to all classes of embedded systems as it offers simple interaction pattern that aids to scalability, predictability and reusability of components.

### **3.3. Blackboard style**

Blackboard style represents a number of components, sharing common information through a connector, called blackboard or repository (fig. 3). When a component wants to send some data to other components into the system, all it has to do is to write it into the repository and this way make it available to others. This style is very appropriate to embedded systems because it save computation resources when components share large amounts of data, or one component produce data more often than other components need it.



**Figure 3** Blackboard architectural style

As it is difficult to maintain the format of data when changing or updating components, this style hampers reuse of software components in the embedded system. This style also lowers reliability of systems, because blackboard represents single point of failure. Predictability is also compromised in case of many components with intensive interactions because the blackboard represents a shared critical resource.

### **3.4. Message-oriented style**

This style is also known as implicit invocation, because usually there do not exist typical method calls between components in the system. Instead a certain message is sent and each module that is interested in the event that caused message should take specific actions. Component interfaces here are listeners and the speciality in this style is in the connector, which should be regarded as a message passing framework, which should take responsibility for shipment of the message to each component listener. There exist two possible implementations of this style, the first is with broadcasting connector, which broadcasts the message and each system component decides by itself if it should take any specific actions. The second implementation has more sophisticated connector, which keeps track of possible events, and components associated with each event. Then it sends the message only to those system components that are interested in it.

When applying this style software architects should keep in mind issues about possible delays in message passing and processing. This also become an issue when ensuring reliability as additional processing is added with tracking if the message has been processed. On the other hand, this style favours reuse of the functionality, implemented in the server.

### **3.5. Client-server style**

This is another very popular software architecture style. In this style a number of components serve as clients and issue predefined requests to a server, which in turn returns results depending on the request received. Usually the server does not have any information about its clients, their number or characteristics. Almost every information or enterprise system is based on the concept of client-server interaction. The well known and recently very modern notion of service-oriented computing actually originates from this architectural style. With respect to embedded systems, when applying this style specific non-functional requirements to the server should be taken in mind to achieve reliability and predictability of the overall system. For example, the response time is very important in order to assess the overall performance of the embedded system. For this reason the service-oriented implementation is not suitable for embedded systems, because in its classical implementation, it is not easy to predict the workload of the service and how many clients will make requests to it.

### 3.6. Discussion

This paper presented 5 architectural styles with respect to the possibilities for their usage in embedded software systems. Of course the way a software system is implemented is far away from just picking up a style and applying it to the architecture. Usually a number of architectural styles is applied together to build the overall system architecture. Actually custom styles are possible to be developed for each system in turn. However the study of each style alone helps in better understanding of the issues that concerns specific types of systems. Table one summarize the applicability with respect to particular requirements of embedded systems ('+' stands for enrichment of the property, '-' for hampering the property and 'o' is neutral).

**Table 1** Applicability of architectural styles to embedded systems

	<b>Performance/ real-time execution</b>	<b>Reuse</b>	<b>Reliability</b>	<b>Scalability</b>	<b>Predictability</b>
Layered style	o	+	o	+	o
Pipe and filter	o	+	o	o	+
Blackboard	+	-	-	o	-
Message oriented	-	+	o	o	-
Client-server	o	+	-	o	-

As seen from table 1, every system usually requires a balanced combination of different architectural styles in order to achieve all of its non-functional requirements. Further analysis of the results in the table show that additional research in architectural styles is needed to improve reliability of embedded software systems.

### 3. Conclusions

Embedded software systems are an area where traditional software engineering methods are difficult to apply due to a number of specific requirements and restrictions that such systems have. Special approach is needed in every area of software engineering and this paper focus reports some initial research in software architectural styles for embedded systems. Five architectural styles are analyzed and evaluated with respect to their applicability to embedded software systems having in mind the specific requirements such systems have. This research will help in definition of architectural styles specifically oriented towards given embedded systems (medical, automotive, process control, etc.) and also will help in definition of different styles particularly oriented towards different non-functional characteristics of embedded systems, including reliability, scalability, real-time execution, etc.

As a matter of further research we will focus on development of architectural styles for automotive embedded systems based on specific requirements for reliability, real-time execution and predictability.

### Acknowledgement

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# Marketing research as a resource for innovative activities of enterprises

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Information gathered through marketing research present a foundation for introducing new products and / or engaging new processes. Innovative activities are a combination of ideas and information that bring about positive changes in company. Satisfying the consumer needs and gaining their loyalty is the main prerequisite in order for a company to introduce innovative activities. Although the innovation process is quite expensive and risky, it is nevertheless a condition without which a company can not secure a long-term sustainable competitive advantage on the market. One of the most important ways in which companies improve and grow is by achieving business success through innovation. In order for innovation to be successful, a company needs to have entrepreneurial spirit and a set of specific skills.

## Keywords:

customer, innovation, marketing research, product

## 1. Introduction

Innovation is every product, service, idea or technological process that is perceived as an new. Innovative activities are vital to maintain competitive advantage. Sometimes even a small innovation can add value and create competitive advantage. Innovation is measured by the company's efforts to find new opportunities and innovative solutions. Innovation should be happening in all segments of the organization, every department - in all aspects of the value chain.

According to the degree of innovation of innovation can be radical and gradual (incremental). Radical innovations cause departure from existing practices. These innovations usually result from technological change. Radical innovation can lead to the creation of products or processes that can be patented, thus giving the company a strong competitive advantage. Incremental innovations reinforce existing practice or lead to minor improvements of products or processes. These innovations increase revenue by creating a new product that is offered to the market and reduce costs by enabling new capabilities which the costs are reduced to a minimum and improves productivity. Some innovations may be extremely radical, while others may be gradual to a lesser extent. Most innovation is between these two extremes.

In order to improve its competitive position through innovation, companies can use the following innovative activities:

1. Encouraging creativity and experimentation. These activities shall be updating and improving products or services or the improvement of procedures performed within the company.
2. Investing in new technology, research and development and continuous improvement. In order for innovation to be successful, the company has to draw benefits from the latest technology. This often requires significant investment.

In this paper we will deal with the development of new products and services as innovative activities of companies. Depending on the degree of innovation for the enterprise and the market, the term "new product" has three basic meanings:

1. Brand new product - a product that is not only a complete novelty for the firm, but also for the market. Of enterprises that develop this type of product are the real innovators.
2. Modified existing products - new products that represent an improved version of existing products. New features of the product can improve the image of the company and products on the existing market. A company can modify existing products in different ways: innovation of existing products, product line extension and so on. A special form of modification is the repositioning of products that allows better positioning of existing products in new market segments.
3. Imitative products - products that are new for a given company, but not unknown product market.

Companies can choose different strategies for product development and services. Leaders have the initiative to develop new products and services. Companies copy successful innovations if they think that the risk of introducing entirely new products is too large. The choice of strategy of development of new products and services depends on the corporate mission and goals, organization size and nature of new products and services.

Depending on the strategies of product development and services, all businesses are classified into proactive and reactive. Proactive companies initiate a major change by creating entirely new products and services. Companies that follow a reactive strategy of developing products and services, launch new products and services that are imitation products and services of competing companies on the market or introduce a modified version of the existing products and services. In this market scenario, the company applies a reactive, but wisher strategy - strategy of "sit and wait". Companies can choose a defensive strategy focused on differentiation of products and services.

Imitators typically invest about 50% -70% less than an innovator. Lower costs and greater prospects for success seem rational enough to prefer to imitate products and services of competitors, but to develop entirely new products and services. However, the danger of imitating leaves little room for differentiation of products and services from the competition, which is considered one of the main reasons why companies recently have difficulty to retain customers.

## 2. The process of developing products and services

Development of new products and services is a process that involves a series of activities starting from the idea of a new product / service until the launch of the product / service to market. Development of new products and services is the result of an interactive process involving experts from different functional sectors within an enterprise, as well as individuals outside the organization. Development and introduction of new products is very expensive and risky. Depending on the industry, 60% to 90% of new products fail at the outset. Lack of marketing research is leading cause the failure of products. The other most common reasons for failure of the products are technical problems in the design or manufacturing error in the time and harmonized product. Duration of individual phases and the degree of development of products and services caused by many factors such as product features and services, target market, the impact of competition, available resources and so on.

The process of developing new products and services can be broken down in the following eight stages:

1. Generating ideas
2. The selection ideas,
3. Development of the concept of product / service and testing,
4. Development of marketing strategy
5. Business analysis,
6. Product / service development,
7. Market testing,
8. Commercialization / launching new products / services.

## **2.1. Generating ideas**

The process of developing new products and services begin generating ideas. Generating ideas includes all activities of the companies which seek to collect ideas for the development of products and services. Ideas for new products and services may stem from internal sources (official procedures for the development of new products and services sector for marketing and marketing research, consumer complaints and complaints) or sources outside the bank (advertising agencies, marketing research agency, competitors, intermediaries, consulting firms, universities, publications).

Marketing research plays a very significant role in generating ideas for the development of new products and services. About 40% of ideas for new products and services are collected in this way, and about 13.5% of ideas collected from other internal sources [6, pp. 106]. The company uses different marketing research techniques (personal interviews, focus groups, brainstorming and so on) to identify problems and needs.

## **2.2. Selection of ideas**

Collected ideas will be ranked based on certain criteria in order to perform their selection, or to accept good ideas for the development of new products and services and also rejected the bad. The most commonly used criteria for the selection of ideas are:

1. compatibility with the company objectives, such as profit, market share, sales volume, customer loyalty;
2. compatibility with the resources and compliance with capital, production, marketing, and distribution.

When you set the list of uniform criteria, it is necessary to determine their relative importance and then evaluate the idea to each of these criteria. The overall ranking of an idea about a new product / service is obtained as the weighted index as the sum product of the relative importance of each criteria and evaluate ideas according to each criterion, where the rating usually expressed on a scale from 0.0 (lowest score) to 1.0 (best score) [3, pp. 92].

## **2.3. Concept development and testing**

Selected ideas in the previous phase of the development of new products and services are translated into the concepts of product / service for further development and testing. The idea of a new product / service are the kinds of products / services that the company may launch in the market, while the concept of product / service is an elaborate version of the ideas described in a way understandable to consumers. Any ideas about a new product / service can be turned into several concepts of products / services depending on the target consumer.

The concept of product / service testing on a specific group of potential customers to discuss the proposed content of the product / service, which allows the company to further reveal the motives and attitudes of consumers, and to gain insight into how best to position and promote the product or service. After developing the product/service concept, following its testing to see a reaction of potential customers. At this stage of products and services development, the company usually uses exploratory research with focus groups of patients.

## **2.4. Marketing strategy development**

At this stage of product development, the company makes a preliminary strategic plan for the introduction of new products / services to market. A preliminary strategic plan consists of three parts. The first part of the plan describes the size, structure and the target market behaviour, the planned positioning of products / services, sales, market share, and predicted a profit for the first few years. The second part of the plan describes the planned price, distribution strategy and marketing costs in the first year. The third part of the strategic plan describes long-term sales, profits and planned marketing mix over time.

## **2.5. Business Analysis**

Upon identification of appropriate marketing strategies needed to transform an idea into a clear and complete business proposal in which they are listed in detail the advantages and prospects for success as well as for failure. At this stage of product development, the company has to evaluate of costs, sale and profit. Marketing research, together with other components of marketing information system, provides the basic elements for the projection of sales [3, pp. 93]. In addition to the profitability of new products / services, it is necessary to evaluate and its compliance with burial offerings. If a new product / service technology is associated with existing products and services, the company can use existing channels of communication and distribution, significantly reducing the cost and risk of failure.

## **2.6. Product / service development**

At the stage of product development / services selected concept of product / service is being transformed into a concrete product or service. Until this stage the products / services exist only as words, drawings and descriptions in the minds of the creators and consumers. The development of specific products and services mainly consist of information or a series of operational activities and includes determining the characteristics of individual products / services which contribute to creating the image of the product / service awareness, supporting procedures, software, assembly instructions for the use of this product. Three commonly used techniques for measuring consumer preferences are: ranking, comparing pairs and individual assessment. Suppose the consumer presents three versions (A, B and C) a new product. According to the technique of ranking, consumers are first presented all three versions of the product. They are asked to rank them by degree of attractiveness. The technique involves comparing the couples that consumers are pairs of products and they are required to declare that they are of two products in each pair more like.

## **2.7. Market Test**

Market testing is the phase in which the product is offered in final form and gets its name. On the one hand, market testing is conditioned by the limited duration and cost of research, on the other side of the invested money and the risk of possible failure. The competitors can receive information about new products and services. This is the problem of the testing phase. Companies can reduce the risk of copying ideas about new products and services by competitors.

## **2.8. Commercialization**

Commercialization is the final stage of the development of products and services and the start of their launch. Market testing will show whether the products and services will be launched in full or make specific improvements or corrections.

In the process of commercialization of products and services, the key question is timing when the market will be "fulfilled" product/service. Marketing research plays an important role in this phase of product development. In the commercialization phase (up to end of life products) marketing research is primarily tasked to monitor sales results.

In the process of adopting new products and services, there are five stages:

- Awareness - consumers become aware of innovations, but it lacks information about it.
- Inters - the consumer is stimulated to seek information about innovations.
- Evaluation- consumer considers whether to try the innovation.
- Test - test consumer innovation that would have a better assessment of its value.
- Adoption - the consumer decides to fully and regularly use a given innovation.

Companies can choose one of the following solutions:

- Introduced the first products to market and maximize the benefits of such decisions;
- Introduces a parallel product, waiting for response competition and then released to the market with a copy of its products;
- Decision on final version of the product, which allows learning to their own mistakes and omissions, then launch improved version of the product.

### 3. The success of new products and services

The speed at which products and services will be accepted by consumers depends on many factors. Some factors depend on the consumer, and some of the very nature of products and services. Businesses should be aware of the reasons why some consumers decide fairly quickly to use new products and services, while others abstain. Therefore, companies should identify and understand barriers to the acceptance of new products and services.

The speed of acceptance of new products and services, consumers are classified into:

- Innovators - those who first adopt new products and services; It is the most common category of "wealthy" young and well informed consumers.
- Early acquirer - those who embrace new products and services after the innovator; This category usually includes an above-average educated consumers.
- Early majority - made up of those who are extremely careful in accepting new products and services.
- Late majority - This category usually includes consumers who are very skeptical about the new products and services.
- Uncertain - the last to adopt new products and services; this category are traditionalists, consumers who look to the past, when they accept new products and services, they can already be replaced by newer products and services.

The development of any products and services is a risk, which is becoming more and more if the new products and services are designed to meet the needs and demands of consumers. Reasons for the failure of new products and services are integrated, indivisible and variable process that is often difficult to conceptualize, and sometimes they are very complex, dynamic and risky because of competition.

Successful products and services are those products and services that bring the company revenues and profits. Therefore, the measure of success for innovation:

- achieved sales,
- achieved by increasing sales,
- achieved market share,
- achieved by increasing market share,
- achieved profits,
- achieved by increasing profits.

In assessing the effectiveness and efficiency of innovation the company should ask the following questions:

1. Are the products or services offered by the new venture accepted in the market? If a new product (service) is accepted, the profits will probably be satisfactory. A successful innovation can be a guideline for future innovation.
2. Does the innovation add value to the company? If the innovation adds value to the company, the company will probably be able to strengthen existing resources and supplement internal knowledge and experience and improving ability of the company.
3. Whether the investment will maintain its competitive advantage? If the investment is maintained competitive advantage, the company will probably provide a stronger position over its competitors and create the basis on which it will build other advantages.

Successful innovation is characterized by [6, pp. 110-112]:

1. Relative advantage. Products and services, primarily, must have features that make them unique in terms of benefits provided by the consumer. Companies must devote full attention to even the smallest details in the design process to create a relative advantage, identify acceptable levels of differentiation and to ensure customer satisfaction.
2. Compatibility. Products and services that are market-oriented or that have been developed according to market demands, no doubt they have the property compatibility between the values and needs.
3. Complexity, which refers to the ease with which consumers understand the products and services. Indivisibility of products and services may cause difficulties in the mental conceptualization of products and services by consumers.

4. Severability. Companies must be oriented to the production and marketing when dealing with the creation of new products and services. Employees who come into contact with consumers must participate in the later stages to ensure the efficiency of products and services.
5. Portability – portability refers to the degree to which ideas can be transmitted to others.

Companies must be able to identify the specific factors contributing to the success of new products and services. These factors include:

- Promotion (planning, creating the image of new products and services, financial support for promotional activities);
- Internal marketing, which includes programs and procedures for staff training, promotional programs, etc.;
- Operating Procedures, which may be extended by testing products and services before launch, and training employees to better understand the new products and services, which will be presented and sold to consumers;
- Technical support;
- Compatibility of new products and services with the existing program of offering;
- The accuracy of identifying target groups of consumers, which is important because it used to be the most appropriate form of communication.
- The degree of differentiation of products and services.
- Marketing research and monitoring of consumer behaviour;

## 4. Conclusions

Innovation can take several forms, from the radical, revolutionary innovation to innovation resulting from the gradual improvement of products and services. Innovations are used to update and improve products and services or to improve procedures within the company. Innovation creates a risk venture, which becomes more and more if the new products and services are designed to meet the needs and demands of existing and potential customers. Innovative activities are quite expensive and risky, but no matter, they are a condition without which we can not provide long-term sustainable competitive advantage in the market.

The policy in the development and supply of products and services must be creative and of experimental and such that makes the constant discovery of new products and services in the future will replace those now in the stage of maturity or decline phase in its life cycle. Marketing research plays an important role in all stages of the development of new products and services. Lack of marketing research is leading cause the failure of products. New products and services introduced by the company shall be in accordance with its overall offering if the company wants to take advantage of the use of existing communication channels and distribution, and thus considerably reduce the cost and risk of possible failure.

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# Knowledge and Technology Transfer in Higher Education as support for Innovation: the case of University of Ljubljana

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University technology transfer models have evolved significantly since the introduction of Bayh-Dole Act. However, the introduction of the knowledge and technology transfer concepts in the Central and Eastern Europe has its specificities, based on both different higher education systems as well as on the history of university-industry cooperation.

Copying of US or Western European innovation models and mechanisms, more specifically of the technology transfer organization, in national innovation system of CEE has lead to smaller effects than foreseen. An example of the situation is also Slovenia, where new strategies for supporting innovation and the exploitation of scientific research results from public research organizations are being reconsidered. The article presents the current situation and the challenges in knowledge and technology transfer in CEE from the point of view of technology transfer offices, and underlines the case of Slovenian public research institutions, most notably the University of Ljubljana. An analysis of the effects of the newly proposed strategies for Research and Innovation Strategy of Slovenia 2011-2020 and the complementary National Program of Higher Education 2011-2020 with regards to TTO services is provided. Legal and infrastructural framework is considered, continued by the specificities of the University of Ljubljana on national and regional level, and the description of its innovation system. Special attention is given to the institutions at the university that together perform classical TTO functions.

The article partially builds on experience gained in the CERIM (Central Europe Research to Innovation Model) project.

## Keywords

Central Europe, Innovation, Knowledge and Technology Transfer, Technology Transfer Organization, University of Ljubljana

## 1. Introduction

Support for innovation processes and improvement of knowledge and technology transfer is vital if the European Union wants to keep up with the competition. The paper aims to present the case of knowledge and technology transfer (KTT) system in Slovenia's biggest university, i.e. University of Ljubljana (UL), from the view point of technology transfer office (TTO) services. It builds on the results of the analysis of the innovation systems in regions in Central Europe, as provided by the CERIM (Central Europe Research to Innovation Model), where IRI UL is a partner.

In the first part of the article, the definition of knowledge and technology transfer through a TTO is provided and the framework conditions for it in the CERIM participating regions are described. In the second part, situation in Slovenia is presented with the emphasis on the proposed drafts for the national research and innovation policy in the period 2011 – 2020. Lastly, the example of KTT system

at the UL is described with the emphasis on the mission of the UL's Institute for Innovation and Development (IRI UL).

The article partially builds on experience gained in the CERIM project which is co-funded by the Central Europe Program of the European Union.

## **2. Knowledge and technology transfer – the case of Central Europe**

### **2.1 Knowledge Commercialization**

Though there is abundant literature on the concept of technology transfer, no single or prevailing definition of the term exists [1], [2]. By considering technology in its broadest sense as know-how, we understand technology transfer beyond the mere transfer of products and commodities [3], namely as a knowledge transfer process [4]. As we are interested in the transfer of innovations and associated research results and knowledge from a public university (and other public research institutions) to final research users, we use the term "knowledge and technology transfer", where we are interested especially in the commercialization (i.e. the end user being a company). The KTT which could be described as pedagogical activity and thus not commercialized (mentoring schemes, invited lectures etc.) is not considered here, nor is the KTT where end user is non-profit organization.

Ever since the Bayh-Dole Act in the 1980s in the USA lay rules for commercializing of results from publicly financed research, governments in the industrialized countries have been underlining the need to improve the ability of research organizations to commercialize their results. University KTT models which were first created in the USA and the UK have gained ground also in the EU countries and evolved significantly, resulting in the "triple helix" or mutual responsibility of university-government-industry for KTT [5]. Most notably, the KTT is managed by the university-established TTOs, who are in charge primarily (but not only) of the questions of intellectual property rights (IPR), licensing, and networking with the potential investors. First established in the US, the TTOs are created as specialized and decentralized unit within the university, which enables them a certain level of autonomy when creating connections with the industry and thus enable KTT. Yet the TTOs with the focus on patenting and similar type of IPR protection are not the sole KTT commercialization activities. Various links with industry are created also through forms of consulting services for companies, thus diversifying the risk on depending on patents and licences [6]. From the organizational point of view, a system that supports university KTT commercialization is thus a mix of decentralized units which provide services to university and industry for protection and transfer of researcher's knowledge in various mechanisms. The main fields of these services are:

- *knowledge valorisation and related protection* (e.g. IPR, patenting, licensing),
- *business development* (e.g. spin-offs),
- *cooperation with industry* (e.g. consulting services),
- *training* and informing the university staff on the commercialization issues.

### **2.2 CERIM project**

Central Europe Research to Innovation Models (CERIM) project unites KTT organizations from regions of Austria, Germany, Hungary, Italy, Poland, Slovakia and Slovenia. The project mission is to develop adapted valorisation models for a more effective and efficient KTT from the universities and research institutes in Central Europe to the companies. Co-financed by the EU Central Europe programme, the project aims to contribute to a stronger sector of knowledge intensive European companies and a revitalisation of markets through innovative companies, especially in the participating regions (Table 1).

**Table 1** CERIM project regions, selected data [7]

<i>Country / Region</i>	<i>Population (mio)</i>	<i>GDP pc (EUR)</i>	<i>Patents per mio inhabitants</i>
Austria, Salzburg	0,5	NA	NA
Germany, Baden - Wuerttemberg	10,7	33.876	385,0
Germany, Mecklenburg – Vorpommern	1,7	21.439	26,1
Germany, Saxony	4,2	22.620	68,6
Hungary, Budapest	2,9	14 800	38,6
Italy, Lombardia	9,64	32.326	113
Poland, Szczecin	1,7	NA	2,36
Slovakia, Bratislava	0,6	26 400 (USD)	NA
Slovakia, Žilina	0,7	12 145 (USD)	NA
Slovenia, Ljubljana	0,5	22.286	NA

Within the project, an analysis of the regional knowledge and technology transfer situation was performed in 2009. Among other, units providing services traditionally linked to TTOs were examined.

### **2.2.1 The policy context for KTT in CERIM regions**

The introduction of the KTT and TTO concepts in the Central and Eastern Europe has its specificities, based on different higher education systems as well as on the history of university-industry cooperation. At the national and at regional level, the governments set the parameters for the effectiveness of the commercialization of academic research and the resulting impacts on economic growth [8]. Though partner countries differ on the approaches towards KTT, all have developed policies on the issue area. Most have seen an increase in this activity after year 2000 with the changes in legislation which allowed for the university (and not state) ownership of results issuing from publicly funded research. The universities and other public research organizations are thus *obliged* to protect the intellectual property created.

Austria, Germany, and Italy have a well developed structure of national and regional systems for KTT. Poland and Hungary, also Slovakia, have managed to develop regional innovation systems, too, yet their performance does not score high on the European Innovation Scoreboard. Centralization, which is the result of building predominantly national (and not regional) institutions in innovation system, may prevent actors from realizing potential advantages associated with KTT; however, fragmentation into smaller dimensions is not good if it lacks support and contact with other levels. Italy, with a strong regional autonomy, is an example of country where even the municipal level of innovation system is important, as institutions from this dimension are considered as relevant partners at setting policies.

### **2.2.2 Types of institutions providing TTOs services in CERIM regions**

According to CERIM RTT overview [9], the new EU members have copied the form of successful KTT organizational structures from the USA and UK – this especially being evident with the number of newly created TTOs at universities and the springing of incubators, technology/science parks and other mechanisms –, but failed to implement also the content of these mechanisms. In the partner countries, there is no single understanding of a KTT-model mix. The identified KTT-models vary, as there are also different legal and policy backgrounds for their creation. Three types of units that provide above-mentioned TTOs services exist in these regions of Central Europe (more in Table 2):

- TTOs as *units inside* the university,
- TTOs as *independent public-private-partnership (PPP) agencies*, and
- *private* institutions (mainly companies).

**Table 2** Types of institutions providing TTOs services

	<b>TTO as unit within university</b>	<b>TTO as independent institution in the form of PPP</b>	<b>TTO as private institution</b>
<i>Target group</i>	Researchers, university	Researchers, region	Investors (market)
<i>Aim</i>	Protect academic research results (IPR)	Market university research results to benefit the region	Develop ideas with market potential & respond to industry needs
<i>Important Services according to mission</i>	Knowledge valorisation (IPR, patents) Business development Training Other cooperation with the industry (consulting)	Knowledge valorisation (IPR, patents) Business development Other cooperation with industry (consulting) Training	Other cooperation with industry (consulting) Knowledge valorisation Business development
<i>Founders</i>	university	(regional) government + universities + regional business association	various (companies, individuals, public non-profit and private for-profit institutions)
<i>Strengths</i>	Knowledge of the academia Proximity to the university management	Support of (regional) governing institutions Pooling of innovations from several universities and achieving critical mass	Fast response to industry proposals Good understanding of market drive
<i>Weaknesses</i>	Little autonomy Slow response on industry demand or proposals Huge costs for small universities Focus on patents	Competition between universities	Lack of support from government and/or academia Perceived as competition to university-based TTOs

Regardless their variety, they all serve for promotion of research results and their commercialization. Yet, the first focus on the IPR (especially patenting) and business creation, the second on the immediate market availability of results through commercialization in form of patenting and licensing, whereas the third tend to focus more on the market itself and the expressed needs of industry. Herein lie also their strengths and weaknesses. Namely, university TTOs (especially in new member states) are often bureaucratic units inside the university structure, with inhibitions coming from the slowly responsive universities with rarely institutionalized cooperation with industry, the administrative red tape and unsupportive legal framework, inadequate rewards for entrepreneurial researchers, and with lack of KTT experts. On the other hand, a form of PPP between the universities, (regional) government and individual innovation management companies (typical of Germany and Austria) has proven to be successful especially at creating a critical mass of innovations and innovation experts who can provide adequate service to the researchers. Important fact is that as government is one of the founders, this reflects also in the related (regional) policy on innovation and KTT. For example, in the case of studied German regions, several universities and institutes in the region would establish a joint patenting and valorisation agency, whereas new EU members tend to create TTOs at the universities. Such TTOs, similarly to the German agencies, provide services of patenting, valorisations, licensing and other types of commercialization. A third type, the private institution performing KTT services, is focused on the needs of the industry, and is typically present in the new member states where university TTOs are new and still have to establish themselves as relevant partner to the industry. An example of this is IRI UL within the system of University of Ljubljana.

### 3. IRI as part of UL TTO system

#### 3.1 University KTT in Slovenia

There are four public universities in Slovenia, namely in Koper, Ljubljana, Maribor and Nova Gorica. The UL is the oldest and the largest in terms of enrolled students, staff, as well as research and development investments. Koper, Ljubljana and Maribor universities cover all fields of science, whereas the most recent Nova Gorica has been built upon the basis set by a strong natural sciences departments and applicative research. Traditionally, the contact with companies was established by each faculty, and usually not on the university level.

**Table 3** Slovene universities

	<i>University of Ljubljana</i>	<i>University of Maribor</i>	<i>University of Primorska Koper</i>	<i>University of Nova Gorica</i>
Established	1919	1975	2003	2006
Enlisted students (total) 2008/09	60.284	23.363	6.490	725

On the policy level, Slovenian Development Strategy for the period 2006-2013 and the Resolution on National Research and Development Program had defined R&D as the main factor for development and competition of Slovenia. Within this, the linkage of business with academia, the restructuring of public R&D system (increased investment, efficiency, strengthening the human resources and focus on high-tech and innovative companies, definition of key research areas) and the mobility of researchers between the two sectors were underlined. The policy documents also enabled the creation and funding of innovation system mechanisms such as technology/science parks and incubators. All universities except for Nova Gorica created their own university incubators aimed at creating student- and/or professor- start-ups, as well as units that are in charge of IPR protection. TTOs within research organizations (patent offices) have been established at all four universities as well as at the Chemical Institute and Institute Jožef Stefan [10]. As these institutions can and do provide also for training of academics and students on IPR and entrepreneurship, there was little focus on providing special services to companies. The situation is mirrored in the national legislation in the field of university KTT services in Slovenia. It is namely most elaborated on the issues of IPR. The Industrial Property Act was adopted in 2006, whereas the following year saw the adoption of Job Related Inventions Act. The main change is in the concept of IPR – now the innovations created by employees in publicly financed institutions (such as university) are owned by employer who also has to decide about the patenting. There are no fixed rules about the share in the profits between inventors and the institution. University remains autonomous in the ways it collaborates with firms.

Slovenian policy documents for 2011-2020 for the national innovation programme and the national higher education programme, reveal the desire to strengthen university TTOs, predominantly by improving the legal framework for enabling public research institutions to collaborate in industrial research and by simplifying the creation of university spin-offs. The financing of university TTOs unit should aim to "reach the entrepreneurial effects of KTT within a few years and to turn the unit more entrepreneurial every year" [10]. Thus, new innovation policy moves from the innovation support mechanisms which were successfully established, to a more entrepreneurial, market-oriented KTT.

#### 3.2 University of Ljubljana KTT system

The UL has more than 63,000 graduate and postgraduate students, approximately 4.000 higher education teachers, and 3 arts academies and 23 faculties. It practices basic, applied and development research, in all fields of science and arts, such as the humanities, social sciences, linguistics, arts, medicine, natural sciences and technology. The University co-operates with various economic institutions in both the public and private sectors, with the government and local authorities as well as other civil institutions [12].

In 2004, UL founded its incubator (Ljubljana University Incubator – LUI), aimed at providing environment for developing professor or student starts-ups. LUI thus offers business development

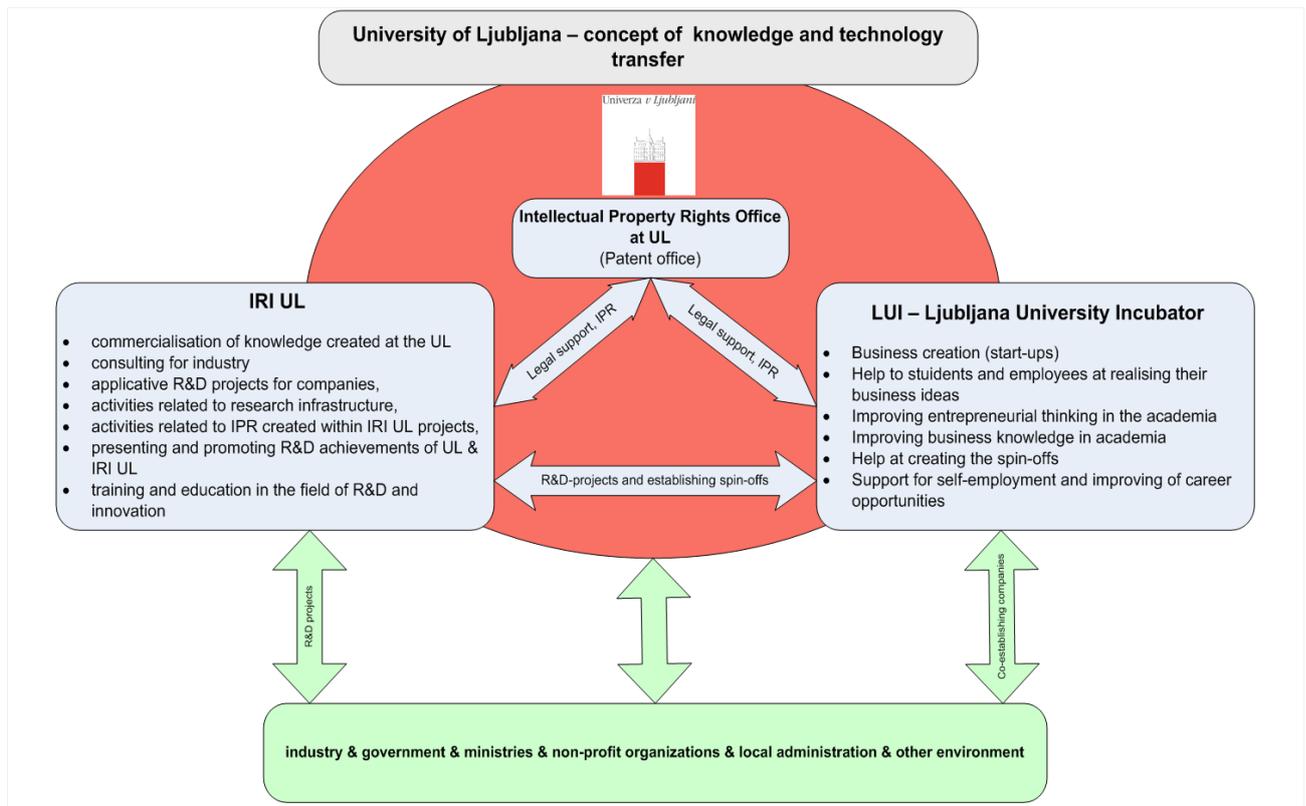
services and training services, and some IPR services. With the new IPR law in 2006, the university needed to create a special unit (patent office) for IPR. Having noted that there is no centralized institution to provide for the requests of the companies which would like to commission research or consulting on the university level, the university also decided to create the Institute for innovation and development (IRI UL). In its 2006-2009 strategy, the UL [13] defined KTT as one of its goals, comprised of a TTO as a unit within the university, of LUI which would continue functioning as a limited company, and of an independent IRI UL (more in Table 4).

**Table 4** TTOs services as performed by the elements of University of Ljubljana KTT system

	<b>IPR Office (Patent office)</b>	<b>LUI</b>	<b>IRI UL</b>
<i>Target group</i>	Researchers, university	Researchers, students	Industry, research labs
<i>Aim</i>	Protect academic research results (IPR) and comply with 2006 IPR law	Create start-ups and spin-offs on the basis of student or professor's ideas	Develop multidisciplinary projects with market potential & respond to industry needs
<i>Important Services according to mission</i>	Knowledge valorisation (IPR, patents, licensing) Training and educating on IPR	Knowledge valorisation (IPR, patents) Business development Training (entrepreneurship classes for students)	Other cooperation with industry (consulting) Knowledge valorisation Business development Training (industry representatives, researchers)
<i>Legal form</i>	Part of the university administration	Independent company (ltd)	Independent private non-profit institute
<i>Founders</i>	University (obliged by law)	University of Ljubljana	University of Ljubljana + 10 Slovene companies
<i>Strengths</i>	Initial financial and staff support of Slovene intellectual property organization Establishing of the IPR system at university	Support of governing institutions Established and recognizable programme for students Incubator facilities (rooms, services)	Fast response to industry proposals in form of consulting or industry research projects Freedom from university bureaucracy Centralized service for all faculties Non-profit institute in public interest (University can veto potentially harmful decisions)
<i>Weaknesses</i>	Little autonomy Focus on patents Unrealistic expectations to create income in short term only established in 2006	focus of student ideas some companies remain in the incubator longer than 2 years	Lack of support from government Lack of recognisability

As Debackere [14] noted, decentralization of the organizational structure is important for successful KTT. Various units have several types of autonomy and can create different responses (thus provide different service) to the needs of their primary target groups.

**Figure 1** the UL system scheme



### 3.3 IRI UL as part of University of Ljubljana KTT system

IRI UL is the innovation and development institute and service for KTT commercialization of the UL. It was established in 2007 by the UL and 10 leading Slovenian companies. It is a non-profit research and development institution whose aim is to establish a long-run and reciprocal partnership between the UL, Slovene industry and public institutions in order to foster research and development activities. Though private institute, it is in public interest as the UL has veto on any decision of the board that would harm the research mission of the university as an independent publicly financed organization. The mission of the IRI UL is to identify the research and development needs of the Slovene industry and competencies of researchers at the UL. The main aim is to enable the university staff to participate in commercial research projects and to enable researchers to consult companies.

IRI UL is the institution that is to be the intermediary between the demands of the industry and the potential of university researchers. IRI's main type of collaboration with industry is to create interdisciplinary teams of experts from UL to serve as consultants on a given issue or to perform industry research. For this purpose, IRI UL has created and is updating a network of all researchers at the university. Other activities consist of business development for ideas that do not qualify in the LUI (e.g. elaborating on the ideas and further development with international partners by applying for EU projects) or where patenting is not a viable option. As such, IRI is partner with university researchers in two EU Framework Programme 7 projects. Independent status of non-profit company enables IRI to participate with UL researchers in projects where the University or the LUI cannot be a partner, either because of the administrative constraints or because of the for-profit form.

All three institutions are to cooperate, yet so far, this has been more the case for the IPR office and LUI, as they have similar main preoccupation: protection of IPR and valorisation. On the other hand, IRI UL is more focused in the needs of Slovene industry and thus primarily searches for experts who could collaborate on research projects. Potential IPR questions are solved within the contract with company, and real IPR protection issues arise only in joint R&D projects. The UL has thus created a system, where it provides service which meets the legal demands, the needs of the researchers and students, as well as provides a new, centralized contractual collaboration for companies.

## 4. Conclusion

The transfer of researcher's know-how and research results from the university to commercial users (companies) can be named *knowledge and technology transfer*. For these purposes, traditionally a TTO unit within university was created, providing services of IPR protection and knowledge valorisation, business development, training for academic researchers and other services for companies. Today the focus in CEE has moved from the researcher to the needs of the industry and the society. In order to provide a more flexible service, the innovation system must consist of institutions which are autonomous and can respond to the needs of the market. In the KTT system of Ljubljana University such an institution was created the last and is the only one primarily aimed at the needs of industry.

Given the proposed changes in Slovene innovation and higher education policy documents for 2011-2020, it seems the patenting and valorisation activities will increase, with more impact on the applicability (market pull) of the research results. Though UL seems to be prepared for it on paper, it should be aware the institutions are very young and are unlikely to bring immediate and very tangible financial results soon.

## Abbreviations

CEE	Central and Eastern Europe
CERIM	Central Europe Research to Innovation Model
KTT	Knowledge and Technology Transfer
IPR	Intellectual Property Rights
IRI UL	Institute for Innovation and Development of University of Ljubljana
LUI	Ljubljana University Incubator
TTO	Technology Transfer Office
UL	University of Ljubljana

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# Entrepreneurial Learning from the Support Organizations and Associations for Entrepreneurs: A Case of Turkey

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The support organizations and associations for entrepreneurs have emerged as important agencies which work to change policy and provide services and networks to members. These organizations and associations help the entrepreneurs to develop themselves in many aspects. On the other hand these organizations and associations will serve and guide entrepreneurs through mentoring, equipping and networking them both spiritually and professionally so that the entrepreneurs can be successful on their job. Some examples of the support organizations and association for entrepreneurs are “Anatolia Businessmen's Association of Entrepreneurs”, “Association of Young Leaders and Entrepreneurs”, “Turkey Young Businessmen Association”, and “Association of Women Entrepreneurs” in Turkey. With a literature review, an empirical study had been conducted on SMEs in Turkey 1207 questionnaires were sent out, and of which 158 were usable. The purpose of this paper is to explore what are the learning needs of entrepreneurs, what do entrepreneurs want to learn about five ‘business dimensions’ in ensuring the success of their enterprises from the support organizations and association for entrepreneurs, what are the specific areas of learning needs and preferred way of learning of entrepreneurs. The empirical results of this study show that entrepreneurs want to have information in five business units as “strategy and policy” and “information technology”. They also need specific knowledge like solutions of problems for business growth. On the other hand, entrepreneurs want to learn from who have experienced the same situation before and professionals. One of the important results of the study is the entrepreneur want to see private consultants in learning process. An empirical verification of the links between learning needs of entrepreneurs and entrepreneur association in the context of Turkey's emerging economy. This paper provides some implications for the support organizations and association for entrepreneurs in presenting the right way to serve learning facilities for their members.

**Keywords:** Entrepreneurial learning, Learning Need, SME's, Support organizations and association for entrepreneurs, Turkey.

## 1. Introduction

Several authors have studied the entrepreneurial learning in entrepreneurship research (Rae, 2000). The importance of learning to small business survival and growth is beyond reasonable doubt in ever changing dynamic market places (Sullivan, 2000). The best training provision often comes from the organisations like Association of Young Entrepreneurs and Businessmen who best understand your business. Those associations are close to their members and fully understand the current training needs of businesses in their sector as well as those skills likely to be needed for future success. They will often recommend approved private training providers or offer tips on finding reputable ones. Sometimes they offer their own training courses.

A survey has shown that in the UK over 40,000 small businesses have failed annually for the last six years. In contrast the number of start-ups has been falling each year and in the last year start-ups have fallen by 26 percent. As a consequence the overall number of small businesses is decreasing (Bank of England, 2002). Beaver and Jennings (2001) updated earlier thinking on the reasons why businesses fail by compiling a list as: inadequate accounting systems; poor location; lack of marketing skills; lack of capital budget; inadequate provision for contingencies; lack of management skills; incompetence; lack of experience; neglect; fraud; disaster; poor record keeping; reckless money management; lack of formal planning; insufficient marketing talents; indifferent employees; inability to cope with growth; and excessive inventory. Deakins (1998) noted a link between the ability of an entrepreneur to learn and small firm failure. For entrepreneurs to deal with the unknown, they must be comfortable with uncertainty and manage risk (Schindehutte and Morris, 2001). To be successful an entrepreneur must think less about entrepreneurial activities and more about a set of qualities influencing behaviour and enabling flexibility and creativity (Henderson and Robertson, 1999). There are some researches defining the learning needs of entrepreneurs (John and Hides, 2002). Smilor (1997, p. 344) states, "effective entrepreneurs are exceptional learners. They learn from everything. They learn from customers, suppliers, and especially competitors. They learn from employees and associates. They learn from other entrepreneurs.

## 2. Entrepreneurial Learning

Learning is considered central to the process of entrepreneurial development (Deakins et al., 2000). This is particularly critical in an ever-changing dynamic marketplace (Sullivan, 2000). There is a close relationship between learning and entrepreneurial achievement in which learning is the dynamic process which enables entrepreneurial behaviour to be enacted. Entrepreneurial learning is concerned with how people construct new meaning in the process of recognising and acting on opportunities, and of organising and managing ventures (Rae and Carswell, 2000: 150-158). The entrepreneur must learn how to react to incidents, to changes and learn from problems encountered (Deakins, O'Neill and Mileham, 2000). Learning is critical to entrepreneurial effectiveness (Rae and Carswell). Entrepreneurial learning has become an important area of enquiry in relation to the academic study of entrepreneurship and the development of new entrepreneurs, yet it is an area that is not well understood (Gorman et al., 1997). The understanding of the learning process relating to entrepreneurs is of great importance. Deakins (1996, pp.21-22) states that "It is accepted that there is a learning experience from merely establishing a new enterprise. The learning process that is involved in business and enterprise development is poorly understood, yet programmes have been devised and interventions are made in business development. There is now a need for re-focusing research away from the emphasis on picking successful entrepreneurs or picking winners, to identifying key issues in the learning and developmental processes of entrepreneurship. Having briefly defined what is meant by the term "learning" time to consider how learning can be supported in the context of entrepreneurs. Entrepreneurial learning motivating on the expert knowledge and use of memory (Young and Sexton, 1997; Mitchell, 1997). Cox and Jennings (1995) suggest that it is this ability to learn from mistakes that makes successful entrepreneurs. Theoretically, external directors could have a critical role in the executive learning process. For example, they may be expected to bring experience, knowledge, discipline and rigour to strategic planning; they may also bring contacts, planning skills and a number of other intangible benefits to the entrepreneurial company (Deakins, O'Neil and Milaham, 2000). If entrepreneurs learn, what do they learn about? According to Minniti and Bygrave (2001), entrepreneurial decisions are a function of two types of knowledge. The first relates to market conditions, opportunities, technologies and/or new business ideas. Previous studies have outlined owner-managers' learning tasks in five broad areas: learning about oneself, about the business, about the environment and networks, about small business management and about the nature and management of relationship (Cope, 2005). For the entrepreneur, developing and transferring knowledge for better performance in product development requires a concerted effort across business processes. Across industries, pivotal knowledge is generated by highly specialized entities whose expertise lies in different areas. In an entrepreneurial arena facing increasing resource constraints, knowledge workers must not only be cognizant of their specific expertise, but also be able to synthesize and transfer their knowledge to other groups (Burns, Acar and Data). Therefore, the paper asks: What are the learning needs of entrepreneurs managing their businesses from the Associations of Entrepreneurs and Businessmen? The entrepreneurs around the world must be on the lookout for an entrepreneur organization to assist them in their own respective business ventures. There could be a notion that establishing one is impossible given the condition that there is a

competition among them and that there is fear of letting others learn of their respective secrets to entrepreneurial success. It also has the mission of letting these entrepreneurs learn and grow at the same time in their own fields of businesses. EO, like any other solid and well-founded organization, has a layout of its objectives. These are to nurture the entrepreneurship, to give support to the members, to present resources for new business ideas, and to have a sharing of success stories that would allow others to gain business principle insights. A free exchange of entrepreneurial ideas is fostered by the organization in order to make room for its objectives ([www.bookfresh.com](http://www.bookfresh.com), 2009). In addition to the above-mentioned research, there are other studies showing that lead to this research. One of them is Scheper's study. Actually in Scheper's (2002) adaptation of the model, the following five 'business dimensions' are crucial parts of every organization that need to be integrated: strategy and policy; monitoring and control; organization and processes; people and culture; information technology. Basically, Scheper's model is that leveling of the five dimensions will significantly contribute to the performance of an organization (Scheper, 2002). Based on Scheper's model, this paper argues that member entrepreneurs of support organizations and association for entrepreneurs want to learn about five 'business dimensions' in ensuring the success of their enterprises.

### **3. The Support Organizations and Associations for Entrepreneurs in Turkey**

An entrepreneur is never really alone unless he chooses to be. There are dozens of support organizations and professional associations specifically for entrepreneurs in Turkey. The support organizations and association for entrepreneurs are aware of their responsibility to create the entrepreneurial vision. The support organizations and association for entrepreneurs aim at maintaining a dialogue with policy makers and other stakeholders in pursuit of the public interest, enhancing the capacities of its members through continuous learning and training about entrepreneurship; creating business development and networking opportunities for its members in Turkey and abroad. The support organizations and association for entrepreneurs organize various meetings, panel discussions, and workshops with its strategic study groups or permanent commissions founded with the aim of forming the entrepreneurial vision in current, economical, social, political, and cultural issues. This organizations and associations have mission to inform their members about all kinds of studies carried out within the framework of our transparent leadership style and to encourage them to participate (Turkey Young Businessmen Association of Turkey, 2011). On the other hand Association of Young Businessmen provides its members with a variety of monthly programs designed to educate and inform, provide leadership opportunities, and develop a strong business and social network within the community.

## **4. Methodology**

### **4.1 Research Questions**

The specific research questions addressed in this research are; What are the learning needs of entrepreneurs managing their businesses from the Associations of Entrepreneurs and Businessmen? What do entrepreneurs want to learn about five 'business dimensions' in ensuring the success of their enterprises from the support organizations and association for entrepreneurs? What are the specific areas of learning needs of entrepreneurs? What is the preferred way of learning of entrepreneurs?

### **4.2 Sample and Response Rates**

The survey was designed to explore the entrepreneurial learning needs of entrepreneurs and their expectations from support organizations and associations for entrepreneurs. A cross-sectional survey-based method is suitable for testing the study hypotheses because data on a large number of organizations can be collected systematically via this method (Babbie, 1973). The survey method is the least susceptible to researcher bias in data collection, analysis, and interpretation (Busha and Harter, 1980). Using the widely accepted definition of SMEs in Turkey as companies with 1-100 employees (Gungen, 2001) but excluding micro firms with 1-9 employees (Storey, 1994) from this set and considering the database of the members of governmental Network of Small and Medium Sized

Enterprises published on Internet (Kobinet, 2011), the population of the study was found to be 6322. There are 7 geographical regions in Turkey and total of 81 cities in these 7 regions. In order to collect adequate cross-sectional data for SMEs, the questionnaires were mailed by a systematic sampling that is used in previous study (Kutlu and Ozturan, 2008). In this way, total of 1207 questionnaires were mailed, informed of the nature of the study, and asked to complete a survey questionnaire. Research was conducted between September 2010 and December 2010. Follow-up reminder e-mails were sent periodically . 121 were returned as undeliverable. 207 respondents returned the completed survey questionnaires (49 of them is not member of support organizations and associations for entrepreneurs). Four survey questionnaires were deleted due to a large amount of missing data. The survey, therefore, yielded 158 usable responses, representing an 13 percent response rate. The survey was divided into sections that recorded personal demographics, the entrepreneur's perceptions of the entrepreneurial learning from the support organizations and association for entrepreneurs. The companies in the study are ranked all in the IT, tele-communication, other services, government and education, manufacturing, trade, transport and logistics.

### 4.3 Survey Instrument

As noted earlier, the survey instrument was developed based on a search of the literature. The questionnaire used in the research were adapted from previous studies (Sexton, Upton, Walcholtz and Mcdougall, 1997; Burns, Acar and Data, Kutlu and Özturan, 2008). SPSS Version 13 was used for statistical analysis. Conformingly, the reliability test done for this research shows an alpha values of which indicates a high reliability.

## 4.4 Results

### 4.4.1 The descriptive statistics of the enterprises

Table-1 shows the descriptive statistics of SMEs group by number of employees and industry. As shown in Table 1 the majority of enterprises are from manufacturing sector (41%). Services-based enterprises made up the largest percentage of the firms surveyed (21%,16%, 22%). 38% of the enterprises have 10-19 and 50-59 employees.

**Table 1** The Descriptive Statistics of the Enterprises

Sector	Number of Employees					Total	%
	10-19	20-29	30-39	40-49	50-99		
IT, Tele-communications and Other services	15	7	10	-	1	33	0,21
Government and Education	11	3	-	12	-	26	0,16
Manufacturing	11	4	16	12	22	65	0,41
Trade, Transport and Logistics	1	7	2	9	15	34	0,22
Total	38	21	28	□□□□□□□□		158	100

### 4.4.2 Demographics Profile of the Entrepreneurs

There are more male (78%; 123) respondents than female respondents (22%; 35). Almost (75%; 118) of the sample are age of 30 and above. Almost half of the sample (55%; 87) indicates collage or university level of education. The majority of respondents are married (65%; 102).

### 4.4.3 Learning Needs of Entrepreneurs

This was measured with a 25-item grouped into 5 sections, five-point Likert scale based on the work of Scheper (2002) and Sexton, Upton, Walcholtz and Mcdougall (1997). The items were designed to identify entrepreneurial learning needs of entrepreneurs based on five 'business dimensions; "stategy and policy", "organization and processes", "monitoring and control", "people and culture" and "information technology". For validity purposes an exploratory factor analysis was conducted for 25-item scale. At first, values from the KMO and Barlett tests were taken into account in order to carry out

a factor analysis. Since KMO test suggested a variance of .83 and Barlett Sphericity test a meaningful variation ( $\chi^2=470.54$ ,  $p=.000$ ), it was decided that it would be appropriate to conduct a factor analysis for the scale. Firstly, factor analysis is applied to reduce the number of variables and to detect structure in the relationships between variables, that is to classify variables in the study. The scale was divided into five dimensions as mentioned previously in the literature, namely “strategy and policy” showed an eigenvalue of 3,12 and accounted for 77.0% of the total variance, which is a good value; “organization and processes” showed an eigenvalue of 3,45 and accounted for 70.0% of the total variance, which is a good value; “monitoring and control” showed an eigenvalue of 4,62 and accounted for 81.0% of the total variance, which is a good value; “people and culture” showed an eigenvalue of 4,00 and accounted for 76.0% of the total variance, which is a good value; and “information technology” showed an eigenvalue of 5,12 and accounted for 84.0% of the total variance, which is a good value. Entrepreneurs respond to items using a 5-point Likert-style that ranges from strongly disagree (1) to strongly agree (5). In this study reliability was measured by the Cronbach Alpha. Cronbach alpha values ranged from 0,67 to 0,96. Specifically, dimensions such as “strategy and policy”  $\alpha=0,67$ , “organization and processes”  $\alpha=0,77$ , “people and culture”  $\alpha=0,79$ , “information technology”  $\alpha=0,84$ , “monitoring and control”  $\alpha=0,96$  had either excellent or acceptable alpha values (George and Mallery, 1995). As shown in Table 2, entrepreneurs have learning needs about “Strategy and Policy” ( $M=4,55$ ) and “Information Technology” ( $M=4,10$ ).

**Table 2** Learning Needs of Entrepreneurs About Five ‘Business Dimensions’

Variables	M	SD	N
Strategy and Policy	4,55	0,76	158
Organization and Processes	2,16	1,35	158
Monitoring and Control	3,39	1,99	158
People and Culture	2,63	1,06	158
Information Technology	4,10	1,13	158

Notes: M=Mean, SD= Standard deviation, N=number of respondents

Based on this finding, support organizations and associations for entrepreneurs recommended that presenting strategy and policy and information technology-oriented learning activities. On the other hand, entrepreneurs reported a negative opinion on having support about “organization and processes” ( $M=2,16$ ). Entrepreneurs remains undecided about “monitoring and control” ( $M=3,39$ ) and “people and culture” ( $M=2,63$ ).

#### 4.4.4 Differences between the business about learning needs

In addition, study try to find out whether there are differences between the groups about learning needs of about five business dimensions according to industry and number of employess. One Way Anova test was applied for this purpose. Table 3 shows the results of One Way ANOVA test according to industry. The results reveal there is no significant difference between any pair of the four groups about learning needs on five business units of entrepreneurs based on industry ( $p=.085 > 0,05$ ).

**Table 3** The Results of One Way ANOVA Test According to Industry

		Sum of Squares	df	Mean Square	F	Sig. (p)
Learning Need of Entrepreneurs	Between Groups	4,322	3	1,541	3,852	,085
	Within Groups	133,039	237	1,461		
	Total	137,361	240			

Table 4 shows the results of One Way ANOVA test according to number of employees.

**Table 4** The Results of One Way ANOVA Test According to Number of Employees

		Sum of Squares	df	Mean Square	F	Sig. (p)
Learning Need of Entrepreneurs	Between Groups	4,690	3	1,430	4,002	,120
	Within Groups	40,638	237	,176		

	Total	44,328	240			
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The results reveal that there is no significant difference between any pair of the five groups about learning needs on five business units of entrepreneurs in terms of number of employees ( $p=,120 > 0,05$ ).

#### 4.4.5 Specific Areas of Learning Needs of Entrepreneurs

Respondents were asked to rate the need of entrepreneurial learning about specific areas as with other similar studies (Sexton, Upton, Walcholtz and Mcdougall, 1997, Sullivan, 2000). As these studies the learning needs area were ranked as below: using cash flow to make operational and financial decisions; financing growth; increasing the value of the business; harvesting value from the business; successful selling via helping customers buy; hiring, training, and motivating a dynamic sales force; value-added advertising topics; sales and marketing strategies for growth; creative management of human resources; hiring, training, and motivating for growth; compensation for self and associates; equity-based compensation as a business strategy; building the entrepreneurial culture within the organization; problems and pitfalls of growth; succeeding in a rapidly changing world; and management succession. Respondents were also asked to identify any other topics not included in the list. Table 5 below presents the results of this question; the figures are in frekans and percentages. As it can be seen in the Table 5, the vast majority of entrepreneurs want to be informed about hiring, training and motivating for growth (91%), equity-based compensation as a business strategy (84%), financing growth (77%) and succeeding in a rapidly changing world (68%). Looking at these results it can be said that entrepreneurs seem to have problems related to the growth of their businesses. They need learning to plan for the success of the organization and to anticipate upcoming problems for growth. Entrepreneurs stated that their training needs of in some other titles like using cash flow to make operational and financial decisions (37%), increasing the value of the business (24%), successful selling via helping customers buy (42%), creative management of human resources (25%), compensation for self and associates (41%). One of the important results of the study entrepreneurs stated that they want to learn about the some issues not mentioned in the list. These are "e-commerce" (34%), "effective leadership" (43%), and "new approaches to productivity" (26%).

**Table 5** Specific Areas of Learning Needs of Entrepreneurs

Specific Areas of Learning Needs	Frekans	Percent
using cash flow to make operational and financial decisions	60	0,37
financing growth;	123	0,77
increasing the value of the business	38	0,24
harvesting value from the business	49	0,31
successful selling via helping customers buy	67	0,42
hiring, training, and motivating a dynamic sales force	40	0,25
value-added advertising topics	15	0,09
sales and marketing strategies for growth	55	0,34
creative management of human resources	48	0,25
hiring, training, and motivating for growth	145	0,91
compensation for self and associates	65	0,41
equity-based compensation as a business strategy	134	0,84
building the entrepreneurial culture within the organization	13	0,08
problems and pitfalls of growth	53	0,33
succeeding in a rapidly changing world	109	0,68
management succession	12	0,07
Other ( e-commerce)	55	0,34
Other (effective leadership)	68	0,43
Other (new approaches to productivity)	41	0,26

Specific Areas of Learning Needs	Frekans	Percent
Total	158	100

#### 4.4.6 Preferred Way of Learning of Entrepreneurs

Respondents were also asked to indicate their preferred way of learning from a list of: nothing, do not need; read a computer bulletin board; listen to an audio tape or CD; watch a video tape; attend a roundtable discussion, attend a seminar; hire a private consultant; or other. Table 6 shows preferred way of learning of entrepreneurs.

**Table 6** Preferred Way of Learning of Entrepreneurs

Way of Learning	Frekans	Percent
Nothing, dont need	-	0,00
Read a computer bulletin board	33	0,20
Listen to an audio tape or CD	28	0,17
Watch a video tape	79	0,50
Attend a roundtable discussion	97	0,61
Attend a seminar	148	0,93
Hire a private consultant	115	0,72
Other	-	0,00
<b>Total</b>	<b>158</b>	<b>100</b>

When asked if respondents preferred way of learning, the majority (93%, n=148) reported they want to attend a seminar, hire a private consultant (72%, n=115) and attend a roundtable discussion (61%, n=97). Of the 79 (43.4%) respondents who reported that they preferred watch a video tape about the topic that they want to learn. Only 28 (17%) and 33 (20%) respondents reported that they want to learn by reading a bulletin or listening an audio tape or CD.

## 5. Conclusions

As firms increase in size and complexities, the entrepreneurs managing them face a number of unique problems. Most of the time the entrepreneurs lack the experience to address these problems. At this point, support organizations and association for entrepreneurs come into for entrepreneurs. The results of this study conducted with 158 businesses show that entrepreneurs want to learn from these organizations and associations. This study also identifies the learning needs and preferred delivery ways of entrepreneurs. In the study the following preliminary findings also emerged: Entrepreneurs need to learn about "Strategy and Policy" and "Information Technology". Support organizations and associations for entrepreneurs share more detailed information about these business dimensions with their members. Managers and executives of companies who are becoming more strategic, more reliant on information technology because today entrepreneurs need information to do their work and support organizations and association for entrepreneurs can offer this service to them. Entrepreneurs want specific knowledge about financing growth, hiring, training, and motivating for growth, equity-based compensation as a business strategy, succeeding in a rapidly changing world, e-commerce, effective leadership and new approaches to productivity. Entrepreneurs have a better understanding of what they want to learn in complex business world. They want information that primarily about business strategies and growth of their businesses. These findings show the entrepreneurs may need to solve problems of growth in their businesses. Actually entrepreneurs tend to be growth-oriented, reach this finding is not surprising for this study. These findings could be used to develop a series of courses or modules that could enhance the success of entrepreneurs and efficiency and effectiveness of support organizations and association for entrepreneurs. Entrepreneurs want to learn the topics in an interactive way like attend a seminar or roundtable discussion. Based on this finding, roundtable discussions and seminars seem to be solution for learning activities of entrepreneurs. This finding also shows that today's entrepreneur want to find out by questioning, consultanting and discussing. Finally, they want to learn from those who have experienced the situation, i.e. private consultant. According to this finding, entrepreneurs believe that experience have effectively prepared them to compete in the

business world. Especially private consultants are preferred by entrepreneurs. Consultants and professionals can offer advice on all aspects of business. Thus, associations should focus on making this service. The results show there is no significant difference between groups about learning needs on five business units of entrepreneurs based on industry and number of employees. Accordingly, it can be said that learning needs of all businesses within the scope of research are the same. In conclusion, this study has contributed towards understanding entrepreneurs' learning need. An empirical verification of the links between learning need of entrepreneurs and support organizations and association for entrepreneurs in the context of Turkey's emerging economy. This paper provides some implications for the support organizations and association for entrepreneurs in presenting information needed and the right way to serve learning facilities for their members. Readers should be aware of possible limitations with the data source and measures used in this analysis. This study also raises a number of other important questions to be addressed in future research. A qualitative research can be done on the same subject. One big limitation was that the sample of the Turkish businesses obtained was only 158 participants. To be a representative sample it would have been needed more, but the resources, and limits of time to make this study didn't make possible to have a higher one. It would be interesting to make this type of study in different countries and societies to see the cross-cultural differences.

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# Strategies, the use of information technologies and competitiveness of companies in Serbia

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The research paper "*Strategies, the use of information technologies and competitiveness of companies in Serbia*" deals with the subject that has been very important in recent years, not only for Serbian economy, but also for the country itself. Of course, the state is in search of the best solution for overcoming this situation; it tries to solve the problem in the fastest, most favourable and most efficient way. It should take advantage of good geographical position of the country, stimulate economic development, improve competitiveness and restore the former success and a good economy. What is the structure of enterprises in Serbia now? Recently we have often come across the term „strategy“ and competitiveness. The question is how and what to change. We must decide what strategies to use in order to increase the competitiveness of Serbian companies, what to do with the companies which have fallen into difficulties... Where is Serbia on the WEF's list now? How to achieve better position on this list? To be competitive means to be successful and to take a better position on the WEF's list. Do new technologies affect the productivity? Will they be the solution for the Serbian companies? What matters should we pay attention to? How should we invest our financial resources? Would this solution moderate the current crisis and the transition period? The information technologies have taken on a new significance. They influence the development and competitiveness of companies. The change of thinking, restructuring and investment in education are vital for the recovery of Serbian economy and bringing it back to European market. It also means making a bigger profit. The use of foreign funds, which are issued for the EU candidate countries, can be one of numerous sources for financing new companies, as well as for presenting the new high-quality products.

## Keywords

Serbian economy, Serbia on the WEF's list, strategy, information technologies, competitiveness

## 1. Introduction

In recent years there has been a number of discussions about what a strategy is and what the elements of a successful strategy are. The main controversy is over the question of how to formulate a successful long-term strategy which would enable a company to survive and develop. The word "strategy" is widely used, but often misinterpreted. Companies need to know what they want and then they can create a strategy. The advantage is to do the same as the competition, but to do it better! The ultimate goal of a strategy is to be above average when compared to others, the competition. A strategy is therefore both science and skill. There is only one strategy in a system - it is related to the whole and it is always defined in relation to certain competitive company. The „strategic theory“ is important for every strategy. A strategy formulates system functioning under all circumstances, and it refers to a longer period of time. Thus it dictates the quality of the managers. A strategic management deals with a strategy. Different strategies lead to different results. The introduction of electronic commerce involves many changes. It changes business strategies. The Internet is the infrastructure for many jobs that did not exist before. Many companies adapt to new business conditions and introduce many novelties. More companies are now implementing ERP systems in their business, in order to improve their competitiveness and to survive in the market in the era of information technology.

Various authors define a strategy differently. One author defines a strategy in five different ways, such as: a plan, a procedure, a position, a perspective and discernment. Another author states that a strategy is defined by at least two aspects: what the company intends to do and what company does regardless of whether its actions have been planned or not. Every author sees the essence of a strategy in his own way, just as every company has its own strategy, which for some may be successful and for others not. Not every decision is good for every company. A strategic plan helps a company to make its dreams come true and to make correct decisions. It allows the organization to have a structure and to know what to do in order to achieve its goal, whether that is the survival in the market or circumvention of the competition. Therefore, most organizations attach great importance to strategic planning for a long-term growth and welfare of the company.

## **2. Strategic planning now and then**

Strategic planning is helpful to managers because it allows them to prepare for the changing environment in which their organizations operate. Nowadays, things change so quickly that the managers' experience cannot be their only reliable guide. They are forced to develop new strategies that correspond to problems and future opportunities. The main drawback of strategic planning is danger of creating a huge amount of paperwork, which can lead to the loss of contact with business products and consumers. Some organizations have overly invested in the consultants, planning staff and sophisticated planning models and programs. Those investments cost greatly, because the planning staff may usurp the initiative and power of the operational managers. It is necessary to make strategic plans and concepts closer to the actual needs of an organization.

Another disadvantage of strategic planning is that it sometimes tries to limit a company i.e. it makes it use the most rational and less risky options. In order to be successful, there should not be too much planning, but more application. The most important thing is to apply the strategy, and convert it into action. This is the basic competency of today's enterprises. However, this is not so easily achievable in practice. Modern technology (mobile phones, internet, email ...) has completely altered the way of organization managing. Once the geographical distance was a problem, and today it is the smallest obstacle, since managers can now negotiate over the videophone, or enter into contracts electronically. The development of technologies has enabled managers to get in touch with anyone anywhere.

### **2.1 Decision-making in companies**

In modern business managers are the main carriers of success, stability and development of a company. As many authors state, the main characteristic of a successful manager is his organizational skill which enables solving business activities efficiently. Based on this, decision-making is defined as solving various problems which occur in a company and its management. Problems may present not only the dangers but also the opportunities for a company. Some decisions are of great importance to the organization and the consequences of those decisions can have a long-time effect. Other decisions are not so important and their consequences are felt only for several days or even hours. Depending on the time dimension, decisions can be strategic, tactical and operational. Strategic decisions are made in high levels in the organizational structure of a company and they are related to the improvement of the future strategic position of the company. These decisions concern new technologies, new products, target markets, the manner of achieving competitive advantages, survivals in the market, stability of the company and others. According to the degree of structure, they are classified into:

1. structured - made on the basis of sufficient information, clearly defined rules and criteria.
2. non-structured - there is a lack of information as well as previous similar experiences and thus creativity and intuition are required.
3. half-structured - a combination of the previous two types.

The changes that are introduced and decisions that are made i.e. decision-making can be:

1. decision - making under conditions of certainty - it is not very difficult because all the facts and the situation are known. There is no risk so this kind of a situation is more of the confirmation than decision-making.
2. decision - making under conditions of partial uncertainty (risk). In this case, the situation is only partially known and the way how the situation will evolve can only be speculated.

3. decision-making under conditions of complete uncertainty. The situation and its possible development are completely unknown.

## **2.2 Competitiveness of enterprises in Serbia**

The word competitiveness is often heard, along with the word strategy. Competitiveness is now an important element of any development strategy[1]. Some authors state that competitiveness is the ability of the economy to attract companies and keep them active by a growing market share and a steady increase in living standards in their communities. It is important for every country since it determines the level of productivity and development. Therefore, competitiveness is defined as a number of institutions, policies and factors that determine the level of productivity of the country. The level of productivity, on the other hand, defines a sustainable level of prosperity that an economy can create. More competitive economy will be able to produce a higher level of income to its citizens. The level of productivity determines the rate of return. Since the rate of return is vital for the economic growth, competitive economy is the one that achieves a faster growth in a long period. The concept of competitiveness includes both static and dynamic components: although the productivity of a country is clearly determined by its ability to maintain a high level of income, it is also one of the key determinants of realized investment returns. Competitiveness strategy now occupies a central place in numerous studies. The essence of competition is not in the rivalry. Companies in Serbia deal little with the matters of internal economy, increasing productivity, improving work organization, increasing profitability, introduction of information technology into their work and personnel training - and these are very important factors for increasing the competitiveness. Human resources and adoption of new technologies and technical facilities are two very important, perhaps the key factors in this era of extremely rapid development of information technology. World Economic Forum – WEF[2] shows twelve pillars of competitiveness i.e. it classifies a wide range of competitiveness factors into 12 categories, and each year it publishes a list of countries based on their competitiveness. The first phase - the initial phase of development - is a policy dealing with basic factors (institutions, infrastructure, macroeconomic stability, health and primary education) and it is of crucial importance, i.e. I - 60% - II - 35% - III - 5%. The second phase - the more mature phase - after reaching the primary factors of competitiveness, efficiency factors are important for future progress (higher education and training, market efficiency, labor market efficiency, financial market sophistication, knowledge and the use of technology, market size), i.e. I - 40% - II - 50% - III - 10%. The third phase - the most mature phase - is characterized by the factors related to innovation and the economy driven by innovation (business sophistication, innovation), i.e. I - 20% - II - 50% - III - 30%. According to the World Economic Forum[2], which shows the ranking of countries by competitiveness in 2009-2010 and compares them with the ranking in 2008-2009, Serbia is ranked the 93rd among 133 countries, which is very worrying. Only Albania and Bosnia and Herzegovina are below Serbia on this list. Serbian neighbors, Montenegro (62nd), Croatia (72nd), Macedonia (84th) are far ahead of Serbia. According to WEF's rankings for 2010/2011 in September 2010 Switzerland is the most competitive country, because its economy is characterized by innovation and sophisticated business culture. It is followed by Sweden, Singapore and the USA. At the bottom of this list, which comprises 139 countries around the world, are Burundi, Angola and Chile. The weak competitiveness of these countries is explained by inefficient bureaucracy, corruption in the country, restrictive labor regulations, policy instability, tax laws, insufficient education, access to finance ... On this new list for 2010/2011 Serbia is on the 96th place. The only countries in the same region that are below Serbia are Albania and BiH, which have recorded a slight rise on the list when compared to the last ranging. Montenegro has moved from the 62nd to the 49th place and entered the 50 most competitive countries, while Croatia reflects a small fall from the 72nd to the 77th place. Macedonia has moved from the 84th to the 79th place on the list. Regarding the adoption of new technologies in companies, Serbia is ranked 125th. Information about the departure of young talents from Serbia is also devastating: the 132nd place on the list of World Economic Forum. These data indicate the fact which is not openly discussed - it is frightening and alarming that one of the European economies is the worst ranked. The productivity of a country is determined by the productivity of its companies. Obviously, Serbian economy must pay greater attention to economic reforms and transition. The companies should actively participate in strengthening their own competitiveness. Entry to the investment-driven phase imposes new challenges on Serbia in terms of improving competitiveness. The future innovative phase will impose fulfilling of more requirements. In Serbia, small and medium-size enterprises (SMEs) employ 2 / 3 of workers. They are the most vital part of Serbian economy, which has achieved 40% of export and 60% of import. Furthermore, there is a great number of companies which produce products that cannot be exported, and are more expensive compared to imported products. Thus, they are non-competitive

and operate at a loss. The solution can be found in the change of thinking, in innovation. The key factor in initiating innovation is human capital. This confirms that the knowledge embodied in a number of competencies, and skills, is crucial for defining the company's competitive position. Strong need for specialized knowledge and skills is one of the dominant characteristics of modern business environment. In this sense, companies need human resources trained to conduct the expertise, to think critically and analytically, and to have the power of synthesis. Therefore, the management of human resources is the direct source of quality and productivity improvement, as well as competitiveness. At the same time, the resource must be continuously developed and perfected. In that sense, in every company, professional training, consultancy support and development of special skills of managers and employees must be of great importance. Production and technological innovation are important but not sufficient for achieving a successful strategy - innovation is necessary. In February 2010 National Agency for Regional Development and the Serbian Chamber of Commerce signed the Protocol on cooperation in the project of Enterprise European Network. This protocol is expected to increase the competitiveness of Serbian economy. The main objective of the Enterprise European Network in Serbia is to put Serbian small and medium-size enterprises in the same position with the European ones and to allow them access to various funds. Serbian small and medium-size enterprises are given way to the EU and their technologies and funds worth several hundred million euros. Thus Serbian small and medium-size enterprises are placed in the same position with the ones in the rest of Europe. Automatically, their competitiveness is increased as well as a greater participation in domestic and international markets. This is a good sign, because in Serbia 2 / 3 of the total number of enterprises are small and medium-size. They are the pillar of the national economy and they employ most people. Enterprise European Network allows companies to gain in one place different types of services, such as assistance in finding partners and establishing business cooperation, participation in tenders, easier access to information on the EU business regulations, support programs, legislation and results related to innovation.

### **2.3 Application of technology in decision-making**

Inclusion of technology in the process of strategic management is an essential prerequisite for efficient and effective business operations. Technology creates new industries, transforms existing ones or destroys them. The increasing impact of technological progress and shorter life expectancy of primary technological changes require companies' continuous adaptation to new technological styles. Life expectancy of the basic technological equipment today is 5-7 years. In younger non-traditional sectors such as air industry, missile industry, electronic industry, electrical – mechanical construction industry, measuring instruments industry, pharmaceutical industry, chemical industry and others, life expectancy is 3-5 years, which requires adequate offensive response.[4]

Thus, companies are forced to be trendy, to change in order to survive and to be stable and thus more competitive in the market. Dynamism of change, globalization of the market, outstanding technological development lead to the acceptance of technology as a means of achieving and improving competitive advantage. An important element of strategic management is management technology and therefore, adaptation to changes in business environment. Management information systems are systems of collection, storage, organization and dissemination of information useful to managers. It should not be doubtful that most jobs today are based on managing a number of information generated from business. Computerization of information management has numerous effects on the organizations. The most important effects are: the ability of processing and creating documents with a high accuracy and high speed. Along with the emergence and development of decision theory, Information Systems evolved. Their development has changed everyday life and work of men. Computers, networks, databases, computer-based models are used in decision-making. The most important benefit derived from computerization of management system is a continuous progress in performance improvement. The biggest risk or threat associated with greater management information is security and protection of confidentiality and integrity of data and information. For most organizations, it is not easy to achieve profitable growth in today's business climate. They are faced with global competition, consolidation of the market, lack of talents, demands for coordination, increased expectations of customers and shareholders, as well as increased profitability. Constant changes in the industry make these challenges even more complex. To respond to these challenges, companies must be able to react and transform their business quickly and economically, without having to sacrifice profitability, transparency and internal control. Flexible, functional and reliable information technologies are required. A company also needs software that efficiently manages the entire process of the industry that the company deals with. The term ERP is often heard today. Almost every business magazine writes about it. ERP is an abbreviation for "Enterprise Resource Planning. ERP in general does not

plan anything and one will not be exempt from liability for one's decisions. It provides information based on which one can plan and make the right decisions. Solutions for enterprise resource planning (ERP) play a significant role in the success of the company. The appropriate ERP software can increase the productivity of corporations. It enables easier management of complex corporate structures, market channels and business scenarios, as well as modernization of business processes and operations, optimization of important corporate resources and assets. Implementation of appropriate ERP software can reduce the time for placing products on the market and returning of the investment, deliver individual products and services to existing and future markets, improve services and satisfaction of employees and customers in all aspects of business operations.

## 2.4 The research on application of information technology in Serbia

The research results of the Republic Bureau of Statistics[5] show that more than 90% of the companies in Republic of Serbia use computers in their work, which is a slight increase of 0.1% compared to 2008. 100% of large and medium-size enterprises use computers, whereas slightly over 90% of small ones do the same (see figure 1).

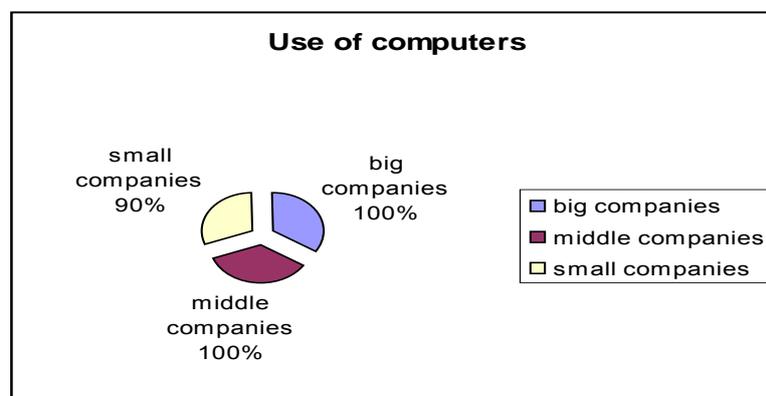


Figure 1 Use of computers

Regarding the representation of information and communication technology, the survey shows that 68.9% of the companies have Wire based LAN, 43.7% Intranet, 34.7% Wireless LAN, while 12.2% of the companies have Extranet. During 2009 11.3% of the companies used ERP system. Analysis of the companies by size shows that 49.2% of the large companies have ERP system, 21.6% of the medium-size, while only 7% of the small companies have ERP systems (see figure 2).

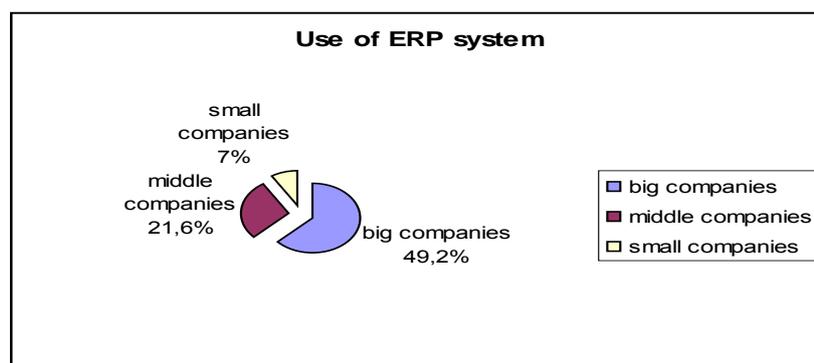
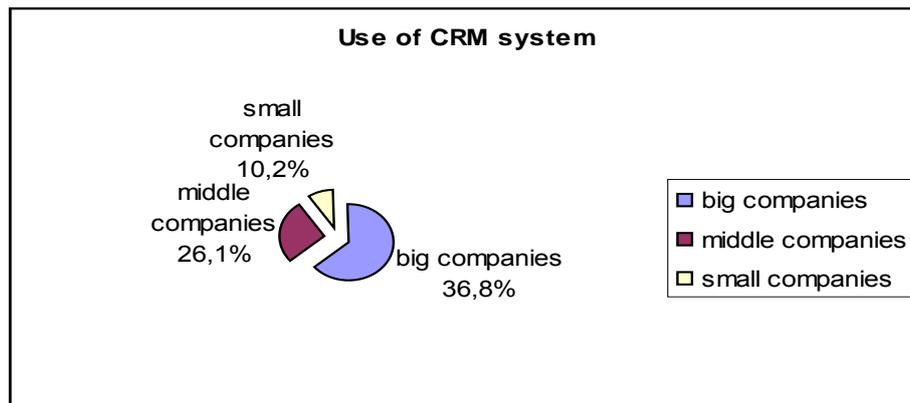


Figure 2 Use of ERP system

Banks and insurance companies use ERP system most (41.9%). They are followed by the companies providing transport, storage and communication services (15.7%). In 2009 CRM system was used by 14.1% of the surveyed companies. In January 2009 10.1% of the companies in Serbia used a CRM system which allows analysis of customer information for marketing purposes. 12.9% of the companies used CRM for entry and storage of customer information, making it available for other business services. Of the total number of analyzed companies, 36.8% of the large companies have a CRM system, as well as 26.1% of the medium-size and 10.2% of the small ones (see figure 3).



**Figure 3** Use of CRM system

This system has the biggest application in the banks and insurance companies (71%), and then transport, storage and communication companies (24.8%). In Serbia, 94.5% of the companies have Internet access (large companies 100%, medium-size 97.7%, small 93.4%), which is 3% more compared to the data from 2008. The answers to the question whether the company has its own web page vary. In Belgrade 78.2% of the companies have their own web sites, in Vojvodina 66.3%, while in Central Serbia only 55.3%. The research shows that only 19.9% of the companies which have Internet access received orders via the Internet in 2008 (e-mail orders excluded) which is a slight increase of 2.9% compared to the data from 2007.

In Republic of Serbia only 20.2% of the companies have rules that normatively regulate the issues of information security. Regarding the knowledge of information security measures, 16.8% of the companies test their employees, while 83.2% have not yet introduced this kind of a test.[6]

### 3. Conclusion

ERP enables a company to integrate data and organizational processes into a single system. The company can design its own information system if its business processes are specific, or if it uses one of the ready-made solutions (Pantheon, SAP, MS Dynamics). In the surrounding region business solutions are used on a greater scale, and it is inevitable that in the coming years more and more companies will come to realize the need for such solutions. Companies in Serbia are not aware of what a standard internationally-recognized ERP represents and what its advantages are. The situation is better than it was last year, and it is expected to improve. The foreign companies on the Serbian market also have a positive impact. Statistics show that the ERP market in Serbia will have expansion in the next few years. Standard expectations of the companies after the process of implementing software solutions are certain benefits gained after the installation itself. This approach is not applied to the ERP solution because returns on investment come from improving business processes by ERP, not just from the new applications. Today's companies that use this software worth more and have higher value. It is possible that the world's financial crisis has slowed down the course of implementation of these systems in the companies in Serbia. One source of income are funds that are little used in Serbia and which are intended for the candidate countries for the membership in the European Union.

Over time the European Union has developed a whole range of external assistance programs, which has resulted in the creation of over 30 different legal instruments based on which these aid programs are implemented. The European Commission has proposed a simpler framework for the provision of external assistance in the budget period 2007-2013. To that end, in September 2004 the European Commission proposed the establishment of a new instrument for Pre-Accession Assistance (Instrument for Pre-Accession Assistance - IPA 2007-2013), which is designed for supporting the candidate countries as well as potential candidates for EU membership[7]. IPA 2007-2013 has two main priorities: helping countries in meeting the political and economic criteria as well as those related to the adoption of EU legislation; building and strengthening the judiciary and helping the countries get prepared for the use of EU structural cohesion funds after accession to the European Union. The components of the IPA for the period 2007-2013 are: transition assistance and institution building, cross-border cooperation, regional development, human resource development and rural development.

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# Visual Analysis of Economical Ratios in Du Pont Model Using Topic Maps

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Economical ratios provide much information concerning functioning of an enterprise. These ratios are essential on condition that they are well calculated and interpreted. Their usefulness depends also on comprehension by decision-makers existing between indicators structural and semantic connections. One of suggested solutions, which allow presenting various associations between economical ratios, is the standard of topic map. This standard can be easily used for representation of financial knowledge about financial measures. In this paper, an approach to analysis of economical ratios in Du Pont model based on topic maps is presented. The managerial staff can be supported by easy-to-use tools that facilitate access to a wide range of relevant data resources. Graphical expressions can assure semantic information search and interpretation for non-technically-minded users. Thanks to visualization users can more swiftly notice and understand various structural and semantic relations. In this paper, case studies illustrating the process of designing topic maps and concept of visual data analysis are discussed. The presented topic map for return on investment (ROI) indicator has been developed in the authoring environment TM4L (Topic Maps for e-Learning). The TM4L provides support in conceptual structure design and maintenance through its editing functionality, browsing and ability to link topics to resources. This article is continuation of carried out researches on possibility of adaptation and verification the standard of topic map as method of presenting semantic associations between different economical ratios.

## Keywords

Economical ratios, Ontology, Topic map, Visual Analysis, Visualization

## 1. Introduction

In business environment, where quick and reliable access to knowledge is crucial factor of success, efficient processing of data and information resulting in acquiring new knowledge concerning enterprise becomes essential. Hence organizations are more and more interested in supporting processes of knowledge management by using information technology allowing appropriately integrating and searching it [1, p. 169].

Essential information concerning functioning of enterprise is conclusions resulting from analysis of economical ratios. Relations between analyzed indicators can be both structural and semantic. In addition knowledge of semantic connections and resulting from them information concerning functioning of enterprise is often possessed only by experienced financial analysts. Research carried out by E. Awad i H. Ghaziri, published in 2004, confirms formulated in 1995 by I. Nonaka and H. Takeuchi statement, that as much as 95 percent of information is preserved as tacit knowledge [2, p. 209]. Therefore the problems still demanding solution is the way of acquiring and representing experts' knowledge to on the one hand support searching essential information in the analysis of economical ratios, but also by appropriate processing data allows discovering new knowledge. That requires connection of two essential issues: knowledge representation in information system that would also enable to change tacit knowledge to explicit knowledge, and using besides traditional

Information searching methods solutions allowing contextual searching. More and more attention is paid on using in this scope semantic technologies such as topic map as solution that can be used to search and acquire unique information [1].

In this article a topic maps application is discussed to show the ease of analysis of economical ratios in Du Pont model. The article is structured as follows. In the next section the state-of-the-art in topic map, visualization of business information and visual data analysis is presented. Section 3 illustrates a concept of application topic map for ROI indicator in Du Pont model and case study of visual analysis of economical ratios. A number of examples of visual interpretation are presented and discussed. Finally in the last section, a summary of this work is given and a future research projects are indicated.

## **2. Related work**

### **2.1 Topic map as knowledge representation standard**

Topic map is ISO standard (13250:2003) for knowledge representation, which main aim is to organize information by semantic connections of topics. Origin of its inception was need of creating technology allowing organizing big number of information sources as part of their semantic index. Towards the end of 2001 this standard was changed to ISO 13250:2003 and is based on *eXtensible Markup Language* (XML). Topic map is abstract structure, allowing mapping knowledge from given field and enabling to look through sources connected with it [3]. Topic map can represent complex structures of knowledge bases [4], becoming useful model of knowledge representation [5, p. 174], where multiple contextual indexing can be used. That results from the structure of topic map that contains three elements: topics, associations (that is relations existing between topics) and occurrences (that is indexed sources related to given topic).

Context search is very helpful in data exploration, as well as in targeting on searching information needed at the moment. In literature new paradigm for accessing and organizing information, consisting in integration and context classification of all information from different systems is written in [1, p. 172]. Context search is more efficient than the one basic only on simple hierarchic structure (see [6, pp. 1898-1911]). Latest research point out also, that searching information basing on semantic connections in topic map have positive influence on discovering essential information [7, p. 301].

As part of one, well defined topic map application there is possibility of merging various structures, diagrams, metadata, taxonomy etc. In this way semantic net can be built above information sources, that allows to easily navigate through scattered data sources (see [8], [9]), basing only on context of information. Topic map application can in a way function as interface between user and different data sources. Such approach allows, by one data model, to access different sources, that are in organizational information systems.

Topic map standard is well fit to map ontology, which is crucial element in many practical appliances of knowledge representation. Creating topic map application allows to map ontology prepared by one as well as several experts from particular field. Essential feature, especially in the context of mapping ontology of economical ratios is possibility – without unnecessary outlays – to modify already existing topic map application. Among advantages should also be mentioned, on what L. M. Garshol pays attention, that as ISO standard it is solution independent of producer and platform, what allows organization to choose any tool to create topic map application regardless of implemented in enterprise information system [10, p. 120].

Ability to connect topics with information sources corresponding to their context that are anywhere and organizing these sources according to given ontology causes, that topic map can be “a key component of the new generation of Web-aware knowledge management solutions” [5, p. 174].

### **2.2 Visualization of business information**

Visualization is the process of representing data as a visual image (see [11, p. 24]), and is defined as “the use of computer-supported, interactive, visual representations of abstract data to amplify cognition” [12, p. 477]. In other words, visualization allows decision-makers to use their natural spatial/visual abilities to determine where further exploration should be done [13, p. 13]. Visualization techniques may help to solve the problem, because “visualization offers a link between the human eye and the computer, helping to identify patterns and to extract insights from large amounts of information” [14, p. 139].

Visualization technologies have been used in many areas of business because graphical representation of the data makes analysis easy and aids the user to make informed and quick decisions. Visualization enables to easily identify oddities in detail data, isolate them, and investigate their source much faster than with traditional analytical methods. Business information has been visualized in the form of tables, outlines, pie charts, line graphs, and bar charts for a very long time (see [15, p. 61]). Mentioned graphic methods do not meet all expectations of users of information systems because [13, p. 13]:

- today business information is typically abstract, discrete, multi-dimensional and can be either historical or generated in real-time,
- today's enterprise data is a mix of structured, unstructured, and semi-structured content, whereas users need access to it all,
- users need semantic information depicting relations between facts.

The important direction of researches concerning business information is verification of graphic methods enabling visual data exploration (see [13]). The basic idea of visual data exploration is “to present the data in some visual form, allowing the human to get insight into the data, draw conclusions, and directly interact with the data” [16, p. 100]. In this interactive process, the user is able to subsequently concentrate on the interesting data elements by filtering uninteresting data, and focusing (zooming in) on the interesting elements, until final details are available for an interesting subset of the analyzed elements (see also [17, p. 1756]). Important stage in this process is use of appropriate solutions, which allow filtering and zooming in (zoom out).

### **2.3 Visual data analysis**

In literature increasingly often visual data analysis (called also as visual analysis or visual analytics) is distinguished as part of visual data exploration. Visualization technologies are interface between user (by using his perceptual abilities) and information system. Visual analysis and visualization techniques have been proven – as said Keim and Schneidewind [18, p. 1767] – “to be of great value in analyzing and exploring such large data sets, since presenting data in an interactive, graphical form often fosters new insights, encouraging the formation and validation of new hypotheses to the end of better problem solving and gaining deeper domain knowledge”. It is possible, because visualization [14, p. 170]:

- could support interaction between users and data-the exploration of an unknown data set,
- could support interaction with the analytical process and output of a data mining system.

The process of visual data analysis consists of the following stage [19, p. 15]:

- analyze first,
- show the important,
- zoom, filter, and analyze further,
- details-on-demand.

In this interactive visual process, the user is able to subsequently concentrate on the interesting data elements by filtering uninteresting data, and focusing (zooming in) on the interesting elements, until finally details are available for an interesting subset of the analyzed elements (e.g. [17, p. 1756]). Important stage in this process is use of appropriate solutions, which allow filtering and zooming in (zoom out).

One of these visualization methods enabling visual data analysis is the topic map. It allows displaying the whole semantic network (topics and associations) efficiently, as it is essential to select the relevant information. Fundamental factors for good visualization interface of application of topic map are: the overview of the structure for the global understanding of the structure and of the relationships within the hierarchy; the ability to zoom and to select some nodes; and dynamic requests in order to filter data in real time [20]. The topic maps can be easily used to represent financial knowledge about financial measures, where graphical expressions can assure semantic information search and interpretation for non-technically-minded users. Analysis of potential possibilities of use of standard topic map for representation of financial knowledge was described in: [4], [8]. Topic map is a relatively new visualization form of the presentation of knowledge, which puts emphasis on data semantics and ease of finding desired information (see [21, p. 4]).

### 3. Case study: topic map application for ROI indicator

#### 3.1 Creating ontology of economical ratios – research problem

Essence of examining and assessing functioning of enterprise consists in appropriate calculating and using economical ratios and/or financial coming from various financial reports. Economical ratios can be an useful tool to analyze results achieved by enterprise and to plan its activity. They are also information basis in the process of decision making, but only when they are appropriately selected, counted and interpreted. Information usefulness of indicators depends on accurate understanding by decision makers logic of counting these indicators and both structural and semantic relations between them. Analysis of economical ratios is the area, in which we deal with acquiring unique knowledge that results from combination of expert's experience and tacit knowledge data processing and obtained ad hoc essential information. In general, business data contains a lot of hidden relationships and dependencies that make their usage difficult. While creating ontology for chosen fragment of analysis of economical ratios it is necessary to include to this process experts from this field, not only to agree on vocabulary and semantic structure, but also to be able to represent their tacit knowledge, which their experience [2] is from repeatedly carried out analyses of economical ratios related to decision making process.

N. Noy and D. L. McGuinness pay attention, that during creating ontology of economical ratios it is necessary of being aware, that: „There is no single correct ontology for any domain. Ontology design is a creative process and no two ontologies designed by different people would be the same” [22]. However, B. Smith notes, that “information systems ontologists have thus far not been able to develop an algorithm for the automatic conversion of income statements and balance sheets prepared on the basis of the two sets of standards” [23]. Despite these problems, it is necessary to undertake researches connected with building ontology of economical ratios in order to create topic map application for them.

Conception of usage topic map as model of knowledge concerning indicators has such advantage that created model of ontology can be relatively easily modified and simultaneously it is possible to use multiple applications based on different ontologies of particular area. This is essential, because there is no single universal system of economical ratios, which would be used in all enterprises (see [24]).

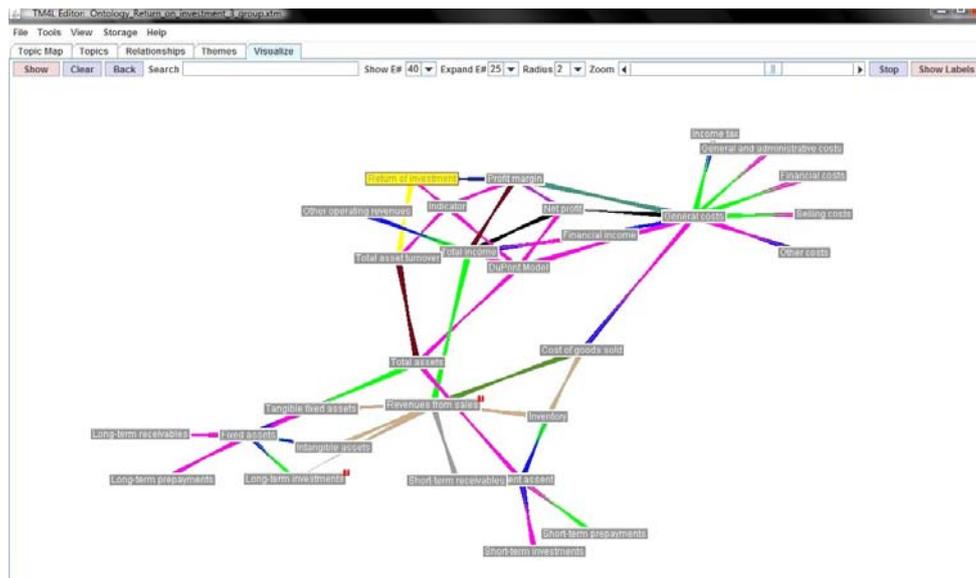
#### 3.2 The conceptualization of ontology of ROI indicator

One of stages of creating ontology of ROI indicator is conceptualization stage (procedure of creating ontology of economical ratios is described in [21]). During this stage occurs enumeration of important terms in the ontology, defining the classes and the class hierarchy, modelling of associations and indicating occurrence. It is not only important, but also difficult stage for constructing topic map application for ontology of economical ratios in Du Pont model.

During creating ontology of ROI approach middle-out was used. Firstly, most detailed terms, and then general terms were identified. At the end by repeated iteration terms acting as subclasses were assigned. Among identified terms following classes were set apart: *Total assets*, *Fixed assets*, *Current assets*, *General costs*, *Total income* and *Indicators*. Next stage of creating ontology is identification of semantic associations (b-ary and n-ary relations). Seven different types of associations are identified. Conceptualization stage of ontology of ROI indicator is wider described in [21], [24].

#### 3.3 Creating topic map application for ROI indicator

To carry out researches concerning verification of the standard of topic map as method of presenting semantic associations between different economical ratios use of program TM4L was planned. The TM4L provides support in topic maps design and maintenance through its functionality for editing, browsing and combining such structures, coupled with support for relating concepts, linking concepts to resources, external searching for resources etc. The TM4L environment consists of a TM Editor and a TM Viewer. The presented application topic map for ROI indicator in Du Pont model (Figure 1) has been developed in the authoring environment TM4L.



**Figure 1** Example of visualization of the topic map for ROI

Source: own presentation based on TM4L Editor.

### 3.4 Visual analysis of ROI indicator

Topic maps may contain a large number of concepts and associations. Filtering techniques are needed in order to select and display only relevant information. For example in the software TM4L Viewer there are three possible manners of interrogations (see [8, p. 95]):

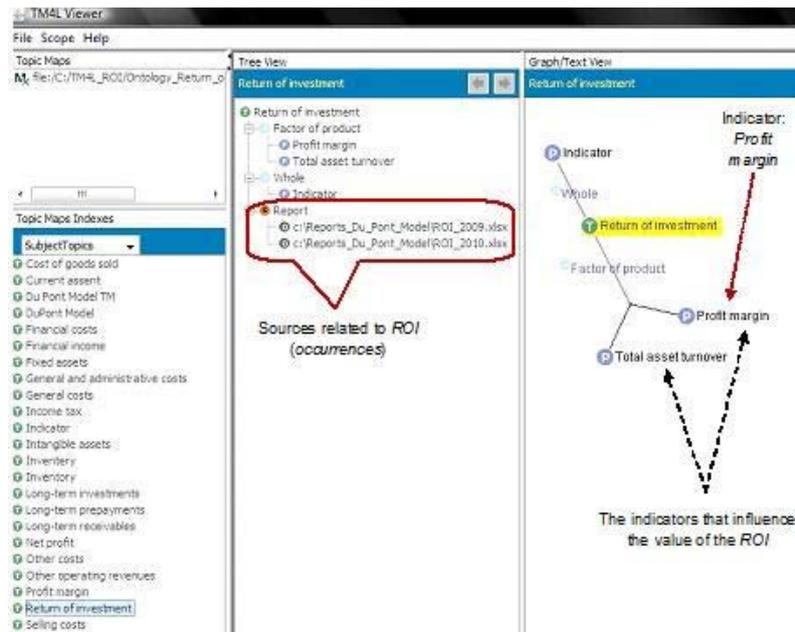
- searching by topic name and/or type,
- selecting topics from a hierarchy (tree view),
- using a custom query to display a list of valid choices (this option can make use of the current context as a part of the query).

Decision-makers by using created topic map application for ROI indicator have possibility to search data sources on account of context, where occurrences of topics refer to additional information sources. In this way they can find relations between data and on this basis get conclusions that can be for them new, unique knowledge.

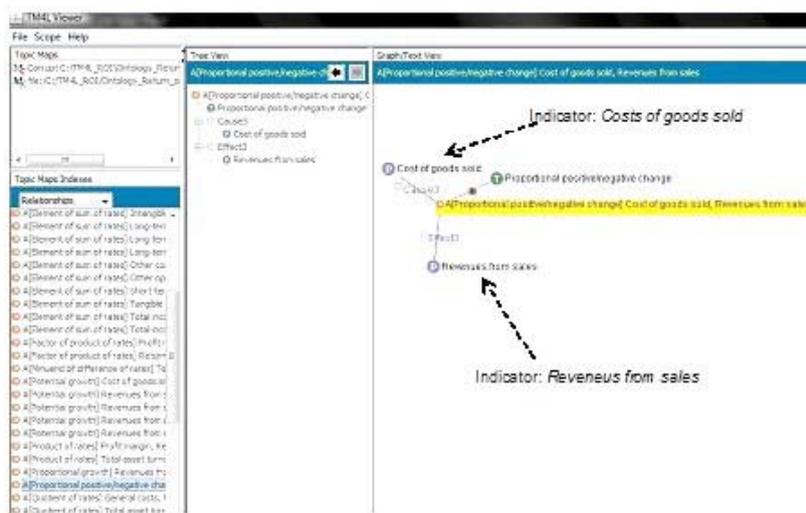
In Figure 1 a screenshot presents visualization of the semantic network of the indicator *Return of investment*. Manager starts visual analysis of ROI indicator. He wants to see the report of the data; therefore he selects the link with instance. He notices that the value of indicator decreased compared with the previous year. Managers begin the analysis of the indicators that influence the value of the ROI. After choosing the topic *Profit margin* the user receives information about this indicator and its associations. The user executing operations zoom, filter and analyze further shows *Total income* with associations. During analysis of these relations, he observes that if *Cost of goods sold* is increasing *Revenue from sales* should also increase (associations: *Proportional positive/negative change* - Figure 2 and Figure 3). User selects and browses the reports, which show that indeed *Cost of goods sold* increased, while *Revenue from sales* hasn't changed. In this way, by performing the operation zoom, filter, and details-on-demand manager finds the reason of a lower ROI compared with the previous year. In the analogous way, the user may analyze other indicators.

Created topic map application for analysis of ROI indicator according to Du Pont model allows inter alia dynamic and interactive visualization of semantic connections between indicators. Thanks to that decision-makers can use user-friendly solution facilitating obtaining information from existing in enterprise databases. In literature studies concerning using topic map to search information are elaborated. They show, that users pointed out usefulness of topic map application and its support in finding unique information (see [7]).

Described solution has shown that topic maps can be adapted to new applications and managers' needs. The managerial staff can be supported by easy-to-use tools that facilitate access to a wide range of relevant data resources. Important advantages of this application are an easy and intuitive graphical user interface.



**Figure 2** Visualization of the indicator ROI  
 Source: own presentation based on TM4L Viewer.

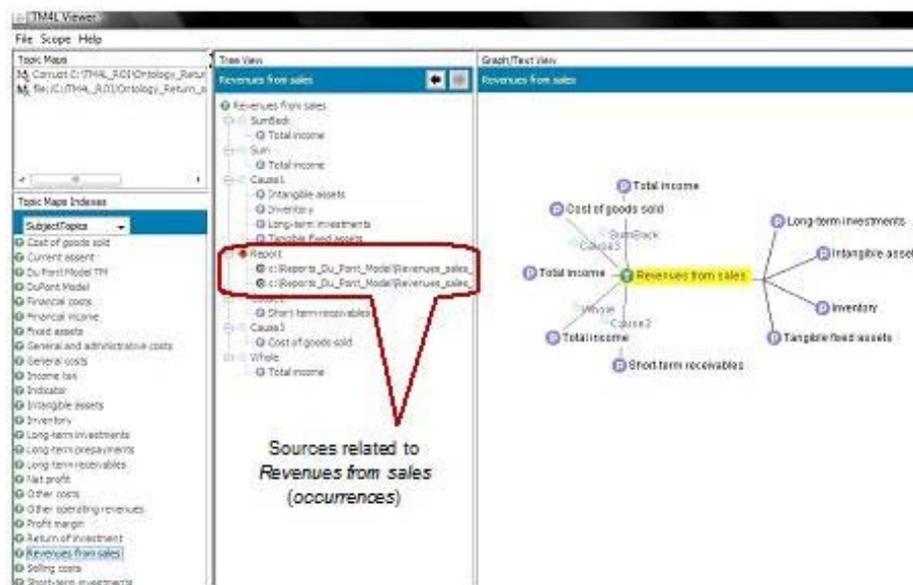


**Figure 4** Visualization of indicator *Revenue from sales*  
 Source: own presentation based on TM4L Viewer.

## 4. Conclusion and future work

Analysis of built topic map application representing Du Pont model results in statement that it serves to integrate data that are in many information systems functioning in the enterprise, often structured in a varied manner, according to logically consistent ontology. Through occurrences of topics (that is references to different data sources) decision makers have access into current information, reports presenting current enterprise's condition. In the context of carrying out analysis of functioning of enterprise it is important, that without necessity of modifying existing information system companies can create many topic map application for different models of analysis of ROI indicator, which can refer to the same information sources. Research carried out on using topic map to reproduce knowledge concerning economical ratios point out, that created model of ontology can be relatively easily modified. It is essential, a there is no single universal system of economical ratios, which would be used in all enterprises. Besides, many firms use many models of assessment of run activity basing

on analysis of various indicators. the topic maps can be easily used for representation of financial knowledge about financial measures.



**Figure 3** Visualization of the indicator ROI

Source: own presentation based on TM4L Viewer.

Information systems using field knowledge mapped basing on created will be created and developed. That will be caused by following factors: easier understanding of content by their users, common logical platform for different languages and applications, relatively easy adaptation of content and additional possibilities of searching and filtering information.

Future works will involve studying for using topic map as data model of knowledge of economical ratios will be continued in order to verify usefulness of such application allowing visualizing semantic associations for particular area of economical analysis and use of topic map application as a tool of visual exploration of data. Researches will be continued in order to verify ontology of ROI in formal and substantive respect testing created applications. Then research verifying usefulness of applying topic map standard as interface allowing to visually exploring data concerning indicators of assessment of functioning an enterprise and usefulness of application in economical analysis will be carried out.

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# **Water distribution problem in the coastal region of Albania - The improvement for strategic changes - Regional development, possibilities and barriers.**

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**Water plays an essential role in sanitation and public health. But while it helps to keep people, homes, and cities clean, water itself can also carry harmful microbial or chemical contaminants. In the United States, many water quality regulations help to ensure that drinking water is adequately treated, monitored, and managed to protect public health.**

**Democratic local governance is a prerequisite to the meaningful decentralization of infrastructure management. When people participate in defining visions for sustainable development for their communities, in formulating strategies for equitable access to services and resources and in setting priorities for action, they have endorsed. Participation also sharpens their awareness of the interrelations between economic, social and environmental issues.**

**This is a highly significant feature of infrastructure programs and carries important implications for local development. Almost everywhere problems of water scarcity can be considerably mitigated through metering, leakage detection and reduction, network improvements, disconnection of illegal connections, and optimization of storage and supply patterns.**

**The distribution problem also has a seasonal aspect: much more water is needed during the summer growing season; when rainfall is scarce, rural drinking water is often misused for irrigation; and the tourist resort areas use large amounts of water. On average, water is available only 3-4 hours per day, with certain areas receiving water only once in three days.**

**Urban areas have mostly combined sewage and storm water collection networks that discharge into near bay surface water bodies. In rural areas, only a small portion of the areas with piped water supply is equipped with sewer networks.**

**Most rural areas have individual household wastewater collection systems, principally simple pit-latrines with no drainage pipes. Upgrading of sewer networks has not kept pace with the general development of infrastructure, and the materials and technology used have not been improved. Presently, there is no treatment of wastewater in Albania; its discharge in water bodies, especially in coastal tourist areas and delicate ecosystems.**

## **Keywords**

Drinking water, Economic development, Social Leadership, Urban areas, Water distribution

Supported by donor assistance and international and local NGO's the city initiated a community-based development strategy in the informal settlement. The program brought together local government teams, NGO's and residents to formulate a development plan for the neighborhood define priorities for improvements and determine equitable cost-sharing formulas to finance infrastructure. This partnership led to the upgrading of roads and electrical networks, the construction of community buildings and schools, improved public spaces and programs. Clarifying the legal status of residential land and formalizing an urban plan resulted in the sufficient leveraging of community and household resources to provide infrastructure and build new housing.

## 1. Strength Local Government Leadership and Initiative

Decentralization has given local governments the discretion and scope they need to take a lead role in responding to the challenges of economic downturn , degradation of the urban environment, and social hardship. They institute bold initiatives and innovative practices. Western European nations have put in place sophisticated frameworks to provide local governments with technical and financial assistance. The European Union supplements these national programs with coordinated assistance aimed at promoting economic development, assisting distressed localities and fostering social inclusion. Infrastructure is an important component of these programs.

{ 2} Anthony, R. N. and Dearden, J. Management Control System, Irwin, Homewood, IL, 1980.

Despite its location in an industrialized province Jerez's economy relies on wine production which, in recent years has been declining. Weak community participation, inadequate infrastructure, poor accessibility to regional resources and an unskilled labor force compounded the effects of massive job cuts in the wine industry..

With regard to economic development the plan focuses on the development of cultural tourism and the promotion of entrepreneurial activities.

### 1.1 Oriented keys of success are seven key factors:

- A dynamic local government leadership
- A coherent strategy acted upon with determination
- A healthy climate of cooperation with business
- Local government's investment initiatives to jumpstart the stagnant economy
- Creative use EU funds to implement local policy
- Efficient municipal administration
- Coherent links among urban planning, infrastructure and economic development

## 2. Partnerships between Municipalities and NGOs

Partnerships with municipalities has provided the best channel for the participation of communities in the organized delivery of public services and paved the way for the growing role of NGO' s and CBO's in this sector in urban and rural areas and different regions of the world.

Albania, one of the smallest and poorest countries in Eastern Europe, has experienced a transition marked by sharp economic swings and periods of civil strife. The early phases of decentralization witnessed the transfer of political autonomy and limited administrative and fiscal authority, to local governments, inadequate legislation outlining central/local responsibilities, scarce financial resources and deficient infrastructure strained the capacity of local governments to manage urban services. In January 2000, the government promulgated a national Strategy for Decentralization and Local Autonomy which includes laws to strengthen the autonomy of local governments and increase their capacity to manage local infrastructure and services.

## **2.1 Supported by donor assistance and international and local NGO's the city initiated a community-based development strategy in the informal**

The program brought together local government teams, NGO's and residents to formulate a development plan for the neighborhood define priorities for improvements and determine equitable cost-sharing formulas to finance infrastructure. This partnership led to the upgrading of roads and electrical networks, the construction of community buildings and schools, improved public spaces and programs for youth. Clarifying the legal status of residential land and formalizing an urban plan resulted in the sufficient leveraging of community and household resources to provide infrastructure and build new housing.

## **2.2 Finally, the engagement of senior government officials in the dissemination of project information secured commitment among communities and farmers.**

- To work closely with Community- Based organizations so as to enhance their capacity to participate in development programs and strengthen the City Council's capacity to respond to requests from communities
- To adopt a new approach to Environmental Planning and Management based on capacity building. {1} Albania -Rural Water Supply and Sanitation Strategy 2009

The CIP upgraded infrastructure, enhanced participation and built the capacity of CBOs and stakeholders. CIP strengthened institutional capacity by establishing program offices in each community, forming steering committees made up of representatives from all stakeholder groups and formalizing institutional links between the relevant partners and information for decision-making and monitoring of performance among the stakeholders altered attitudes and understanding of roles and responsibilities. Communities have agreed to earmark part of stakeholders as partners in urban development ensures the sustainability of these assets.

## **3. Community-Based Approaches to Infrastructure Services and Neighborhood Revitalization**

This is a highly significant feature of infrastructure programs and carries important implications for local development.

Sustained political pressure and the demonstrated capacity of municipalities to manage their responsibilities were the driving forces for local administrative and fiscal autonomy. Initial assessments suggested that decentralization did improve the quality of service delivery and foster a new, user oriented attitude, facilitating the transition from a centrally planned to a market economy.

### **3.1 The act for support of local investment committed the municipality to cover 50 percent of the cost of water, sewerage and power lines, 70 percent of the cost of roadbeds and sidewalks and 100 percent of the cost of drainage and street paving.**

The cost sharing formula can be modulated to take into consideration issues of equity and cost burden. As an incentive to private rehabilitations of buildings, investors are granted a three year exemption from property taxes.

We recommended these conclusions:

- Introducing participatory planning and community-based development processes through neighborhood development committees and street representatives working in partnership with the city
- Creating an enabling environment for private investment
- Empowering citizens to pursue their own self improvement
- promoting privatization of the housing a stock and fostering the development of micro- enterprises
- Ensuring the sustainability of activities initiated
- Promoting the reliability of successful initiatives.

Albanian government will be reality these points:

- A dynamic local government leadership
- A coherent strategy acted upon with determination
- A healthy climate of cooperation with business
- Local government's investment initiatives to jumpstart the stagnant economy
- Creative use EU funds to implement local policy
- Efficient municipal administration
- Coherent links among urban planning, infrastructure and economic development.

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# Economic Crisis and Informatisation Strategies of Enterprises in Poland. Selected Results of Comparative Surveys from Years 2009-2010

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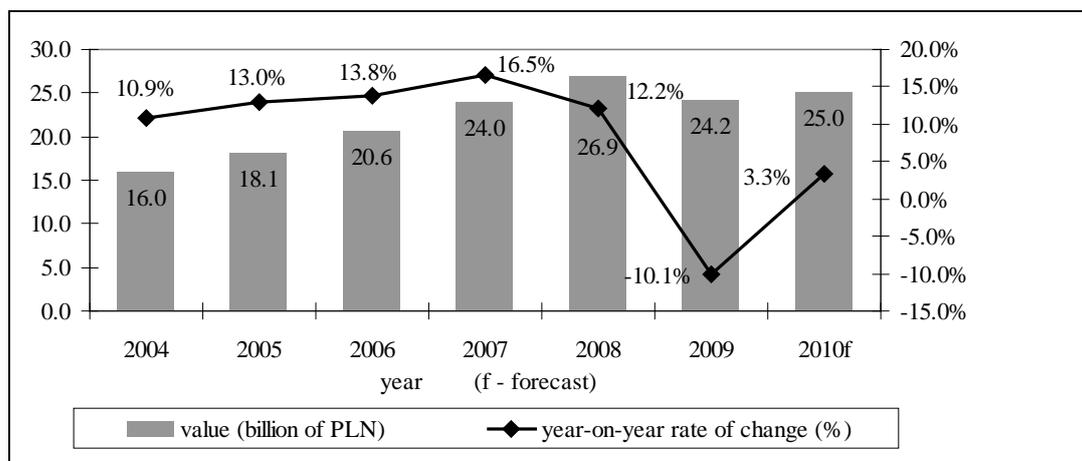
The last-year proceedings of the ICEIRD 2010 Conference contained results of a survey – carried out by the author of this paper in 2009 – which aimed at analyzing how the recent economic crisis had influenced informatisation strategies of enterprises (see [2]). In 2010 a comparative study was conducted, with an objective to determine whether any substantial differences in reference to the previously obtained results could be observed, and if yes, how intensive such changes were. This paper discusses results of the comparative surveys from years 2009-2010. The obtained results support a working hypothesis that the economic crisis affected – to smaller or greater extent – short- and long-range informatisation strategies in the majority of companies. Even if relative shares of identified variances and intensity of their visible symptoms changed from year to year, deviations were minor and referred only to selected elements of informatisation strategies or areas where IT was applied in business entities. The detailed information to that subject is included in this paper.

## Keywords

economic crisis, statistical analysis, informatisation strategies, comparative survey results

## 1. Introduction

The global financial crisis, which have been affecting the Polish economy since the second half of 2008, resulted in deteriorating economic situation in majority of companies. Evidence was provided by: current business statistics, economic and social analyses, or by monitoring tendency changes in the



**Figure 1** Value and year-on-year rate of change at IT market in Poland according to PMR data and forecasts from August 2010 (based on [9, p. 2]).

economy. Implications of the crisis were observed in information technology domain, as well. Clear signals came from producers and providers of IT products and services, and from their customers. They were also acknowledged by nearly all major companies monitoring IT industry, including: DiS, Gartner, Forrester Research, IDG or PMR. The last of the forgoing companies, for example, revised its forecasts for the Polish IT market twice in 2009, from the original 14.7% to 1.2%-growth only (see [2], [7] and [8]). The report published in August 2010 [9], which incorporated the most recent data on the value and dynamism of the Polish IT market, revealed that the situation was in fact much worse. For the first time in many years, instead of growth, a decrease (see figure 1) by 10.1% was observed (from 26.9 to 24.2 billion PLN). This situation made consulting companies examine quality and credibility of their projections and ultimately update them (see opinions and assessments included in e.g. [1], [5], [6] and [10]). All these confirmed the author's belief that it was necessary to continue the study initiated in 2009, which investigated an impact of the economic crisis on IT strategies and projects in selected companies. The same conclusion were drawn from presentation of the published outcomes of that study at several conferences where they earned marked attention ([2], [3] and [4]).

This paper will present various data breakdowns and analyses which help to assess an impact of the economic crisis on IT strategies and to detect changes observed in the two subsequent years.

## 2. Assumptions for the comparative study

Selection of the area for the comparative study followed the author's conviction that awareness of ways in which business organizations respond to the prolonging economic crisis (with the focus on IT-related activities) is important in order to counteract effects of the crisis more effectively. Such knowledge should enable the IT industry to get back on track of dynamic growth observed in recent years (see figure 1) much quicker, what is essential considering long-term strategies for developing e-society and e-economy in Poland.

The aforesaid study has an interregional reach, and reflects situation of companies located mostly in Warsaw and Mazovia or in Wroclaw and Lower Silesia. Both surveys, which provided data for the comparison, were carried out in April and May, the first in 2009 and the other in 2010. Selection of that period resulted from the author's conviction – substantiated by other sources – that at that time forecasts drawn up at the turn of 2008/2009 and 2009/2010 were modified, and already incorporated information on crisis development, figures from financial statements for years 2008 and 2009 along with data from closing reports for the first quarters of 2009 and 2010 respectively. The companies reflected the most recent data in their strategies, including those referring to IT area, by either sticking to or modifying prior plans.

The overall number of collected questionnaires amounted to 139 in 2009 and 109 in 2010. All answers formed a repository of 248 sets of data, each comprising: 38 quantitative and qualitative characteristics describing how the economic crisis affected IT strategies and what changes in strategies were adopted, 6 descriptive and typological features of the surveyed objects, and 5 other which allowed to verify collected data. The repository contains data on a very diverse group of companies, which differs from year to year. A detailed presentation of that group is, therefore, required.

## 3. General characteristics of the surveyed objects

Before selected results of the study are discussed, the surveyed objects will be presented in brief. The table 1 presents a breakdown of objects examined in 2009 and in 2010 by their areas of operations and sizes. It includes: importance of clusters in the whole samples, dominating values (cells with digits in bold), and substantial differences between the two examined years (cells shaded in grey).

The information presented in table 1 requires short comment. Considering areas of operation, the category "other" prevails (despite observed decrease of its share by 14.71%, from 53.24% of answers in 2009 to 38.53% in 2010), what was a consequence of professional profiles of students who carried out the surveys. This group included mostly IT companies (58.67% in 2009 and 48.84% in 2010) but also telecommunication ones (10.67% in 2009 and 13.95% in 2010). This means that the ICT industry amounted to 69.33% in 2009 and to 60.47% in 2010 of all objects belonging to the category "other sector". It should be noticed that distinct differences (exceeding 2.5% – see cells shaded in grey) between year 2009 and 2010 were observed – beside previously mentioned category "other" – in relation to the following groups: "public administration" (increase by 4.61% in 2010 in relation to 2009), "banking, finance, insurance" (growth by 5.85%) and "industry" (gain by 2.84%).

**Table 1** Structures of the objects by sector and by size – the comparative analysis.

Sector	Object size* (percentage in surveyed objects)										Total	
	micro		small		medium		large		the largest		2009	2010
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010		
public administration	0.00	0.00	0.72	1.83	2.88	4.59	2.16	1.83	<b>4.32</b>	<b>6.42</b>	10.07	14.68
banking, finance, insurance	0.00	0.00	0.00	0.00	1.44	0.92	2.16	5.50	<b>4.32</b>	<b>7.34</b>	7.91	13.76
commerce (commodity trade)	2.88	4.59	<b>5.04</b>	<b>5.50</b>	3.60	3.67	2.16	0.00	1.44	1.83	15.11	15.60
industry	0.00	0.00	1.44	<b>6.42</b>	4.32	3.67	5.04	4.59	2.88	1.83	13.67	16.51
other	8.63	5.50	<b>12.95</b>	<b>10.09</b>	12.23	7.34	11.51	6.42	7.91	9.17	<b>53.24</b>	<b>38.53</b>
Total	11.51	10.09	20.14	23.85	<b>24.46</b>	20.18	23.02	18.35	20.86	<b>27.52</b>	100.00	100.00

\*Sizes of institutions were determined in a simplified manner, and considered number of employees only.

With regard to size, similar shares of objects belonging to: small-, medium-, large- and the largest-sized enterprises can be observed (18.35%÷27.52%). Some changes in composition of the samples should be noticed, though. They include both increases (the share of small objects went up by 3.71% and that of the largest ones by 6.66% in 2010) and declines (the number of medium sized entities went down by 4.28% and that of large ones by 4.67% within one year time). A number of microenterprises was relatively smaller (11.51% of the sample in 2009 and 10.09% in 2010). The situation differs slightly from sector to sector, in particular in case of financial institutions where the largest objects dominate (54.55% of that sector in 2009 and 53.33% in 2010). The author is aware that the samples reflect neither sector- nor size-related profiles of the Polish economy (in both years). Having considered basic characteristics of the surveyed objects, the following parts of the paper will analyze influence of the crisis on economic situation of these companies and institutions.

#### 4. Assessing influence of the crisis on economic situation of the surveyed objects

The table 2 compares industrial profiles of the examined objects with evaluation of an impact which the crisis had on their economic situation. The assessments were based on a 5-grade scale. Considering information presented in the table 2, it can be observed (see cells with bold digits) that the most frequent response was that a situation of an object became “slightly worse” (51.8% of all the answers in 2009 and 53.21% in 2010). Nevertheless, the significant share (32.37% in 2009 and

**Table 2** Structures of the objects by sector and by impact of the crisis on their economic situation – the comparative analysis.

Sector	Impact of the crisis on economic situation of an object										Total	
	it is much worse		it is slightly worse		nothing has changed		it is slightly better		it is much better		2009	2010
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010		
public administration	0.00	2.75	<b>5.04</b>	<b>7.34</b>	<b>5.04</b>	3.67	0.00	0.92	0.00	0.00	10.07	14.68
banking, finance, insurance	2.16	2.75	<b>3.60</b>	<b>6.42</b>	2.16	3.67	0.00	1.83	0.00	0.00	7.91	13.76
commerce (commodity trade)	1.44	0.00	<b>8.63</b>	<b>10.09</b>	4.32	4.59	0.72	0.92	0.00	0.00	15.11	15.60
industry	0.00	2.75	<b>8.63</b>	<b>9.17</b>	4.32	3.67	0.72	0.92	0.00	0.00	13.67	16.51
other	2.88	2.75	<b>25.90</b>	<b>20.18</b>	16.55	8.26	7.91	5.50	0.00	1.83	<b>53.24</b>	<b>38.53</b>
Total	6.47	11.01	<b>51.80</b>	<b>53.21</b>	32.37	23.85	9.35	10.09	0.00	1.83	100.00	100.00

23.85% in 2010) of responses suggested a stable economic position. It is worth pointing out that in this last group a decrease of 8.52% in comparison to the previous year was observed. Considering

also a growing share (by 4.53%) of responses: “it is much worse”, it can be stated that the economic crises still affects the surveyed objects. In relation to sectors, the most acute deterioration of the economic situation was noticed in the following three domains: “public administration” (increased share of negative assessments by 18.75% to the previous year), “industry” (growth by 9.06%) and “other” (increase by 5.47%). The biggest increase in share of neutral or positive assessments was noted in the “banking, finance, insurance” cluster (by 10.23%).

**Table 3** Structures of the objects by size and by impact of the crisis on their economic situation – the comparative analysis.

Object size	Impact of the crisis on economic situation of an object										Total	
	it is much worse		it is slightly worse		nothing has changed		it is slightly better		it is much better			
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
micro	1.44	0.92	<b>7.19</b>	3.67	1.44	<b>4.59</b>	1.44	0.92	0.00	0.00	11.51	10.09
small	0.72	1.83	<b>7.91</b>	<b>12.84</b>	<b>8.63</b>	8.26	2.88	0.92	0.00	0.00	20.14	23.85
medium	2.16	0.92	<b>11.51</b>	<b>10.09</b>	8.63	6.42	2.16	1.83	0.00	0.92	<b>24.46</b>	20.18
large	1.44	3.67	<b>11.51</b>	<b>11.01</b>	7.19	0.92	2.88	2.75	0.00	0.00	23.02	18.35
the largest	0.72	3.67	<b>13.67</b>	<b>15.60</b>	6.47	3.67	0.00	3.67	0.00	0.92	20.86	<b>27.52</b>

The table 3, in turn, compares size of the surveyed objects with assessments of an impact of the crisis on their economic situation. Considering information presented in that table, it can be noticed that the most acute deterioration of the economic situation was observed among “small” and “large” objects (increased share of negative assessments by 18.68% and by 23.75% respectively in relation to the previous year). On the other hand, the highest increase in share (by 29.55%) of neutral or positive assessments was observed in the “micro” cluster.

Having considered all basic characteristics of the impact of the crisis on economic situation of the surveyed objects, the following parts of the paper may focus on analyzing influence of the economic crisis on IT strategies – what is the major point of interest of this publication.

## 5. Assessing Influence of the crisis on informatisation strategies

Results of the analysis, showing how the economic crisis affected informatisation strategies, will be presented in the following sequence. In the beginning it will be examined whether – and, if yes, than to what extent – informatisation strategies were modified; firstly, in particular industries (table 4), secondly, in objects of certain sizes (table 5), and thirdly, in objects grouped according to informatisation levels (table 6). Subsequently, it will be analyzed in what ways changes in economic situation of companies influenced their informatisation strategies and ongoing IT projects (table 7). The following tables present: importance of clusters in the whole sample, dominating values (cells with bold digits), and important differences between the two years of the survey (cells shaded in grey).

**Table 4** Influence of the economic crisis on informatisation strategies and projects in the objects according to sectors – the comparative analysis.

Sector	Influence of the economic crisis on IT strategies and projects						Total	
	no change		slight change		radical change			
	2009	2010	2009	2010	2009	2010	2009	2010
public administration	2.88	4.59	<b>6.47</b>	<b>9.17</b>	0.72	0.92	10.07	14.68
banking, finance, insurance	1.44	0.92	<b>4.32</b>	<b>13.76</b>	2.16	0.00	7.91	14.68
commerce (commodity trade)	5.04	6.42	<b>8.63</b>	<b>9.17</b>	1.44	0.00	15.11	15.60
industry	6.47	3.67	<b>7.19</b>	<b>12.84</b>	0.00	0.00	13.67	16.51
other	20.86	11.01	<b>28.78</b>	<b>21.10</b>	3.60	6.42	53.24	38.53
Total	36.69	26.61	<b>55.40</b>	<b>66.06</b>	7.91	7.34	100.00	100.00

**Table 5** Influence of the economic crisis on informatisation strategies and projects in the objects according to their sizes – the comparative analysis.

Object size	Influence of the economic crisis on IT strategies and projects						Total	
	no change		slight change		radical change		2009	2010
	2009	2010	2009	2010	2009	2010		
micro	4.32	<b>4.59</b>	<b>6.47</b>	<b>4.59</b>	0.72	0.92	11.51	10.09
small	8.63	4.59	<b>10.79</b>	<b>18.35</b>	0.72	0.92	20.14	23.85
medium	5.76	<b>11.01</b>	<b>16.55</b>	9.17	2.16	0.00	<b>24.46</b>	20.18
large	<b>12.23</b>	1.83	9.35	<b>13.76</b>	1.44	2.75	23.02	18.35
the largest	5.76	4.59	<b>12.23</b>	<b>20.18</b>	2.88	2.75	20.86	<b>27.52</b>

**Table 6** Influence of the economic crisis on informatisation strategies and projects in the objects according to their informatisation levels – the comparative analysis.

Informatisation level	Influence of the economic crisis on IT strategies and projects						Total	
	no change		slight change		radical change		2009	2010
	2009	2010	2009	2010	2009	2010		
low ( $\geq 30\%$ )	<b>2.16</b>	0.00	0.00	<b>1.83</b>	0.00	0.00	2.16	1.83
some ( $\geq 45\%$ )	<b>2.16</b>	<b>2.75</b>	<b>2.16</b>	0.92	0.72	0.00	5.04	3.67
medium ( $\geq 60\%$ )	4.32	3.67	<b>11.51</b>	<b>10.09</b>	0.72	0.00	16.55	13.76
high ( $\geq 75\%$ )	12.95	7.34	<b>17.99</b>	<b>22.02</b>	2.88	1.83	33.81	31.19
very high ( $\geq 90\%$ )	15.11	12.84	<b>23.74</b>	<b>31.19</b>	3.60	5.50	<b>42.45</b>	<b>49.54</b>

**Table 7** Crisis-related changes in economic situation of the objects and their influence on informatisation strategies and projects – the comparative analysis.

Impact of the crisis on economic situation of an object	Influence of the economic crisis on IT strategies and projects						Total	
	no change		slight change		radical change		2009	2010
	2009	2010	2009	2010	2009	2010		
it is much worse	0.72	0.00	1.44	<b>9.17</b>	<b>4.32</b>	1.83	6.47	11.01
it is slightly worse	10.07	10.09	<b>38.85</b>	<b>40.37</b>	2.88	2.75	<b>51.80</b>	<b>53.21</b>
nothing has changed	<b>20.83</b>	<b>13.76</b>	10.79	9.17	0.72	0.92	32.37	23.85
it is slightly better	<b>5.04</b>	0.92	4.32	<b>7.34</b>	0.00	1.83	9.35	10.09
it is much better	0.00	1.83	0.00	0.00	0.00	0.00	0.00	1.83

The data presented in tables 4-7 requires explanation.

First of all, the study shows (see the cells with bold digits in the table 4) that as much as 63.31% (in 2009) and 73.39% (in 2010) of the surveyed objects adjusted their informatisation strategies and IT projects due to the crisis ("slightly": 55.40% in 2009 and 66.06% in 2010; "in a radical way": 7.91% in 2009 and 7.34% in 2010). This substantiates results of similar analyses carried out in 2009 and 2010 (see [2], [7] and [9]). Considering data from the table 5 (see shadowed cells in the 'Total' row) material changes in answers received in subsequent years can be noticed. On the one hand, the number of objects reporting "slight changes" increased in 2010 (by 10.66%), and on the other one, the share of answers indicating "no change" decreased at a similar rate (by 10.09%). Secondly, the data collected shows that influence of the crisis on informatisation strategies and IT projects was only partially related to sectors where the objects operated. Intensity and direction of observed changes differ between sectors and groups of answers (see shadowed cells in the table 4, depicting the biggest changes from year to year). Thirdly, a similar conclusion may be drawn in reference to the relation between the crisis and sizes of objects (see cells with bold digits and shaded cells in the table 5). The fourth conclusion is that an impact of the crisis on informatisation strategies and IT projects is more visible among objects characterized by higher level of informatisation (see shaded range in table 6). Nevertheless, the changes were recognized as "slight" both in 2009 and in 2010. Finally – as expected – a scope of adjustments in informatisation strategies and in IT projects was correlated with a magnitude of change in economic situation of an object. The growing tendency can be detected among objects declaring evolutionary ("slight") changes in their informatisation strategies and IT projects. It refers (see table 7)

both to deteriorating (“much worse” or “slightly worse” indications were more frequent by 9.25%) and to improving economic situation (the answer “slightly better” was more frequent by 3.02%).

The following parts of the paper will identify and depict the most important symptoms of changes in informatisation strategies in reference both to the whole analyzed group and to those object where IT strategies were modified.

## 6. Symptoms of changes in informatisation strategies and in IT projects

The data collected in both studies enabled to detect and structure major symptoms of changes in informatisation strategies and in IT projects, which resulted from the crisis. It should be added that these symptoms were identified by the surveyed objects with a help of a predefined list. The list was open, nevertheless, only 6 of all the objects (i.e. 139 in 2009 and 109 w 2010) presented other reasons than defined. By compiling the list of the symptoms (table 8, column 1), the author considered various studies (see [2, p. 85]). The surveyed objects were asked to select all relevant symptoms. The table 8 present structures of responses in the whole analyzed group (columns 2 and 3) and for those objects only where changes – either slight of radical – in IT strategies took place (columns 4 and 5). Dominating values (those exceeding 20% of indications) were marked – like in previous tables – in a bold type, and substantial changes (over 5%) between results from 2009 and 2010 were shaded.

**Table 8** Structures of identified symptoms of changes in informatisation strategies for the entire group of objects – the comparative analysis.

Identified symptoms of changes in informatisation strategies	Percentage share of particular symptoms			
	all objects		objects which modified their strategies	
	2009	2010	2009	2010
a budget of an IT department was reduced	<b>25.90</b>	<b>28.44</b>	<b>38.64</b>	<b>38.75</b>
spendings related to IT investments decreased	<b>30.94</b>	<b>30.28</b>	<b>48.86</b>	<b>41.25</b>
new projects were abandoned	13.67	6.42	<b>21.59</b>	8.75
ongoing projects were stopped	7.19	7.34	11.36	10.00
a scope of projects was reduced	13.67	13.76	<b>21.59</b>	18.75
IT investments were postponed	<b>20.86</b>	<b>38.53</b>	<b>32.95</b>	<b>52.50</b>
IT services outsourcing was intensified	2.88	4.59	3.41	6.25
IT personnel was made redundant	15.83	16.51	<b>23.86</b>	<b>22.50</b>
IT seminars and trainings were cut	<b>33.09</b>	<b>33.03</b>	<b>51.14</b>	<b>45.00</b>
IT was financed with external sources	1.44	3.67	2.27	3.75
IT costs were streamlined (using TCO)	15.83	<b>22.94</b>	<b>25.00</b>	<b>31.25</b>
other, namely...	4.32	5.50	5.68	6.25

Referring to data depicted in table 8 (columns 2 and 3) it should be noticed that the surveyed objects declared the following symptoms of informatisation strategy changes the most frequently (they appeared in over 20% of questionnaires): reduced number of IT seminars and trainings (33.09% of questionnaires in 2009 and 33.03% in 2010), decreasing spendings on IT investments (30.94% in 2009 and 30.28% in 2010), reduced budgets of IT departments (25.90% in 2009 and 28.44% in 2010), postponed IT investments (20.86% in 2009 and 38.63% in 2010) and IT cost streamlining initiatives using TCO (22.94%-level, which exceeds the said 20%-threshold only in 2010). When the data are analyzed, and values from subsequent years compared, several facts become visible. Firstly, the biggest increase in indications (by as much as 17.67%) refers to the situation when “IT investments were postponed” – which was also the most frequently selected answer by the surveyed companies in 2010. Secondly, the biggest decrease (by 7.25%) in indications, in relation to the previous year, refers to the situation when “new projects were abandoned”. All these confirm observations of many researchers (see e.g. [1], [5], [9] and [10]), who pointed out significant reduction in number and value of new projects in all sectors except for “public administration”. Thirdly, an increased share (by 7.11%) of objects declaring that their “IT costs were streamlined (using TCO)” is also worth mentioning. This is a proof that awareness of this issue has grown recently. Finally, the low significance of IT services outsourcing (only 2.88% in 2009 and 4.59% in 2010) along with limited external financing (1.44% in

2009 and 3.67% in 2010) are unpleasant surprises. In particular the latter figure is disappointing, considering significant funds for fostering innovations (including ICT) available within EU and nationwide frameworks for financial support. The results obtained in the group of organizations which declared changes in their informatisation strategies were similar, and differed only – what is obvious – in percentage levels (see table 8, columns 4 and 5).

**Table 9** Intensity of symptoms of IT strategy changes (quantitative and monetary assessments) for the objects which modified their strategies – the comparative analysis.

Symptoms of informatisation strategy changes in the objects which modified their IT strategies	„Intensity” of IT strategy changes (quantitative and monetary assessments)									
	substantial decrease		decrease		no changes		increase		substantial increase	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
IT investment budgets	7.95	8.75	<b>53.41</b>	<b>53.75</b>	31.82	21.25	6.82	13.75	0.00	2.50
current spendings on IT	2.27	6.25	<b>48.86</b>	<b>45.00</b>	43.18	28.75	5.68	16.25	0.00	3.75
purchases of equipment for IT department	18.18	8.75	35.23	33.75	<b>39.77</b>	<b>42.50</b>	4.55	12.50	2.27	2.50
purchases of equipment for end-users	10.23	6.25	32.95	18.75	<b>50.00</b>	<b>63.75</b>	4.55	8.75	2.27	2.50
software purchases	11.36	7.50	27.27	27.50	<b>54.55</b>	<b>48.75</b>	5.68	12.50	1.14	3.75
purchases of application software/systems	7.95	3.75	31.82	26.25	<b>50.00</b>	<b>50.00</b>	7.95	16.25	2.27	3.75
purchases of external services	5.68	1.25	27.27	28.75	<b>61.36</b>	<b>47.50</b>	4.55	20.00	1.14	2.50
own projects (carried out by IT department)	3.41	2.50	19.32	8.75	<b>56.82</b>	<b>61.25</b>	18.18	20.00	2.27	7.50
project implementation	5.68	0.00	27.27	21.25	<b>56.82</b>	<b>57.50</b>	9.09	20.00	1.14	1.25
outsourcing projects	5.68	0.00	21.59	15.00	<b>63.64</b>	<b>63.75</b>	9.09	18.75	0.00	2.50
IT seminars and trainings	18.18	20.00	<b>40.91</b>	<b>33.75</b>	<b>38.64</b>	<b>31.25</b>	2.27	11.25	0.00	3.75

Apart from identifying symptoms of IT strategy changes, the study covered also quantitative and monetary characteristics which reflected „intensity” of such changes. This part of the questionnaire used a 5-grade scale of quantitative and monetary assessments. The surveyed objects declared „intensity” of particular symptoms as: „substantial decrease”, „decrease”, „no changes”, „increase”, „substantial increase”. Among the objects which modified their IT strategies the most significant decreases were observed in (see table 9): IT investment budgets (61.36% of answers in 2009 and 62.50% in 2010 indicated „decrease” or „substantial decrease”), seminars and trainings (59.09% and 53.75% respectively), equipment purchases for IT departments (53.41% in 2009 and only 42.50% in 2010) and current spendings on IT (51.14% and 51.25% respectively). It should be emphasized that in 2010 a number of answers indicating „decrease” or „substantial decrease” went down in case of nearly all the symptoms, and the most significant changes in relation to the previous year included „purchases of equipment for end-users” (by 18.18%). On the other hand, in 2009 a noticeable growth (by 15%) could be observed only in case of projects carried out by own IT departments (20.45% of answers indicated „increase” or „substantial increase”), whereas in 2010 such growth was observed for 10 out of 11 symptoms. The most frequent indications of „increase” were related to the following options: „own projects, carried out by IT department” (27,50%), „purchases of external services” (22.50%), „project implementation” and „outsourcing projects” (21,25% each), „current spendings on IT” and „purchases of application software/systems” (20.00% each). It is worth mentioning that in 2010 shares of answers indicating „increase” or „substantial increase” went up for nearly all the symptoms in relation to the previous year. The most significant changes included: „purchases of external services” (by 16.82%), „current spendings on IT” (by 14.32%), „IT seminars and trainings” (by 12.73%), „outsourcing projects” (by 12.16%) and „project implementation” (by 11.02%).

## 7. Conclusions

The selected results from analyzing data collected in the comparative surveys carried out in April 2009 and May 2010, with a focus on an impact of the economic crisis on informatisation strategies and IT projects, entitle to formulate the following conclusions.

Firstly, the results supported the working hypothesis that the economic crises affected, to smaller or greater extent, long- and short-term informatisation strategies in most of the examined objects. Observed modifications in IT strategies (in 63.31% of all the surveyed objects in 2009 and 73.39% in 2010) are the most evident indicator of this situation.

Secondly, the observed frequency and magnitude of changes in IT strategies was – as expected – correlated with informatisation level (see table 6). It is worth mentioning that this correlation was stronger in 2010 than the year before. The major symptoms of IT strategy and projects modifications were similar in subsequent years (see table 8).

Thirdly, in 2010 the number of indications on negative changes, including “decreases” and “substantial decreases” went down in comparison to the previous year with regard to most of the symptoms for IT strategy modifications (see table 9). The aforementioned data substantiate observations included in other reports and analyses, and depicted by Jadczyk [5] in the title of his study: “The Polish IT market – 2009 debacle! 2010 – new hope”.

The author believes, that by monitoring behavior of companies and their responses to the economic crisis in IT domain, and observing changes in this respect in the two subsequent years, the following two objectives were achieved. On the one hand, the findings presented in other reports and analyses were confirmed and supplemented, and on the other one – due to new pieces of evidence gained – negative consequences of the crisis in IT area may be effectively counterbalanced.

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# Science-based Incubators Linked with Universities

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**Key features of pre-incubation in higher education institutes are analysed, by examining good practices in supporting potential entrepreneurs to turn a science or technology-based business idea into a viable business. Recommendations for transferring good practice elements of pre-incubation are presented, focusing on environments with specific contextual characteristics of entrepreneurship, policy making and innovation system, as in the case of a Greek region.**

## Keywords

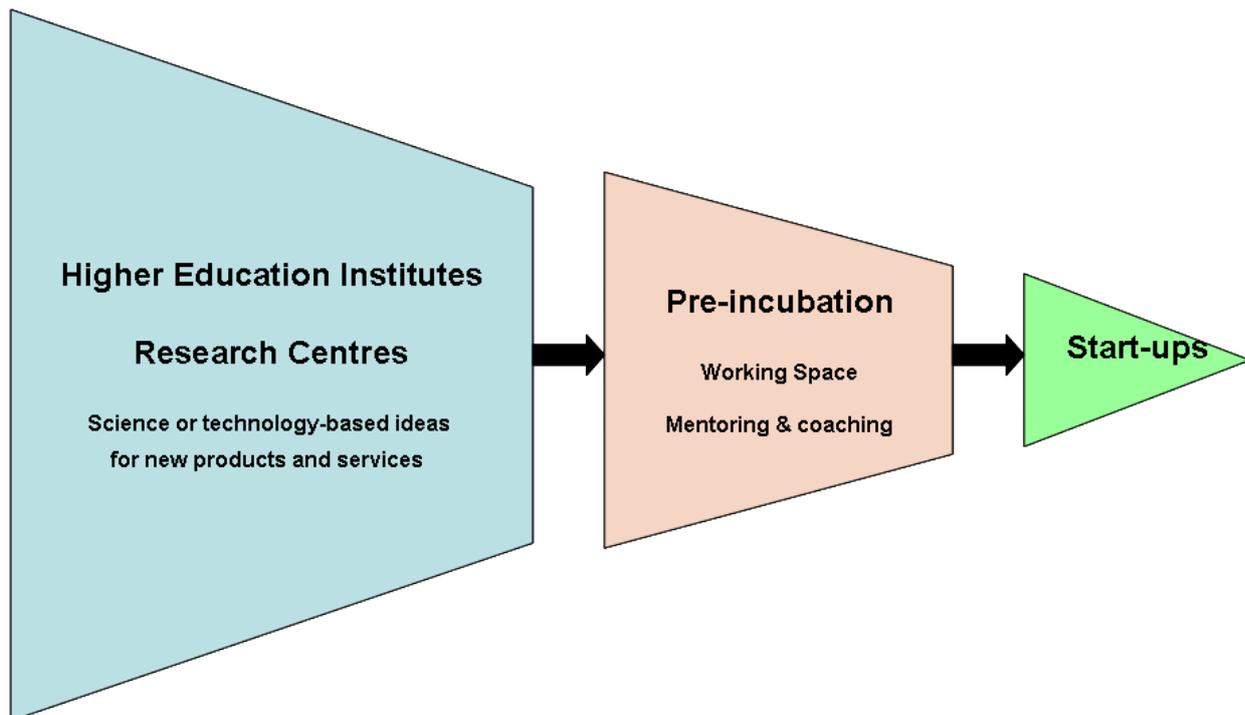
Entrepreneurship, Innovation, Pre-incubation, Start-ups, Spin-offs

## 1. Introduction

The higher education institutes are expected to play a new role in society, in addition to teaching and research, by applying a third mission of contributing to economic development. They can contribute to entrepreneurship both indirectly, through education of potential entrepreneurs, and directly by commercialization of research results. The research conducted at higher education institutes is a source of ideas with potential for commercialization that has not been fully utilised in most cases. Moreover, the traditional focus in entrepreneurship education is seen as inadequate. There is an increased focus on the context and learning by doing, which implies involvement of students in working on real business cases, from case-based teaching to real start-ups, and finally in starting their own company [1]. The pre-incubator model, linked with higher education institutes, is one mechanism that supports both commercialization of research and entrepreneurial education through learning by doing.

## 2. The Pre-incubation Concept

In the higher education environment, pre-incubators are seen as a necessary facility to fill the gap that exists between higher education establishments and science-based business incubators. As opposed to business incubators, which offer support to new enterprises already established, pre-incubators offer services and support at a very early stage of the start-up process until the establishment of the new start-up (Figure 1). The target groups of a pre-incubator are students, young graduates and researchers of higher education institutes. The objective of pre-incubation is to support future entrepreneurs from the academic environment to establish and manage a successful business, leading to the creation of viable start-ups, the increase of spin-offs from the academic environment and in general the creation of an entrepreneurial culture in higher education. A pre-incubation process is often part of the services offered by a science-based business incubator that is linked to a higher education institute.



**Figure 1** Following the Entrepreneurial Path in the Academic Environment

The first European pre-incubator was established in 1997 at the University of Bielefeld in Germany. The pre-incubator was designed to qualify and coach academic entrepreneurs, increase the number of sustainability of the spin-offs from the University of Bielefeld and to foster the entrepreneurial spirit at the university. The USINE project experimented in transferring the model of Bielefeld pre-incubation across national borders and led to the creation of two regional pre-incubators, one at the Universidad Politecnica de Valencia in Spain and the other at the Ecole Polytechnique in France [2].

In Finland, incubation activities seem to be well established too, including pre-incubation as part of a wider organization or process. Due to their special character as facilitators of start-ups from higher education pre-incubators are mainly located in the higher education institutes. Examples of pre-incubation in the Finish polytechnics and universities include the pre-incubators of Jyväskylä Polytechnic, Satakunta Polytechnic, Turku Polytechnic, University of Tampere, Helsinki University of Technology etc [3].

In Sweden, the interest for entrepreneurship has been significantly growing since the 1990s. A significant number of higher education institutes in Sweden offer entrepreneurship education, which does not focus on traditional teaching of individuals, but has increased the focus on active involvement of the students in commercializing research and new venture creation [1]. A specific example is the case of Jonköping University, which provides a course to all students, where teams of students can establish their own company, parallel to their study. The students get access to experienced mentors and relevant teaching activities during the study. Many activities are coordinated by Creative Center, which is a non-profit organization at the university that runs the Business Lab, a pre-incubator where persons get an environment to explore the potential of their ideas. With more than 200 student start-ups during a period of 5 years, it can be viewed as an implementation of a business generation model of entrepreneurship education, where learning by doing and student involvement is the core activity.

### 3. Key Elements of Good Practice in Pre-incubation

Key elements of good practice of pre-incubation in European higher education institutes have been identified, which can be transferred in other contexts and environments. The pre-incubation elements of good practice are focusing on strategic issues, such as stakeholders and benefits, intellectual property rights, facilities and services, and operational issues, such as legal status, management structure, cost, resources, selection procedures.

### **3.1 Stakeholders and benefits**

The main stakeholders in the pre-incubation process are:

- The *higher education institutes* that are interested in supporting the commercialization process of science or technology-based ideas generated by students, young graduates and researchers
- *Potential entrepreneurs*, rising from the higher education environment, who need to be assisted to move from study into work by following the entrepreneurial path

Through the pre-incubation process, potential entrepreneurs are getting the opportunities and skills needed to grow and develop their business idea, aiming for their business to be successful and reach a state where they will not need the pre-incubator's support any longer. Moreover, the pre-incubation process can also be seen as a way of filtering out non-viable business ideas.

It should be noted that the pre-incubation process is a staging post in a long process starting from an idea for a science or technology-based product or service to the commercialization of that idea. Many cases that are suitable for pre-incubation may not generate significant returns for the higher education institute but there can be additional significant gains for the regional economy, such as giving rise to sustainable science or technology-based companies within the region.

For this reason, other regional stakeholders may be involved in the pre-incubation process, including:

- Regional authorities or regional development agencies
- Other relevant structures such as regional innovation or entrepreneurship centres that offer business support services or business incubators, publicly funded or commercially owned
- Other forms of private capital

### **3.2 Facilities and services**

The added-value of pre-incubation is the capacity to test the market of a business idea before the company formation, by offering learning based on experience and therefore lowering the risk of market failure. For this reason, pre-incubation comprises a set of core features, including:

- *Space and facilities*, either real or virtual, that may include:
  - Working space for the potential entrepreneurs in order to develop their idea
  - Shared facilities, such as Information and Communication Technologies infrastructure, meeting room access, laboratory access etc
  - Information and communication tools allowing interaction with other entrepreneurs, experts and the pre-incubation management
  - Virtual space to provide advice and support
- *Support* for the potential entrepreneurs to develop their ideas into viable businesses, that may include:
  - Testing if there is a market for the idea
  - Linking into specialist networks and expertise
  - Producing prototypes
  - Forming a business plan
  - Training in business skills and requirements
  - Assistance with the formalities of establishing a new company

### **3.3 Intellectual property rights**

There are several strategic issues surrounding intellectual property generated by research conducted using the facilities and resources of the higher education institute. A key issue is the chosen commercialization route, since there may be a potential conflict between the interests of the individual and those of the higher education institute. The academic may wish to start a company while his/ her institution may prefer another route to commercialization. The potential for conflict of interest is greater where there is intellectual property that belongs to the higher education institute.

Best practice suggests that the pre-incubator should gain experience in negotiating on behalf of the potential entrepreneur towards a position where both parties benefit. Intellectual property issues should be dealt at an early stage and negotiations should be based on mutual respect and trust, leading to the establishment of clear and detailed boundaries of the intellectual property.

### **3.4 Legal and management structure**

Pre-incubators are usually established as part of bigger host organizations: higher education institutes, technology centres or business incubators. If the pre-incubator is established as a separate entity it has the ability to act as an autonomous organization, creating its own corporate identity. In most cases, the higher education institute seeks to build pre-incubator ownership models to share investment costs with regional authorities.

The management team should undertake the overall management and commercial activities of the pre-incubator. The core expertise of the management team should include company/ financial management and accounting expertise, transaction/ negotiating expertise and general marketing expertise. The pre-incubator should have the right networks to be able to access any specific expertise needed that the pre-incubator cannot have in-house.

### **3.5 Cost and resources**

Regarding the cost of pre-incubation, flexible options are usually available so that pre-incubation space and support can be used in a way that best suits the potential entrepreneur.

The budget of the pre-incubator should cover staff expenses, including expert time, market research activities, hiring facilities for technology development, developing promotional material, buying supplies etc.

### **3.6 Selection procedures**

The selection of the potential entrepreneurs to be supported by the pre-incubator is based on corresponding applications. Selection criteria should include the profile and commitment of the potential entrepreneur, the level of innovation and technology development, the potential market and the potential business model. The selection panel should include the manager of the pre-incubator and other stakeholders with relevant experience and expertise.

The pre-incubation has a clearly defined beginning and ending. The average time for pre-incubation is 6 months, but experiences have shown this period may be too short and it is recommended to be extended to one year. Entrance in the pre-incubation is sealed by a contract, which is ended when the pre-incubation time runs to an end or before, if a start-up company is established.

## **4. The Case of the Central Macedonia Region in Greece**

Central Macedonia, situated in the centre of Northern Greece, has an important geographical position; it shares borders with two Balkan countries and its capital, Thessaloniki, is the second economic centre in the country with a metropolitan role in the Balkan / the Black Sea area. The population of the region is 1710000 (16.7% of the country's total) with a growing trend. The agricultural sector has a higher productivity rate than the country's average and contributes significantly to exports, but it is especially sensitive to changes over time. Industrial activity entails 23.5% of the regional Gross Domestic Product and is strongly specialized in certain branches (food-drinks, textile, footwear-clothing, non-metal minerals, building materials). Exporting activity is important and covers 30% of the country's total export value. The contribution of tourism in the economic development of the region is important in terms of employment, income, foreign exchange inflow [4].

As a result of national and regional policies supporting innovative entrepreneurship in Central Macedonia, there are a number of local initiatives for the establishment and development of networks and infrastructures that support entrepreneurship and innovation. Most of the established organisations supporting innovative entrepreneurship are situated in the Metropolitan area of Thessaloniki, the capital city of Central Macedonia, and act as incubators for innovative businesses, providing housing, business advisory services and access to venture capital.

The main regional stakeholders of the innovation system of Central Macedonia include four higher education institutes (Aristotle University of Thessaloniki, University of Macedonia, International Hellenic University and Technological Educational Institute of Thessaloniki), one research centre (Centre of Research and Technology Hellas), three business incubators, the Technology Park of Thessaloniki and more than 250 high-tech firms and their networks.

The Regional Innovation Pole of Central Macedonia, supported by the Operational Programme "Competitiveness" 2000-2006, has been planned as a regional system of institutions and partnerships

that reinforces innovation, firstly in the sector of Information and Communication Technologies and then in other sectors of industry and services, dealing with their shortcomings in the fields of research and development, patent acquisition, development of new products, and access to international markets. The Regional Innovation Pole of Central Macedonia aims at contributing to the reinforcement of the regional innovation system. In long-term, it aims at the creation of an innovation system in the field of Information and Communication Technologies, while its direct objective was the enhancement of the innovation of Information and Communication Technology firms of the Region of Central Macedonia.

Thessaloniki Technology Park is the structure established in Thessaloniki in order to link research to production. Today, Thessaloniki Technology Park includes the research facilities of the "Centre for Research and Technology Hellas" (CERTH), an incubator building which houses 10 companies, administration building containing a library and conference centre. The Management and Development Company of the Thessaloniki Technology Park (TTP / MDC) promotes and enriches the activities of the businesses housed in the Technology Park in collaboration with the Federation of Industries of Northern Greece and the Universities and Research Centres.

The Business Incubator "Incubation for Growth - i4G S.A." is one of the most significant and particularly successful business activities implemented within the framework of "ELEFTHO" Programme of Ministry of Development according to specifications set by other pertinent European programmes. The business incubator i4G S.A. mainly aims at both the stimulation and management of the knowledge and technology flow exchanged amongst universities, research institutions, companies and markets. It also provides value-added services along with high quality infrastructure, contributing thus, to the economic growth of the local community.

Similarly, Thermi S.A. has created an Integrated Corporate Support System in its Business Incubator, where recently established technologically innovative enterprises are hosted. In addition to the high quality installations and equipment provided by Thermi Incubators, its incubatees are also offered the support of the incubator's Integrated Corporate Support System based on the highly qualified human resources employed by Thermi S.A. and on the external support it receives through its network of consultants, comprising academics, university professors and researchers.

"Technopolis Thessaloniki SA" is a unique initiative taken by the Association of Information Technology Companies of Northern Greece. Its shareholders consist of:

- Social and educational institutions of Thessaloniki as well as companies belonging to the wider public sector
- Over 70 companies with a strong interest in information and new technologies, which employ a large number of scientists and researchers and are export - oriented with established presence in the neighbouring countries

The concept behind "Technopolis Thessaloniki" is to create a cross-regional, cross-Balkan operational base and a pole for innovation, research and cooperation in developing innovative solutions and in commercializing the innovative products and services. As a catalyst for commercial investments in the sector of Information and Communication Technologies, "Technopolis Thessaloniki" envisages its operation as a Centre of Excellence in the wider region of South East Europe and beyond. The vision is to become a hub of high-tech, entrepreneurial companies that attracts investments by Greek and foreign companies creating thus new opportunities for growth. Aiming to accelerate the existing knowledge capital in the region, "Technopolis Thessaloniki" will bridge research with business and will become the meeting point of local and regional innovators. Technopolis Incubator is an integral part of Technopolis Thessaloniki. The incubator has the aim to provide the necessary infrastructure, consulting support and investment funds to lead promising start-up companies to success. The incubator focuses on the fields of information and communication technologies as well as related areas, thus utilizing the dynamics and partnerships of the Technopolis Business Park. Through the incubator new business ideas and technologies can have access to Technopolis Thessaloniki, while the new companies enjoy all the advantages of being located in this thriving environment.

The business incubators in the region not only provide building and state-of-the-art equipment infrastructure to the incubator tenants, but they also support the firms by offering management consultancy and information provision, as well as access to capital in order to finance development concerning short-term operating needs and long-term investments. They have also established beneficial links among research and entrepreneurship, activating at the same time long-lasting mechanisms:

- Co-operation among scientists, researchers, entrepreneurs and investors
- Entrepreneurship encouragement by pointing out new ideas and supporting their business-wise utilization

However, the regional business incubators are not directly linked to the higher education institutes, and they do not provide permanent pre-incubation services, unless these are provided as part of a local project or initiative for a limited period. An example is a corresponding activity of the Regional Innovation Pole of Central Macedonia, aiming at providing specialized support and evaluation services prior to assuming the business risk, combined with the existing support and finance structures (incubators) of innovative ventures. Two cycles of stimulation activities for innovative entrepreneurship were conducted and proved to be a significant instrument in the empowerment and acceleration of the commercial exploitation of the research results. Parallel to this, the collaboration of all the incubators in the implementation of the task ensured the homogenization and complementarities of the services provided at the level of structures as well as at the level of the services rendered, creating a strong support cluster for new knowledge intensive businesses in the Region of Central Macedonia.

The strong networking relationships and past collaboration experience between the regional innovation structures and organisations in Central Macedonia, in collaboration with regional authorities and regional policy makers, can provide the perfect environment and suitable infrastructure to further develop and support pre-incubation activities in the region. In contrast to the incubators, which provide services for new businesses already operating, a pre-incubation program can provide employment, education and counselling at a very early stage of the start-up process until the establishment of the new start-up company.

The proposed pre-incubation program should provide the following services to the young scientists who will join the program:

- *Working space.* In collaboration with the existing incubators, the pre-incubation program should be able to provide a certain number of working spaces for the participants. Conference and meeting rooms will be available for the networking of the participants between themselves or with the management team during the training and personal guidance activities.
- *Training and personal guidance (coaching / mentoring).* Training activities should be organized for the participants in the pre-incubator program, including training courses and practical training in subjects related to business planning and development issues, sales and marketing, organization. Personal guidance should be also provided to each participant to design and develop the business idea in the form of a business plan for the establishment and development of a start-up company.

## 5. Conclusions

In the academic environment, pre-incubators have been developed to address the obstacles that academics often see regarding entrepreneurship, such as insufficient knowledge about economics, unknown market potential of the developed products and services, high financial risks, lack of personal skills on entrepreneurship, unawareness of the value of their intellectual property.

Particular emphasis is put on the following pre-incubation features that serve the main objective of the pre-incubation approach, which is to support a young entrepreneur to turn a business idea into a viable business:

- Providing efficient customized services, through coaching and mentoring of the young entrepreneurs, in setting out, monitoring and evaluating the development plan of their business idea
- Assisting the young entrepreneurs in defining and testing the market potential of their business idea, incorporating also user requirements into the design, configuration and price of their new product or service.
- Providing a shared environment for networking and sharing experiences

In the case of Central Macedonia, the business incubators in collaboration with the higher education institutes should build on the successful experience of the pilot pre-incubation activities in order to establish permanent pre-incubation facilities and services with the aim of supporting entrepreneurship emerging from the academic and research environment. Current and future pre-incubation activities should have the support of national and regional authorities, within the broad innovation policy framework that has been developed in Central Macedonia. Regional funds for innovation and entrepreneurship should be directed towards the pre-incubation approach for supporting academic entrepreneurs in the initial stages of their development.

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# Entrepreneurship and innovation in Russia: local and international perspective

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Promoting innovations is one of the hottest topics in the Russian political and economical life at the moment. Vital necessity to upgrade manufacturing facilities and diversify economics through production of high-tech goods with significant value added makes analysis of innovation process and diffusion of innovations in the economy actual as never before. However, deficiencies of the data, collected by the official statistics, due to relatively short history of innovation surveys in Russia, mostly cost-based approach, and situation, when most of the forms on innovation activities results are turned in blank, stimulate search of alternative ways to data collection and analysis. One of the possibilities provides Global Entrepreneurship Monitor, conducted worldwide on a longitude basis for a quite significant period of time already. Overall, this methodology, as shown in the article, lies within the requirements stipulated in international statistics manuals on innovations (such as, for example, OSLO manual). Additionally, they provide an opportunity to include small and medium enterprises, and even those businesses, that are currently being at the planning stage (nascent entrepreneurs), in the scope of the research, to conduct a cross-national comparison and explore indicators in dynamics. Even initial results obtained from such an analysis provide quite unexpected results and facilitate further thorough study of the problem.

## Keywords

GEM, innovations, innovative entrepreneurship, product innovations, technological innovations

## 1. Introduction

Research on innovation activity of entrepreneurs is probably one of the most promising and asked-for areas of economic study at present. It is also one of the least developed topics in the field. Xheneti and Blackburn [1] in their analysis of publications on Small Business and Entrepreneurship in 696 articles from 6 major ISI journals on entrepreneurship identified that articles on innovative aspects of entrepreneurship amounted for only 17. Many scientists admit the leading role of innovations though in economic development, as it is innovation that appears to be “carrying out of new combinations” – activity, seen as the primary function of entrepreneurship by J. Schumpeter [2]. Innovations are also the key to understanding economic growth – conclusion that has been reached by different economists at different points of time: K. Marx in the law on the tendency of rate of profit to fall told about the exhaustion of economic growth unless the so-called “switch of technologies” occurs or production methods change. Soviet economist N. Kondratiev showed that the slowdown in development without implementing changes in the production process – innovations – is inevitable [3]. Breakthroughs in technological development of industry were identified as the main factors of long cycles of economic development [4]. Technological progress is the key factor of economic growth in popular and well-known Solow model [5] and later and more complicated models of economic growth.

In spite of thorough proof by economic theory of the key role of innovations in many economic processes at the macro- and micro-level (including success of the entrepreneur and his firm), categories of innovation and innovation activity are often mentioned in relation to absolutely different in its substance processes and phenomena. Besides that very often the meaning of these categories is

unreasonably broadened or, on the contrary, narrowed. That is why empirical research of innovation activity of entrepreneurs, study on possibilities of innovation development, especially pressing in view of the proclaimed course towards modernization of Russia through innovations, requires statistically correct and unambiguous specification of the scope of innovation activity. Only finding an answer to the statistical specification of innovation category, methodologically consistent with the definitions and concepts of SNA UN 2008 will provide for the adequate measure of innovation activity and create conditions for the empirical study of factors and obstacles on the way towards increase of innovativeness of Russian economy, including the context of international comparisons.

## **2. Problems with measuring innovative activity in official statistics and possible solutions**

The official methodology currently implemented for the purpose of innovation data collection out through the European Union and in many other, including OECD, countries all over the world is best described by the special manual developed by experts of both European Union and OECD: Oslo Manual [6]. The thorough outlook of the methodology can be found in many works including another work of the author [7].

The Russian Federal State Statistics Service (Rosstat) monitors innovation processes based on the same OECD–Eurostat methodology. During the past few decades, surveying principles at Rosstat have undergone the same changes as principles of Community Innovation Surveys.

As of now, official statistics on innovations in Russia is collected in compliance with the standard form No. 4-Innovation, and it is not empirical facts that are covered therein, but individual outlooks on innovation activity of business organizations responsible for the respective course of their business in terms of qualitative and quantitative estimates. In theory, it is supposed that opinion expressed by an organization that fills the form is by itself an expert judgment. Considered from the standpoint of reporting practice organization principles, this means that such opinion is expressed in good faith and can be effectively used to describe the actual state of affairs at a company and make effective management decisions (in abroad books, such opinion of usually referred to as ‘true and fair view’). Nevertheless, it would be logical, when setting up a survey, to take into account the biased nature of the valuation and make the category of innovation as defined in respective items of the questionnaire or reporting form, as statistically specific and clear to a potential respondent as possible.

The other important factor in this regard is responder’s trust in statistical observation and his/her readiness to cooperate. For example, a survey of industrial enterprises with respect to the quality of filling the Form 4-Innovation conducted in 2008 at the request of St. Petersburg Territorial Statistics Service (Petrostat) and led by Irina Eliseyeva, Ph.D. Econ. and associate member of the Russian Academy of Sciences, showed that enterprises that were unapt to disclose information or had doubts about the privacy of information put in the questionnaire by contrast with when such data is published in an annual survey, would return the forms almost unfilled. In particular, even sections with the largest number of questions answered still were filled out for less than 73%. It is noteworthy that, even if a responder leaves an entire section of the questionnaire unfilled, it cannot actually lead to any adverse consequences [8]. Probably, so large a number of unanswered questions was due to the unreasonably high statistical load on respondents, which had to fill an extra reporting form immediately after the annual survey. Nevertheless, we have to acknowledge that the problem of empty answers and incompleteness of collected data do exists in the course of statistical measurement of innovation activity, and even more so is aggravated by the inaccuracy of given valuations.

The fundamental need for the resolution of both the aforementioned and other problems related to the credibility and integrity of data collected for the purpose of official government statistics on innovation data encourages alternative statistics to search for, and use, additional sources of empirical evidence for interpreting innovation activity.

One of such sources is the Global Entrepreneurship Monitor (GEM) database. GEM is an international scientific and research project, which involves more than 50 member states. Within the GEM project, adult working population is interviewed, with an eye to make up a statistical characteristic of activity and qualitative structure of entrepreneurship in a country. The survey allows for a chance to group entrepreneurs by phases of business development, from potential entrepreneurs, i.e. individuals that are only trying to start their business, to owners of established businesses, i.e. entrepreneurs that have received a hard gross mixed income for at least 3.5 years [9]. The GEM program pays special attention to the monitoring of early entrepreneurship, represented by the most active, mobile and unreliable strata of nascent entrepreneurs and owners of new business; official statistics, however,

provide almost no coverage of the above groups [10]. Entrepreneurship characteristics, covered by the GEM on a permanent basis, also include indicators of product and technological innovations. Since 2006, information on innovation activity of Russian entrepreneurs, obtained through the polling of adult working population of the Russian Federation, is handled by the research group of the Higher School of Economics. Under the GEM survey, entrepreneurs answer questions about their businesses' innovation activities, which make it possible to spot product and technological innovations. The wording of questions is linked to the standard international definition of innovation, but responders can supplement their personal assessment of novelty by several additional qualifying characteristics. For example, a responder can additionally specify whether the product or service offered by his/her company is new to all, some, or none of consumers. The question about product innovations is worded so as to define product innovation by the 'new-to-market' criterion, which implies a greater degree of novelty and a much more precise valuation by contrast with the OECD–Eurostat methodology, which defines the scope of innovation by the 'new-to-firm' criterion. The identification of technological innovation in surveys under the GEM methodology is also largely particularized: a respondent must not only define whether a used technology is 'new-to-firm', but also specify its age, i.e. for what time it has been available to market producers: less than 12 months, from 12 months to 5 years, or more than 5 years. Therefore, data on innovation in Russia collected under the GEM methodology make it possible to analyze the innovation activity of Russian entrepreneurs at various phases of business development for a period since 2006, including in the context of international collations, based upon objective criteria that make the specifications of international innovation measurement standards more precise.

### **3. Empirical study of innovation activity of Russian entrepreneurs: GEM survey**

Official statistics show Russia's growing retard in the innovation sphere from countries with developed economies. For reference, the World Bank estimates Russia's share of global exports of science intensive civilian products at 0.5%. At the same time, the US controls a 36% share, Japan has 30%, Germany 16% and China 6%. Based on the above data, we may assume that the most economically developed states are characterized by businesses' heightened innovation activity. This can be reasoned by the fact that developed economies have more preconditions for the usage of new, more technically and technologically complex methods of product manufacturing and service providing. In addition, such states have a more developed resource base for innovation development. However, as we have stated hereinabove, the impact of some statistical causes on the above-described results cannot be ruled out either.

It is therefore appears as appropriate that a comparative analysis of market innovation activity should be carried out based on an alternative source of empirical information, preferably in a detailed form, as company's market position can change markedly at every phase of entrepreneurial activity.

The need for a reliable resource base for any investment, including in the innovative development of enterprises, suggests a hypothesis about the influence of economic recession on entrepreneurs' innovation activity.

*H1. Financial crisis causes entrepreneurs to cut capital expenditures, including investments in the development of new products and technologies.*

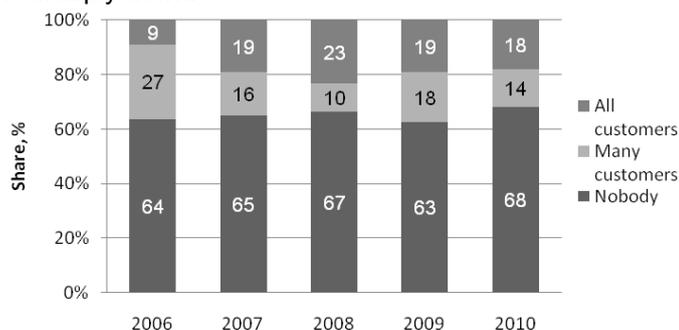
An analysis of literature on the theory of entrepreneurship makes it possible to suggest that the degree of innovation varies greatly among various entrepreneurial strata. Early entrepreneurs are just coming to the market and are trying to take a specific niche by means of a competitive struggle. According to the Schumpeterian concept, the manufacture of an innovative product, new to all customers, and the product supply to the market is the only way to introduce a nascent or new firm to the market [2], [5]. This puts forward the second hypothesis about the innovation activity of Russian entrepreneurs.

*H2. Early entrepreneurs are more active in fostering innovation than owners of established businesses.*

The statistical verification of the hypotheses was made based upon the international GEM database, available, as it has been noted above, for Russia for the period from 2006 to 2010. To study into the dynamics and place-to-place collations for 2006-2009, a database was formed that covered innovation activity of entrepreneurs from 24 states which have been members of the GEM project over the entire period of its existence. Under the terms of national teams' participation in the GEM consortium, data for 2010 is presently available only for Russia.

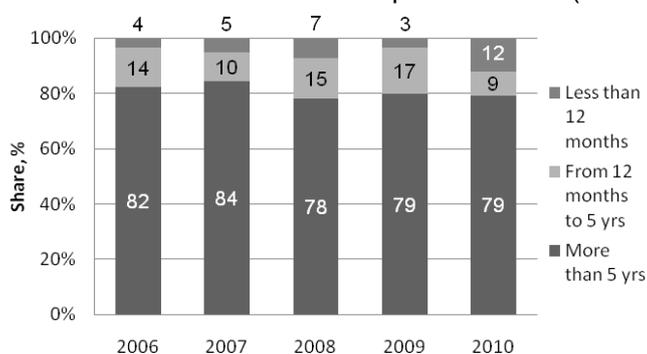
As is seen on figure 1 below, the percentage share of Russian entrepreneurs that offer products that are new to all consumers rose by 10% y-o-y in 2007, which was primarily due to a decreased number of entrepreneurs that offered services to many consumers. In 2008, the share grew even higher, up to 23.3%, but came down slightly in 2009 and 2010.

The verification by the Student criterion showed that a change in the percentage of products new to the entire market was statistically significant (5% sig., Student's test) only in 2006-2007. Economists consider this period as the time when global crisis processes emerged: the mortgage crisis in the US outraged in 2006. The absence of data on Russia for the preceding periods does not suggest a compelling reason to say that year 2007 was critical, i.e. the share of entrepreneurs that offered innovative products increased sharply that year, or that 2006 was abnormal, and the product innovation indicator came sharply down.



**Figure 1** Share of entrepreneurs, offering product, new to all customers, to many and to nobody (%)

The situation with technological innovations is much more oppressing (see figure 2): here, the statistically significant positive dynamics for absolutely new technologies (5% sig., Student's test) was only registered in 2010. This was probably the result of resource restrictions after the economic recession. The reduction in the share of entrepreneurs using new technologies, i.e. those that had only been available to market producers for less than 12 months, can be reasoned by the overall drop in investments in new technology and economic insecurity, especially given the crisis was still in full play in 2009. In 2010, the Russian economy followed a steady upward trend, and the society generally considered the crisis to have come to end. As a result, the share of entrepreneurs that implemented technological innovations increased and even exceeded pre-crisis level (12% vs. 7%).

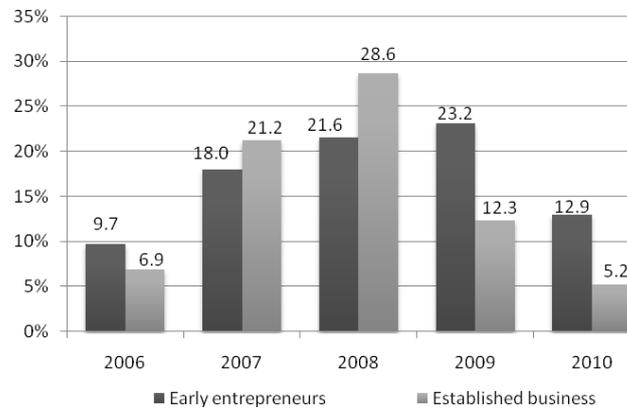


**Figure 2** Share of entrepreneurs, using technology available for less than 12 months, from 12 months to 5 years and more than 5 years

Therefore, the H1 hypothesis was proved wrong: the crisis does not necessarily bring forth any statistically significant reduction in entrepreneurs' innovation activity in either the sphere of product innovations or technological innovations. This is probably due to the fact that higher resource restrictions make competition among small and medium businesses more intense amid the crisis. This encourages entrepreneurs to apply more state-of-the-art technological production processes on one hand and master new product niches on the other. As a result, the limited access to financial resources, caused by the financial crisis, did not give rise to any grave negative consequences, e.g. new forms of competition, in the innovation sphere.

The difference among innovation activity levels for various phases of business development, i.e. for early and established entrepreneurs, is of particular analytical interest, too. The chart 3 below shows that early entrepreneurs were more active in an attempt to deploy product innovations in all the years, except 2007 and 2008. The statistically significant gap was registered in 2009 and 2010 (15% sig.,  $\chi^2$

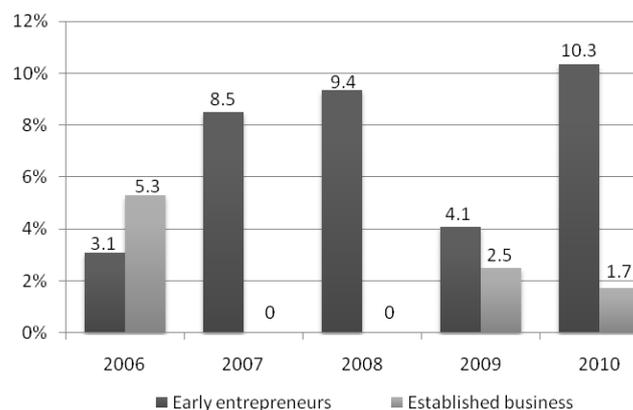
test), when is amounted 11% and 8%, respectively. Therefore, the H2 hypothesis proves out amid economic stabilization: early entrepreneurs, when put in more or less secure conditions, are indeed more active in the deployment of product innovations.



**Figure 3** Share of entrepreneurs, offering product, new to ALL customers

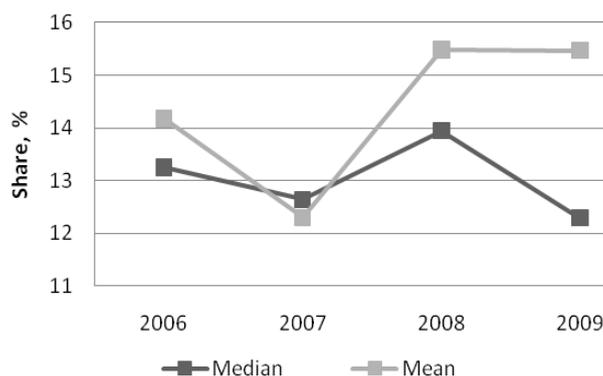
This can be reasoned by new entrepreneurs' ambition to market the innovative product with a view to occupy a specific market niche, get a competitive advantage over other firms and entrepreneurs and "carry out a new combination", i.e. perform their primary entrepreneurial function, according to Schumpeter. The dominating share of established businesses in the marketing of product innovations in 2007-2008 can be attributed to their larger financial, social and institutional resources by contrast with early entrepreneurs, especially amidst stronger resource restrictions when exposed to the financial crisis. For the same reason, established businesses are less inclined to conserve their economic activities in anticipation of better economic conditions. This is the reason why established businesses actively search for opportunities to offset crisis-driven market contractions through the extension of their market positions, if not by upgrading profits, but at last by keeping them at pre-crisis levels, including by supplying customers with innovative products.

In case of technological innovations, implemented by entrepreneurs at various phases of business development, the leading role of early entrepreneurship is even more significant (see figure 4). In 2007-2008, established businesses made almost no implementations of technical innovations. On the contrary, early businesses showed quite robust results in the sphere of technological innovations.

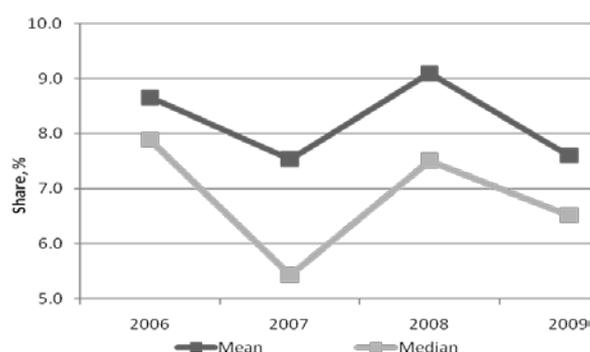


**Figure 4** Share of entrepreneurs, using technologies, available for less than 12 months

The benefit of GEM data from an analytical viewpoint is their longitude character and convenience for making place-on-place collations. In 2006-2009, a panel of 24 countries was made up, which permitted to not only monitor entrepreneurs' innovative activity in Russia, but make comparisons with other countries. Figure 5 below depicts the curves of average and median percentage numbers for entrepreneurs that classify their products as new to all customers on the domestic market.



**Figure 5** Median and mean evolution: share of entrepreneurs, offering products new to ALL customers (24 countries)



**Figure 6** Median and mean evolution: share of entrepreneurs, using technologies, available for less than 12 months (24 countries)

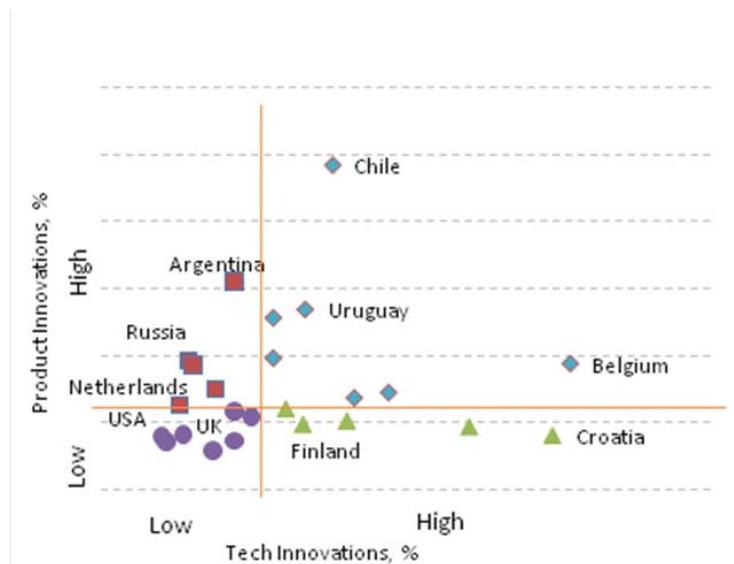
Analysis of the available data shows that, since 2006, product innovation in Russia has been much above the average level of other monitored countries. At the same time, the situation with technological innovations is polar: technological innovation in Russia is below the average level of the 24 GEM member states that have been project members in the course of the observation period.

**Table 1** Russia's rating in the made-up panel for a period from 2006 to 2009.

Indicator	2006	2007	2008	2009
Product innovations	18	3	5	6
Technological innovations	20	14	15	20

Global data on innovation activity among early and established businesses makes it possible to carry out a bi-dimensional clustering of countries by the product and technological innovation for 2009. A total of four such clusters were distinguished: countries with low level of product and technological innovations, high level of product and technological innovations and countries with high level of one type of innovations and low level of the other. The distinction between high and low levels has been made based on the mean values of entrepreneurs implementing product and technological innovations for the populations. The obtained results appear to be quite interesting and may serve as a clear illustration for the fact that innovation on developed markets is more of technological nature. At the same time, innovation on less developed, and hence less competitive markets, is largely of product type. Figure 7 shows that the countries with the highest product innovation numbers are Chile, Peru and Uruguay. The leading technological innovators are France and Croatia. At the same time, the US, Japan, the UK and the Netherlands were classified as states with the least intense technological and product innovation activity among entrepreneurs. Russia, together with Argentina,

Peru and Columbia, was put in the cluster of states with quite a large amount of product innovation and a relatively low level of technological innovation.



**Figure 7** Country clusters

All in all, we may assume there is an interrelation between the level of economic development of a country in general and the innovativeness of its entrepreneurs. For reference, the most economically developed states according to GEM data entrepreneurs show the weakest production and technological innovation levels. The cluster that includes France, Croatia, Finland, Greece, Spain and other countries also covers states with relatively high living standards, but which still are the leading technological innovators. The least economically developed states, on the contrary, show the highest level of product innovation.

## 4. Conclusions

Data collected within the GEM survey open up tremendous opportunities for the further observations and are an appropriate supplement to information covered by official government statistics, as they monitor entrepreneur's innovative activity at the earliest phases of business development. The sphere of innovations still has more questions than answers, and the continuous development of the pool of empirical evidence will soon permit to resolve problems, which might seem almost insoluble under a statistical system available just 10 or 15 years ago. For example, one may conclude even now that early entrepreneurs, at least in Russia, are more dynamic innovators than established businesses, which are crustier, more stagnant, and far less dynamic when it comes to innovation. In addition, we may arrive at a conclusion that product innovation in Russia is presently at a relatively stable level. Technological innovation in this country has followed a steady upward trend, except in crisis-shaken years. On the back of economic recession, entrepreneurs do their best to curtail expenses, and consider switching to new, more efficient and resource-saving technologies and production schemes.

The survey showed innovation activity of small and medium business was in non-linear dependence on the level of economic development. It is noteworthy that, in spite of initial assumptions and results of official statistical surveys, this relationship is inverse. Contrary to expectations, such countries as the US, Japan and the UK show lackluster product and technological innovation performances. At the same time, Chili, Peru, Uruguay and Argentina have the largest product innovation numbers. Countries with more developed economies, such as Belgium, France and Croatia, have greater technological innovation numbers. Moreover, small, medium and large businesses play different roles in the innovation sphere in different countries: in developed states, innovators are medium and huge businesses. In emerging economies, innovators are small and medium businesses.

Finally, we would like to underline that we regard the achieved results as a precursor to a new extended general survey of entrepreneurs' innovative activity. The way the GEM monitoring is organized implies that data is collected primarily for small and medium businesses. The study covers business activity of the entire population, and there is almost no chance any large entrepreneur or monopolist could be covered in the survey. Official statistics, on the contrary, monitors medium and

large businesses. In more economically developed countries, innovation activity, or at least the marketing of new products and the initial implementation of new technologies, is the task of medium and large, and not small businesses. In emerging countries, the situation is polar: innovation is pioneered by small businesses. For this reason, one of the most important aspects that should be covered in future surveys is the detailed monitoring of innovations at various entrepreneurial strata.

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# Entrepreneurship orientations before and during the global economic crises

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The objective of this paper is to explain the implications of economic boom and economic crises on entrepreneurship orientations. Survey results of 1075 experienced entrepreneurs and business and entrepreneurship students in Estonia during the years 2005-2010 are presented and discussed. Theoretical foundations for analyzing imitative, innovative and co-creative entrepreneurship orientations are presented. The paper explains, why studying three different entrepreneurship orientations is essential in rapidly changing business environments of catch-up economies. Combinations of co-creative and innovative entrepreneurship orientations are more popular than the imitative entrepreneurship orientation even during the economic crises. When comparing survey answers that were given during the boom period 2005-2007 and later in the economic crises period 2008-2010, there is some evidence of trends towards innovative and co-creative orientations and diminishing support for the imitative orientation. In 2005-2007, 28.7% of the respondents supported the co-creative view of being entrepreneurial because it enabled others to be innovative and 36.2% were focused on imitation. In 2008-2010, imitative orientation on implementing proven ideas from other places received only 28.1% support, but support for the co-creative view had increased to 43.6%. Support for the co-creative statement that customers should participate in business development more openly increased from 26.1% to 35.8%. An action research that involved some survey participants in a training setting revealed that participants with some entrepreneurship experience mainly focused on opportunities for locating new export markets for existing products and on taking over local enterprises that face bankruptcy or opportunities to acquire cheap resources available in depressed markets. At the same time both students that lacked entrepreneurship experience and serial entrepreneurs were open to the “blue ocean” thinking and were focused on more innovative entrepreneurship opportunities. Research results can be used as an input for training that takes into consideration differences in entrepreneurship orientations and changing business opportunities in the business cycle.

## Keywords

Entrepreneurship education, Entrepreneurship orientations, Innovation, Networking

## 1. Introduction

In the discourse about business development and innovation, the crucial role of entrepreneurs in recognising new business opportunities, in developing, expanding, restructuring and sometimes down-sizing or even closing businesses deserves special attention. Innovative business ideas facilitate organisational changes. Peter Drucker [1] has stressed that entrepreneurs play an important role in building and nurturing organisational learning and initiating organisational change. Initiatives that focus on innovation and regional development have to take into consideration preferences of the entrepreneurs in charge of the business and their ability to rely on their own old and new ideas and competences of business partners in entrepreneurial ventures. Preferences of entrepreneurs to use innovative or more traditional business opportunities may change during an economic crises.

This paper addresses two main research questions: How do imitative, innovative and co-creative entrepreneurship orientations appear before and during the economic crises? Which differences between entrepreneurship orientations of respondents with entrepreneurship experience and without such experience are relevant to developing innovative entrepreneurship and entrepreneurship education?

In order to answer these questions, the paper at first provides an overview of some key concepts of entrepreneurship and entrepreneurship orientations in the context of change and innovation managements. The next section of the paper presents the logic of the self-assessment tool applied in order to assess preferences of respondents, when they have to choose between different entrepreneurship orientations. Survey results are then analyzed by comparing surveys conducted before and during the economic crises. The last section focuses on some learning experience and highlights opportunities to align training of present and potential entrepreneurs to their orientations.

## 2. Entrepreneurship orientations and innovation

Innovative entrepreneurs have to understand new opportunities that in the long run cause economic growth. Developing the skills involved in identifying business opportunities has an important role in the entrepreneurial effort [2]; [3]. Recognition of new opportunities is one of the most important outcomes of entrepreneurial learning [4]. The right balance between the opportunity-driven entrepreneurial domain and the resource-driven managerial domain [5] has to be found taking into consideration limited resources.

Schumpeter [6] linked the role of the entrepreneur to creative destruction by transforming existing production systems. Kirzner [7] in his theory of entrepreneurship concluded that the entrepreneur is a driving force in the market due to his or her role in discovering unused opportunities in the marketplace, and the competitive behaviour of entrepreneurs is operational in restoring the equilibrium of the market. The innovative entrepreneur described by Schumpeter is more related to introducing creative business ideas that may change the nature of markets, whereas the entrepreneur described by Kirzner is more an opportunity seeker able to perceive market gaps and mistakes made by other entrepreneurs in the situation of incomplete information supply. Shane [8] links Kirznerian entrepreneurial opportunities to equilibrating forces, to limited discovery of common and less innovative solutions that do not require radically new information, whereas Schumpeterian opportunities are disequilibrating, rare, innovative, involve creation and require new information and organisational learning. Scarce resources are not limited to finances, but often include human resources, who are essential for core competence development.

Entrepreneurs have also been characterised as individuals that believe something that nobody else believes [9]. Such differential beliefs allow them to use new business opportunities. Unique beliefs, at the same time, create the challenge of aligning the vision of the entrepreneur and his/her team with business partners and other stakeholders in the process of identifying, developing and implementing new business ideas. Ireland et. al. [5] pointed out that entrepreneurial opportunity-seeking may be at the same time also strategic behaviour with the aim of value creation. Strategic choices of individual are influenced by their more general orientations.

Entrepreneurship researchers Tom Lumpkin and Gregory Dess developed the entrepreneurial orientation construct that integrates five dimensions: innovation, proactiveness, risk-taking, autonomy and competitive aggressiveness [10]. The founders of the enterprise try to lead it in a direction that is consistent with their personal tendencies [11]. The behaviour of the firm and that of the entrepreneur are likely to follow the same orientation in entrepreneur-led firms [12].

The construct of the single entrepreneurial orientation however does not address some crucial choices that are driven by the basic attitudes of the entrepreneur concerning preferable ways of value creation and the nature of the core competence needed for successful business development. The construct of a single entrepreneurial orientation has been further developed by differentiating several entrepreneurship orientations: imitative entrepreneurship, individual innovative entrepreneurship and co-creative entrepreneurship [13].

The dynamic capability school developed by Barney [14] links business success to developing distinctive organisational capabilities and core competences that are difficult to imitate. Prahalad and Hamel [15] treat core competence as an outcome of collective learning in an organisation by integrating and co-ordinating diverse skills and multiple technologies to deliver unique value to customers. In the rapidly changing business environment of an emerging market, an entrepreneurial person can, however, gain business success by imitating business ideas and technologies that have already been used by other entrepreneurs. Imitation in a non-saturated market of a catch-up economy

can support market pro-activeness and the competitive aggressiveness of a fast mover in recognising business opportunities that can be exploited by transferring business models from more advanced markets without “reinventing the wheel”. Such business behaviour does not assume core competence for delivering unique value based on entrepreneur’s own product or process innovation development efforts. Successful imitation, however, assumes not only an understanding of product life cycles, but also of economic boom and crisis cycles in order to follow the right business ideas at the right time and to sell the business before the business opportunity becomes unprofitable and exhausted. Imitative orientation may sometimes mean illegal copying of products, but alternatively it can be applied in the legal framework of representing some well-known trade mark, importing goods or taking a franchise. As the imitator is not offering a unique product or service, the long-term success of the imitative orientation assumes the core competence for retaining the cost advantage or changing the object of imitation when the competitive situation becomes unfavourable.

Individual innovative orientation is a good basis for entrepreneurial ventures in a business environment, where creative differentiation is the main prerequisite for creating and retaining local or international competitive advantage. This orientation will work for business growth if core competence of the entrepreneur is sufficient to manage the change starting from the creative idea until commercialization of the innovation. Entrepreneur has to be able to protect his/her innovative solution and to individually control human resources and investments that are needed in order to implement an innovative product or technology. Start-up ventures in a catch-up economy often lack capital for long-term new product development and credibility for commercializing their innovation at international markets. Innovative entrepreneurs have to understand if their new business idea corresponds to the business opportunity at the marketplace that they are able to access. An important feature of innovator’s core competence is to understand if markets are ready for commercializing their innovative solutions. Innovative orientation can be supported by the core competence in the field of new product and/or technology development or by creative ways to re-define business boundaries and to combine existing business ideas in a new way. The “blue ocean” concept of Kim and Mauborgne [16] explains business opportunities of value innovations that focus on new markets and on new ways of satisfying client needs not yet discovered by competitors stacked in fierce competition in existing “red oceans”. The innovative entrepreneur faces the choice of developing in his/her entrepreneurial venture core competences sufficient for implementing a value innovation or relying on complementary core competences of business partners and customers as co-creators of new business solutions.

The co-creative orientation is a reflection of the emerging network economy of the 21st century. Entrepreneurs that choose to follow this orientation can co-operate as members of regional or global value chains. Software development projects that are based on open source code and communities of practice are examples of co-creative environments that may generate synergetic entrepreneurial ideas. Co-creation is also linked to the rise of business services [17]. Co-creative orientation in the pure mode assumes knowledge sharing readiness and mutual trust in a business environment where, as in a brainstorming session, it is not always possible to fix and protect the authorship of the idea. Co-creative orientation means a readiness to share business opportunities and business gains with partners. Co-creative entrepreneurship is based on social networks and clusters as information dissemination mechanisms that facilitate entrepreneurship [18]. Business networks mean continuous information exchange and the other co-operative relationships that a business organisation is engaged in with other organisations. Core competence development and open innovation management become inter-organisational processes that are supported by networking. At the same time, networking assumes readiness to overcome individualistic attitudes of traditional entrepreneurs. It may be difficult to align co-creative orientation with such dimensions of the traditional concept of entrepreneurial orientation [10] as autonomy and competitive aggressiveness.

Understanding imitative, innovative and co-creative entrepreneurship orientations of entrepreneurs helps to understand attitudes and priorities of entrepreneurs at the changing business landscape. Entrepreneurs that prefer one of these entrepreneurship orientations need to develop the core competence of their business venture in accordance with this entrepreneurship orientation.

### **3. Self-assessment tool for studying entrepreneurship orientations**

Elenurm and Moisala [13] created a self-assessment tool for studying imitative, individual innovative and co-creative entrepreneurship orientations of entrepreneurs and potential entrepreneurs. Fifteen questions were developed to cover guiding principles and priorities in these main phases of the entrepreneurial process: business opportunity identification, business idea development and implementation. Sources of entrepreneurial ideas, interaction with customers and partners and risk

management in the entrepreneurial activity are reflected in the questionnaire. These issues were, however, not separate questionnaire sections, but presented through alternative statements that had a mixed sequence in order not to disclose the questionnaire pattern in the process of self-assessment.

Respondents were asked to compare three statements under each question and to choose only one statement that is most suitable for describing his/her preferences in the role of an entrepreneur. Table 1 gives a brief overview of the key issues of statements. The full statements are sentences that describe entrepreneurial action priorities and principles such as: "The best way to succeed in business is not to "invent a bicycle", but to introduce an existing product that will best serve the market need" that had to be compared with statements such as, "The best way to succeed in business is to trust your own intuition every time you have a creative business insight" and "The best way to succeed in business is to develop new business ideas with other people, although there is never a guarantee of success if you match people with different visions." Additional questions about entrepreneurial experience, age and gender were included in the questionnaire.

Surveys were mainly conducted in the business and entrepreneurship training environment in order to discuss survey results with participants. In this paper we analyse the results of 1075 respondents from two periods, 2005-2007 and 2008-2010. The respondents comprised 51% females and 49% males. Among the respondents, 32% (98 females and 245 males) had practical entrepreneurship experience. Of the survey participants, 49% represented the age group 18-24 years, followed by 21% in the age 25-29, 12% in the age 30-34, 8% in the age 34-39. Just 10% of the respondents were older than 40 years. The age composition of the sample represents well such age groups where young people involved in business studies should consider entrepreneurship as an option for their business career.

This sample also includes 105 Finnish students who participated in 2005-2006 surveys. The comparison of Estonian and Finnish business students indicated that in both countries there are two preferred entrepreneurship orientations among the business students: individual innovative orientation and co-creative innovative orientation. The imitative orientation was less popular among the business students in both countries. However, in Finland more students had followed a combined pattern of different orientations [19].

**Table 1** Issues for the self-assessment of entrepreneurship orientations

	<b>Key points of alternative statements reflecting entrepreneurship orientations</b>		
	<b>Imitative</b>	<b>Individual innovative</b>	<b>Co-creative</b>
<p><u>I</u> questionnaire issue</p> <p>Sources of entrepreneurial ideas</p>	<ul style="list-style-type: none"> <li>• Ideas proved elsewhere</li> <li>• Brands from other markets</li> <li>• Do not invent "bicycle"</li> <li>• Follow best practices</li> <li>• Flexibility to make profits like others</li> </ul>	<ul style="list-style-type: none"> <li>• Own original ideas</li> <li>• First in the marketplace</li> <li>• Trust intuition</li> <li>• Change existing practices</li> <li>• Flexibility to develop own innovation further</li> </ul>	<ul style="list-style-type: none"> <li>• Supporting ideas of others</li> <li>• Social impact</li> <li>• Develop ideas with others</li> <li>• Combine solutions of partners</li> <li>• Open to cooperation that reshapes existing business</li> </ul>
<p><u>II</u> questionnaire issue</p> <p>Interaction with employees, customers and partners.</p>	<ul style="list-style-type: none"> <li>• Well-tested service - no complaints</li> <li>• Clear standards and rules</li> <li>• Employee initiative mainly for quality assurance</li> <li>• Schedule for pre-defined inputs</li> <li>• Earn average profit of industry</li> </ul>	<ul style="list-style-type: none"> <li>• Customer ideas unrealistic</li> <li>• My vision motivates to follow my ideas</li> <li>• Entrepreneur defines employee initiative focus</li> <li>• Team members propose means</li> <li>• Do not give too much profit to partners</li> </ul>	<ul style="list-style-type: none"> <li>• Negative information shared</li> <li>• Employees as creative partners</li> <li>• Initiative of partners revolutionizes</li> <li>• Free flow of ideas</li> <li>• Financial targets depend on co-operation</li> </ul>

	Key points of alternative statements reflecting entrepreneurship orientations		
	Imitative	Individual innovative	Co-creative
<u>III questionnaire issue</u>  Managing entrepreneurial risks	<ul style="list-style-type: none"> <li>No need to own innovation</li> <li>Avoid mistakes of friends</li> <li>Somebody else could bare development risks</li> <li>Only I know the cost structure</li> <li>Credibility of the brand that I represent</li> </ul>	<ul style="list-style-type: none"> <li>Have to own innovation personally</li> <li>Friends overcome obstacles inhibiting my idea</li> <li>I have all development risks I and closest partners know the cost structure</li> <li>Credibility of my creative personality</li> </ul>	<ul style="list-style-type: none"> <li>Ownership of innovation can be shared</li> <li>Contact network for broadening my approach</li> <li>Customers should bare product development risks</li> <li>All potential contributors have financial information</li> <li>Credibility of business network</li> </ul>

#### 4. Survey results before and during the economic crises

In the total sample of 1075 respondents, 40% gave priority to statements that correspond to the co-creative entrepreneurship orientation. Individual innovative orientation in the business creation and development process was supported by 35% and imitative orientation by 25% of respondents. Support for the imitative entrepreneurship statement of keeping one's eyes open to implement ideas that have already proved workable in other places is 31.5% among respondents that do not have entrepreneurship experience, and marginally higher (34.6%) among experienced entrepreneurs. Among experienced entrepreneurs, 51.9% are ready to combine good business solutions of partners in a new way, while 45.3% of inexperienced respondents prefer the same statement. Experienced respondents have higher readiness to share even negative information with customers (42%) than inexperienced respondents (30.8%). Among experienced entrepreneurs 53% support the view that the business vision of the entrepreneur will define the focus of the employee initiative while 39% of inexperienced respondents prefer the same statement. Instead of this statement, 50% of inexperienced respondents limit the initiative of employees to quality assurance in the established production process. These results indicate a potential challenge that some students and trainees without entrepreneurship experience may behave in a more directive and less participative way in the business creation and development process than experienced entrepreneurs with their own business practice reflections. Encouraging participation of employees in business development is an important challenge during the economic crises, where many enterprises have to restructure their operations.

On comparing survey answers that were given during the period 2005-2007 and 2008-2010, there is some evidence of trends towards innovative and co-creative orientations and diminishing support for the imitative orientation. In 2005-2007, 28.7% of the respondents supported the co-creative view of being entrepreneurial because it enabled others to be innovative and 36.2% considered themselves entrepreneurial because it kept their eyes open to implement ideas that have already proved workable in other places. In 2008-2010, imitative orientation on implementing proven ideas from other places received only 28.1% support, but support for the co-creative view had increased to 43.6%. Support for the co-creative statement that customers should participate in business development more openly increased from 26.1% to 35.8%.

Evidence of increasing support for the individual innovative orientation from 2005-2007 to 2008-2010 is reflected in the desire to be the first to launch a new product that has not been introduced before (from 29% to 39.4%) and in stressing the individual innovative view that the business vision of the entrepreneur will define the focus of employee initiative (from 36.8% to 57.2%). Support for the statement that the entrepreneur has to own the innovation that is used in a business activity has

increased from 32.4% to 41.4%. These trends can be explained as a result of the transition towards a more advanced market economy, where innovation has become more essential in international competition. During the economic crises some innovative entrepreneurs see a business opportunity in acquiring ownership in companies that face financial difficulties but can be restructured on the basis of their innovative vision. Ownership of the innovation as a feature of the individual innovative orientation, which can decrease the risk of imitating rare and valuable components of the core competence, assumes however more awareness about intellectual property protection.

## 5. Implications for entrepreneurship training

In 2009-2010 we used in the Entrepreneurship MBA programme entrepreneurship orientation self-assessment and business opportunity identification exercises in order to understand business development priorities and action patterns of real and potential entrepreneurs in recognizing business opportunities and in following different entrepreneurial orientations in the economic crisis situation. The training process involved developing written descriptions of individual short- and long-term entrepreneurship visions, specifying individual high priority business opportunities for 2009–2010, followed by discussing and reflecting business opportunity descriptions in teams during the entrepreneurial life cycle training programme and the development programme for entrepreneurs in 2009.

Managers and course participants that had some entrepreneurship experience mainly focused on opportunities for locating new export markets for existing products and on opportunities for taking over local enterprises that face bankruptcy or opportunities to acquire cheap resources available in the current depressed markets for industrial goods. They found such opportunities in real estate development projects that have run into difficulties and have been taken over by banks. Among actual entrepreneurs, there was evidence of the arbitrage logic that corresponds to Kirzner's [7] interpretation that the entrepreneur is the actor that restores the equilibrium in a non-perfect market. The business ideas of this group assume certain core competence to receive just in time information, flexible access to risk capital and good business contacts in order to exploit "window of opportunity" profitably. This reflects some kind of combination between the imitative and co-creative entrepreneurship orientations taking into consideration the limited capital base of these individuals that forces them to find business partners.

Participants that lacked entrepreneurship experience were in fact more focused on innovative business opportunities in the field of green products and alternative energy production. They also described life style entrepreneurship opportunities such as arranging cost efficient tourist trips to new destinations chosen in line with their own travelling interests. Some serial entrepreneurs with extensive business start-up experience, were, however, also inspired by business opportunities that correspond to the "blue ocean" thinking. From the point of view of imitative versus innovative entrepreneurship orientations, these entrepreneurial business ideas cannot, however, be interpreted as completely innovative. Their authors to some extent imitated green ideas and related business development practices of more advanced market economies. In fact they did not have a precise understanding of the extent to which their business opportunities can be exploited by transferring already existing business concepts and technologies from other countries, and what is the exact scope and resource base of their innovative development work in the Estonian context. Co-creative entrepreneurship orientation, in such cases, can be implemented through involvement in international virtual networks that use social software for discussing ideas related to alternative energy sources, green products and ethical entrepreneurship. Involvement in such networks can enhance a more realistic assessment of one's own core competences in following global trends and reveal differences between regional and global business opportunities. Entrepreneurship education can support networking by offering e-learning platforms that help cross-border teams to develop co-creative entrepreneurship skills.

## 6. Conclusions

Survey results indicate that during the period 2005-2010 innovative and co-creative entrepreneurship orientations have gained more popularity, and support for the imitative orientation has diminished.

Combining individual innovative efforts and the co-creative entrepreneurship orientation is a logical way to adapt to the changing business environment. The survey gives evidence that such combinations of orientations are perceived to be successful also during economic crises.

When developing core competences for managing global changes in the emerging network economy of the 21st century, cross-border networking is a crucial factor for discovering new business opportunities that can be used by combining ideas and resources of entrepreneurs in different regions. In order to anticipate potential opportunities and problems in such business co-operation, entrepreneurs have to be conscious, consistent and ethical in their choices between imitation, individual and co-creative innovation. Applying the tool for self-analysis of entrepreneurship orientations when discussing new business opportunities in the entrepreneurship education framework can empower present and future entrepreneurs for combining innovative and co-creative orientations.

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# Innovation in LifeLong Learning. The challenge of an open framework accessible to all

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The LifeLong Learning (LLL) paradigm supports the idea that learning should occur throughout a person's lifetime. Its purpose is to integrate education and work in a continuous process in which all citizens should be able to access knowledge and perform work at 20, 40 or 60 years old or even older. To support this valuable paradigm, following a "student-centred approach", students have to be equipped with their attitudes and skills to learn both in formal education and long after they have graduated. Strikingly, though, this student-centred approach is inappropriate for an increasing number of students, who are supposed to benefit from this paradigm, but in fact have to face social, physical and cognitive barriers because they have special needs and do not meet "standard ways of doing things".

To tackle this problem, the Integrated Project EU4All (European Unified Approach for Accessible Lifelong Learning) focuses on developing a flexible, open, standard-based architecture of services to support the LLL paradigm in Higher Education Institutions for people with special needs, giving a special attention to elderly people and those with disabilities. The project is based on the idea that in a knowledge-based economy, education and work are integrated throughout people's lives. All citizens need ongoing access to learning to enable them to work. Technology is playing an increasing role in mediating this learning. However, if this technology is inappropriate and introduced with insufficient support, disabled people will face even further exclusion from the interlinked worlds of education and work.

Furthermore EU4ALL contributes to a more general objective of "eInclusion" by ensuring equal access, independent living and participation in the Information Society for everyone and developing next generation assistive systems to empower persons with disabilities and ageing citizens playing a role in society, increasing their autonomy and realising their potential.

In EU4ALL, the R&D main aim is to provide full access to Lifelong Learning to users (adult learners and professionals) with impairments, allowing them to fully benefit of all the learning content and support facilities, including assessment and guidance, in a high education context.

The project now faces the challenges of promoting adoption, use and exploitation of the EU4ALL outcomes.

## Keywords

accessibility, innovation, lifelong learning, special needs.

# 1. Introduction

The LifeLong Learning (LLL) paradigm supports the idea that learning should occur throughout a person's lifetime. Its purpose is to integrate education and work in a continuous process in which all citizens should be able to access knowledge and perform work at 20, 40 or 60 years old or even older. To support this valuable paradigm students have to be equipped, following a student-centred approach, with their attitudes and skills to learn both in formal education and long after they have graduated. Strikingly, though, this student-centred approach is inappropriate for an increasing number of students, who are supposed to benefit from this paradigm, but in fact have to face social, physical and cognitive barriers because they have special needs and do not meet "standard ways of doing things". This issue is palpable for those involved in providing assistance to learners with special needs in educational institutions, where the mere lack of information or access to pre-established procedures, not to mention the difficulties in providing the required infrastructure, may become insurmountable barriers for students interested in making this paradigm come true.

Furthermore, students and professionals with special needs have problems in accessing LLL due to what can become a crooked path of barriers that many times are involved in the various stages required to realise their learning goals. From enrolment to assessment, students have to negotiate a pre-established general procedures, which are intended to fulfil a "standard" set of needs but are far from considering their individual needs and preferences. Nonetheless, learning should be a personalised and adaptive process for all, which from the start to the end should consider the learner's needs. In fact, it is disturbing to note that most service providers, educational institutions and corporations as well, do not meet properly the most basic requirements of people with special needs. In particular, this problem is even more urgent in the so called mega-universities where an increasing number of students with special needs have to be assisted.

To tackle this problem, the a Sixth Framework Programme Research and Development Integrated Project EU4All (European Unified Approach for Accessible Lifelong Learning) focused on developing a flexible, open, standard-based architecture of services to support the LLL paradigm in higher education institutions for people with special needs, giving a special attention to elderly people and those with disabilities. Thus, the scope of EU4ALL is a subset of the general concept of "Assisted Living", namely Assisted Lifelong Learning (ALL).

The project is based on the idea that in a knowledge based economy, in which education and work are integrated throughout people's lives, all citizens need ongoing access to learning to enable them to work. Technology is playing an increasing role in mediating this learning. However, if this technology is inappropriate and introduced with insufficient support, disabled people will face even further exclusion from the interlinked worlds of education and work.

To address this, the EU4ALL project sets forward the concept of Accessible Lifelong Learning uniting 3 key strategies:

- That the technology mediating lifelong learning does so in accommodating the diversity of ways people interact with technology and the content and services it delivers.
- That this technology is used to bring support services to disabled learners.
- That provides support services and technical infrastructure enabling teaching, technical and administrative staff of educational institutions to offer their teaching and services in a way that is accessible to disabled learners.

## 2. LifeLong Learning (LLL) paradigm and technology

LifeLong Learning, also known as LLL, is the continuous building of skills and knowledge throughout the life of an individual. It occurs through experiences encountered in the course of a lifetime. These experiences could be formal (training, counseling, tutoring, mentorship, apprenticeship, higher education, etc.) or informal (experiences, situations, etc.) LLL is the "lifelong, voluntary, and self-motivated" pursuit of knowledge for either personal or professional reasons. As such, it not only enhances social inclusion, active citizenship and personal development, but also competitiveness and employability.

In the early 21st century new processes for education delivery and learner support mechanisms advanced to meet the dynamic needs of the adult learner marketplace. Today's depressed economic environment and challenged workforce have dramatically increased the needs and demands of learners to retool their capabilities and acquire new competencies. LLL definition is based on Jacques Delors' [1] four 'pillars' of education for the future. Learning to know - mastering learning tools rather than acquisition of structured knowledge.

Learning to do – equipping people for the types of work needed now and in the future including innovation and adaptation of learning to future work environments.

Learning to live together, and with others – peacefully resolving conflict, discovering other people and their cultures, fostering community capability, individual competence and capacity, economic resilience, and social inclusion.

Learning to be – education contributing to a person's complete development: mind and body, intelligence, sensitivity, aesthetic appreciation and spirituality.

European policy, also through the Bologna Process, aims to drive for a Europe of knowledge which includes lifelong learning and development. In the Leuven Communiqué of 2009 the Ministers identified among the priorities for the coming decade: lifelong learning, student-centred learning and social dimension as an equitable access to learn. To establish synergies between the Bologna process and the Copenhagen process, which concerns vocational education and training, in co-operation with Member States, the European Commission has established a European Qualifications Framework for lifelong learning (EQF) [2], applying it to all types of education, training and qualifications, from school education to academic, professional and vocational. This approach shifts the focus from the traditional system which emphasises 'learning inputs', such as the length of a learning experience, or type of institution, to the reference levels describing what a learner knows, understands and is able to do – 'learning outcomes'. It also encourages lifelong learning by promoting the validation of non-formal and informal learning [3].

To support LLL paradigm and to follow a necessary student-centred approach students have to be equipped, with their attitudes and skills to learn both in formal education and long after they have graduated. This approach needs an emphasis on the reformulation of access and equity priorities in a lifelong context, by looking at the opportunities that are available to individuals across their life-cycle and in the different settings where learning can occur. It is argued that knowledge-based economies and societies cannot afford to exclude a large part of their population from access to education and learning resources.

One of the pillar of Bologna Process, the so called "social dimension" aims at equality of opportunities in higher education, in terms of access, participation and successful completion of studies; at studying and living conditions; at guidance and counselling; at financial support, and student participation in higher education governance.

Nowadays technology is playing an increasing role in mediating LLL. The introduction of computing technology into higher and further education could have a large impact on how people participate in learning activities. From the retrieval of learning resources, such as lecture notes or presentation slides, to being able to engage with teachers and tutors in virtual environments, nowadays there are more available opportunities to learn than ever before. Technology has a strong potential to provide a personalized education experience to students and staff with disabilities in higher and further education institutions. While there are definitions for accessibility in both the physical and digital domains, it is unclear what are the current barriers to participation for people with disabilities in higher and further education environments. Furthermore it is unclear if the current technology is being leveraged in addressing the needs and preferences of people with disabilities in their environments. EU4All project worked on a large-scale user requirements elicitation activities undertaken in international higher and further educational institution, and on activities behind the development of the prototypes technology improved to promote accessibility and usability of virtual learning environments.

### **3. EU4ALL aims, framework, and services**

The EU4ALL-project created an open architecture systems (OAS) focused on providing flexible and standard-based set of components and services for higher education institutions in order to solve issues that are hindering the individual access to learning content or support. The components and the services as well as third party authoring tools can easily be integrated in existing learning environments (actually with Moodle [4], .LRN [5], and SAKAI [6]).

In a wide sense EU4ALL is a framework to build up adaptive eLearning systems, if we consider it a conceptual and tool-based infrastructure providing generic functionality which can be use to solve groups of similar problems in order to offer a set of theoretical and practical tools that can be adopted by educational institutions to increase the quality and coverage of the accessibility services that are offered to students with disabilities [7]. In particular EU4ALL framework aims to offer theoretical and practical guidance to educational institutions in order to enable them to effectively offer support to students who make use of tools such as virtual learning environment (VLE) systems. VLEs are often described as web-based systems that enable educational institutions to disseminate learning

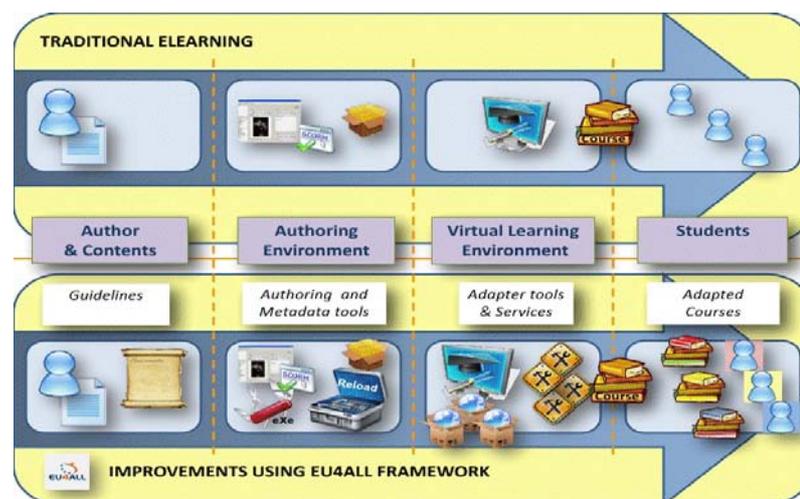
resources to students and facilitate the provision of on-line learning activities [8]. Through the use of VLE systems, students can contribute to their learning by participating in on-line discussions, writing reflective blog posts or diary entries, or working collaboratively with other students to create useful resources using tools such as wikis or ePortfolios. VLE systems enable educational institutions to increase face to face teaching.

The main areas the EU4ALL framework aims to address include [7]:

- Enhancing the learning experience by presenting learning materials that are appropriate for and matched to modality and end-user devices preferences, such as mobile devices or assistive technologies used with a desktop computer.
- Providing a wide range of services that an institution can adopt to ensure that the needs of learners with disabilities are most appropriately supported.
- Providing practical advice and guidance from domain experts to ensure that educators are in a position to ensure that their use of technology encourages inclusion.

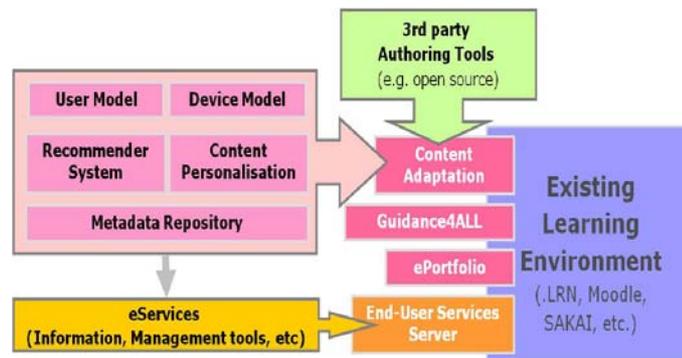
The first two areas represent functional components of the architecture that can be practically implemented using a service-oriented architecture. The third area, in EU4ALL is entitled Guidance 4 All (G4All). This is a set of complementary training resources providing practical advice on inclusive teaching practice and technology use. G4All is also associated to a wider part of the EU4ALL project to explore how best to offer psychological and pedagogical support for students with disabilities.

The EU4ALL OAS is built up in order to allow institutions to create (or modify their current traditional eLearning systems in) adaptive systems. While the traditional eLearning systems create an accessible course allowing all the users to access to all the contents adapting themselves, in the EU4ALL systems the contents of the course are presented to the users by an adaptation to the user's needs (see figure 1).



**Figure 1** Shows the difference between traditional eLearning systems and the EU4ALL systems[1]

The key components of the EU4ALL system include a content delivery system, such as a virtual learning environment (VLE), a user modelling service (UM), a content personalisation system (CP), metadata repository system (MR), a recommender system (RS) and a device modelling system (DM). The eServices server (ESS) is an institution facing component aiming to provide ways to manage the delivery of accessibility services. This component can be used to guide the development of new digital resources that can be consumed by learners. It also offers a framework for the development of accessibility support systems. Such systems can present information about effectiveness of accessibility support and gather information about changing levels of support demands (see figure 2).



**Figure 2** Shows the relation among the EU4ALL components and the VLE in order to create an adaptive eLearning systems[2].

The components represented in figure 2 are the core of the EU4ALL AOS. Those functions of those components can be summarized as follow [7]:

- *User Modeling (UM)*: It is a software system that stores information about the functional needs and preferences of learners. The notion of 'needs and preferences' refers to a combination of media preferences, such as whether a learner would prefer to receive learning resources in a textual as opposed to a visual format. The UM component provides a web service interface that facilitates the storage and retrieval of user preferences. A VLE system can make calls to the UM component to allow either administrators or users to create and modify user preferences. Learner preferences are specified using a controlled language. The UM data held is used alongside data that is held by a component called the Metadata Repository (MR) to permit the delivery of material that has been selected for the needs of an individual learner.
- *Metadata Repository (MR)*: Whilst the UM component stores information about the accessibility preferences of the user, the MR stores descriptions of the accessibility properties of individual resources. It has been designed with the intention of holding information about whether a digital resource can be perceived through a particular modality. A digital video resource that does not contain an appropriate level of supplementary audio descriptions may not be able to be perceived by learners with visual impairments. By way of an example, given two digital resources, one which presents material in a visual form (such as a diagram), and another resource which presents the material in a textual form (such as an equivalent description of a diagram); the MR enables course creators or administrators to indicate that different digital media items are semantically equivalent in terms of the learning material they present to a user.
- *Content Personalisation (CP)*: This component selects materials that are most appropriate for an individual user, given what is known about their needs and preferences, and the device that was used to request the materials. The VLE acts as a mediator. When a user requests a content that can be personalised, the VLE sends a request to the CP content to ask it what material or digital resource is best suited to the needs of an individual learner. It does this by sending information about the user, device and content item. This information is presented in terms of identifiers, which are represented in the form of character strings or numbers. A similar action occurs in relation to the MR component: the CP component asks the MR component for all the accessibility metadata that is associated to a particular content item (or learning resource). The CP system then converts the metadata descriptions from each of the EU4ALL components into an internal representation. The internal representation is then used by a rule based system, where a matching process takes place to ensure the most appropriate content alternative is selected. At the end of the selection process, an address or an identifier that references the most appropriate resource is returned to the VLE. This resource is then delivered to the learner through the VLE.
- *E-Services Server (ESS)*: Although providing accessible personalised content can alleviate some of the challenges that learners may face, an educational institution is necessarily required to offer a range of services to support all its students, especially to those with disabilities. These services may be embedded within mainstream educational services, or be managed through a dedicated organisational unit for disabled which co-operate with different departments throughout a university structure. The ESS within the EU4ALL Framework represents a workflow and information system that can be used by different stakeholders within a university. Its underlying intention is to offer functionality that directly supports an institution in the provision of services, which directly support learners. The provision of services can be thought of in terms of 'what' can

be done to help learners, 'how' can a particular service be carried out, 'who' provides appropriate support, and even 'where' the support is offered.

- *Associated Services:*
  - *The G4ALL package:* can be used in association with another EU4ALL component called the Recommender Service (RS) [9]. Drawing on the information that can be obtained from the UM, the RS component aims to provide a user with useful information and links that have been drawn from previous interactions with the system or a set of suggestions that have been prepared by a tutor. The notion of user modelling and recommendation systems is one that is familiar to users of e-commerce sites [10]. In the context of a learning management system the RS presents information about what activities, content or learning material a student may potentially benefit from. This may include a link to a recent forum post that has been made by a fellow student, or a reference to some learning material in response to recent learning activities. In the case of the G4ALL system, the 'student' G4ALL will often be a member of academic staff.
  - *The ePortfolio:* that has been developed as a part of the EU4ALL has been designed to make use of the user accessibility information that is held within the user modelling (UM) component. The accessibility of ePortfolios is particularly important, because unlike most web applications it is designed to enable many authors to publish for few readers. Further work on ePortfolio accessibility needs to consider how best to address the creation and deployment of accessible authoring tools. Such an issue is beyond the planned scope of the EU4ALL project.
  - *Device Model (DM):* DM component, has been briefly presented earlier. Due to the availability of increasingly powerful mobile devices and the changes in the way that web-based applications can be consumed, the DM component aims to provide a way to manage the storage and delivery of information relating to mobile devices, desktop computers, browsing software and presence of assistive technologies. By gathering the information that describes the capabilities of a device [11] and presenting this information to the applications which deliver materials to a device, it is envisaged, through content personalisation, that the users can be presented with materials that are most effectively adapted to changing personal circumstances. This component of the framework is the subject of on-going research and evolution due to the increasing availability of widening internet access. Further work is necessary to ensure that the CP module can select the optimal resource for an individual given both their stated personal requirements (as held by the UM) and the capabilities of a particular device (as detected by the DM) that is being used at the time when a resource is requested.

The EU4ALL prototypes are now running and are being integrated in four different settings for the launch of a large scale pilots. Two major distance training universities and two small educational institutions will evaluate the developed system with the help of disable professionals, course developers, tutors and students. The evaluation will include different kind of disability categories: on one hand visual, hearing and other physical impairments, and on the other specific learning disabilities, in particular dyslexic and dyscalculia and general cognitive impairments.

## 4. Accessibility and “eInclusion”

The connection between educational and social exclusion, especially labour market exclusion, emerges as a major theme for development.

In the framework of EU policy several are in the last year the Communications adapted by European Commission (EC) stressing active strategies to improve e-accessibility to the Information Society for all potentially disadvantaged groups, in particular [12]:

- pursuing standardization efforts, financial support for research and deployment of technology solutions for people with disabilities and for elderly persons, and
- enhancing cooperation with Member States and other stakeholders towards a common European approach for e-accessibility, including through a new EU high-level e-accessibility expert group to provide strategic guidance.

The EC is also running the ICT Policy Support Programme in which eAccessibility is considered a key priority [13].

At the level of Member States the awareness of this strict connection between education and social exclusion is still often not clear. The Academic Network of European Disability (ANED) conducted in 2008 an analysis within 14 European Countries. By the results of the National Strategy Reports for Social Protection and Social Inclusion emerged that only in few countries the disabled people's risk of exclusion from education is specifically identified, or related to consequent labour market risk. In general, disabled people's labour market skills are more likely to be addressed by Member States in

terms of special vocational rehabilitation programmes than by tackling access to lifelong learning in the mainstream [14].

EU4ALL project contributes to a more general objective of “eInclusion” by:

- mainstreaming accessibility in consumer goods and services, including public services through the applied research and development of advanced technologies. This will help ensure equal access, independent living and participation in the Information Society for everyone.
- developing next generation assistive systems that allow persons with (in particular cognitive) disabilities and ageing citizens playing a role in society, increasing their autonomy and realising their potential.

## 5. Conclusion

The EU4ALL-project created an open architecture systems (OAS) focused on providing flexible and standard-based set of components and service for higher education institutions in order to solve issues that are hindering the individual access to learning content or support. The EU4ALL AOS is built up in order to allow institutions to create (or modify their current traditional eLearning systems in) adaptive systems. In EU4ALL R&D main aim is to provide full access to Lifelong Learning to users (adult learners) with impairments, allowing them to fully benefit of all the learning content and support facilities, including assessment and guidance, in a high education context.

EU4ALL also contributes to a more general objective of “eInclusion” by mainstreaming accessibility in consumer goods and services through the applied research and development of advanced technologies and developing next generation assistive systems that empower persons playing a role in society, increasing their autonomy and realising their potential.

The project now faces the challenges of the future adoption, use and exploitation of the EU4ALL outcomes. Most organisations in the sector are not yet ready to offer accessible education to their students and to implement part or the whole framework. The readiness of institutions is not only related to technical aspects, but depends principally on social, political, organisational and management issues.

A social innovation perspective needs to be introduced to make sure that the EU4ALL outcomes have a chance to be adopted. Rogers theory of Diffusion of Innovation and the social innovation perspective outline the importance to find a strategy to approach organisations taking advantage of their potential for adoption and offer a progressive and modular implementation of the solution, depending on institutions accessibility preparedness [15]. Consequently, as “social innovation refers to new ideas that work in meeting social goals” [16], in addition to technology transfer, a social innovation perspective needs to be introduced to make sure that the EU4ALL outcomes have a chance to be adopted. Effectively, the market study realised in the context of the project [17] reveals that most organisations in the sector are not yet ready to offer accessible education to their students and to implement part or the whole framework. The readiness of institutions is not only related to technical aspects, but depends principally on social, political, organisational and management issues. Warford [18] sustains that individual decisions are incomplete without recognising the impact of socio-organisational aspects (e.g. management level decisions).

The EU4ALL outcomes present three kinds of innovations: technological innovation, the so called “practice-based innovation” (guidelines, support materials), and organisational innovation or “principle-based innovation” (e.g. new approaches, new staff structures, to support disabled and elderly students). Consequently, the EU4ALL innovation nature is complex. On the one hand, we should take advantage of the fact that, according to Rogers (1995), technological innovation, as well as practice-based innovation, which are easy to be employed, have the best chance of success. On the other hand, we should pay attention to the fact that idea- and principle-based innovations are the most difficult to implement.

However, for EU4ALL outcomes to be implemented and used by potential adopters, not only technology transfer is needed, but social innovation has also to take place. Factors such as institution accessibility preparedness, as well as their ability to change, are crucial when considering the potential adoption of the EU4ALL innovation. The legal and political frameworks are additional factors of influence. Therefore it will be very important to outline a strategy to approach organisations taking advantage of their potential for adoption and offer a progressive and modular implementation of the solution, depending on institutions accessibility preparedness. Actually, due to the changing political, social, technological and educational context regarding Students with Disabilities (SWD), institutions increase the need to “becoming a learning organisation by opening up to disability. Whatever the country and whatever the institution, the way in which disabled students are admitted depends on the

attitude of the institution to diversity” [18]. Opening up to needs of learners with disabilities is seen as a source of innovation and modernisation of HEI [19]. Consequently, it will be crucial to check the attitude and dimension of target adopters. If the contacted organisations are open to social changes, they might be more likely to adopt.

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# Reflexive Open Innovation in Central Europe

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**Earlier organizations were usually closed and focused on their own internal resource base (their “core competencies”), today they have to engage into interaction processes with many and changing actors and to involve external resources if they want to be innovative (Open Innovation). On the other hand reflexive modernization deeply manipulates the context for innovations. This paper will discuss ‘reflexive open innovation’ for Central European Region.**

## Keywords

Closed Innovation, Open Innovation, Reflexive Open Innovation, Reflexive Modernization

## 1. Reflexive Modernization and Uncertainty

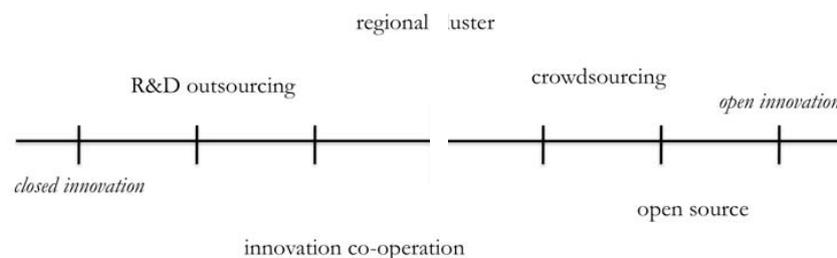
Sociologist Ulrich Beck has defined time diagnosis in terms of so called Reflexive Modernization [1], [2], [3], [4]. He indicates a thoughtful transformation in the character of the modernization process itself. This transformation is typified as a changeover from uncomplicated/simple/first modernity to reflexive/automatic/late modernity. First modernity represents the progress from a conventional, undeveloped social order to a modern, developed social order. In this period of transformation, reasonableness stays over convention and false notion. Methodical reasonableness functions as a perfect source of authentic and purposeful awareness. The societal group dissimilarity has replaced the previous dissimilarity between the 3 feudal domains. However this ‘classical’ modernity is a ‘semi-modern condition’. The manufacturing, developed background intrinsically encloses more than a few anti-modern essentials which stay resistant to additional modernization. It means that the contemporary institutional prototypes of social group and sexual category are reasoning novel social disparities. These contemporary disparities actually substitute the conventional hierarchy. The methodical fascination with development produces significant hazards that are no more controllable. However, these unmanageable risks stay unseen behind a contemporary frontage of lucid dominance and ideal managing systems. Knowledge and expertise reach therefore a self-disagreement with the as yet uncontrolled increase of dangerous side-effects of their success [5], [6], [7], [8].

The *Theory of Reflexive Modernization* argues that industrial civilization threatens itself throughout its imperfect structural design. Through the disagreement with its partially contemporary restrictions, developed civilization becomes the energetic power of its own alteration progression. Reflexive Modernization thus represents a transformation of the developed civilization itself. From the wrecks of developed civilization, first-order modernity occurs. This essential transformation breaks through the semi-modern nature of the ordinary contemporary developed period. Away from the charts of developed civilization, it produces a dissimilar and not unavoidably better, institutional form, so called hazard social order full of risks. This novel institutional circumstance is typified by a basic insight into the critical and repeatedly increasing consequences that are methodically shaped together with the rising accessibility of well-being. The hazard social order refers to the mixture of stability and instability. While in traditional developed civilization the sense of prosperity creation prevails, transformation does not just mean prosperity growth, but also the methodical creation of increasing and universal hazards like nuclear risks, which can’t be understood as simply handy consequences of a smooth transformation progression. On the opposite, they more and more come into view as intrinsic products of additional transformation. Furthermore hazard social order refers to the far-reaching societal transformations that are reasoned by the transformation progression. These split as ordinary

characteristic the immanent disagreements flanked by modernity and anti-modernity within developed civilization and indicates the progressions of globalization and individualization, to altering relations among men and women, within the family etc. to progresses in the area of employment, economical development and political affairs. Consequently, the development of automatic, reflexive transformation and modernization deeply manipulates the social surroundings. The developed dynamism of improvement also challenges the philosophy of social groups and categories, qualified employment, family, sexual category roles, church, manufacturing, political affairs etc. which are extremely entrenched in individual life. Novel and radical structures are taking forms alongside the environment of the outstanding but collapsing mature ways of life. In these unfinished and opposing circumstances among departed and upcoming conditions, life obtains some novel attribute appearances as uncertainty, randomness, temporality and doubt linked with the loss of identity [9]. In a first step, the Field of Action *Management of Uncertainty* developed problem-oriented expertises. They show how new ways of dealing with uncertainty become necessary in various practical fields of economy and labor and how new approaches can already be found in scientific discussion. The expertises relate to the fields (1) people, (2) organizations and (3) technology and highlight changes in dealing with uncertainty (1) in vitas, biographies and learning, (2) in project organization and product **innovation** and (3) in complex technological systems. New approaches on dealing with uncertainty emerge in science and practice [10], [11]. *Managing of Uncertainty* can be regarded as a core practice of successful **innovation management**. Firms face various sources of uncertainty with regard to their technological and managerial capabilities and the target markets [12], [13].

## 2. Reflexive Open Innovation

More and more organizations are confronted with highly dynamic external organizational environments. The drivers of change are globalization, sustainable development, new technologies and the aged population. The pressure on organizations forces them to continuously adapt to the environmental shifts [14] and to create organizational forms able to provide faster and innovative response to market threats and opportunities [15]. Innovation is a key-factor of business success [16], but in “many organizations, especially those with a traditional approach, innovation is often only seen as valid when it is completely ‘homemade’”. This traditional view of innovation – *Closed Innovation* - completely disregards the growth market of demand-driven innovation” [17] or *Open Innovation* (Figure 1).



**Figure 1** The innovation continuum [18]

Open Innovation is “the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation [20]. Open Innovation should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” [19], [20]. Research activities has been focused on the notion of Open Innovation, business models, organizational design and boundaries of the firm, leadership and culture, tools and technologies, IP, patenting and appropriation, industrial dynamics and manufacturing [17]. This paper affects the themes leadership and culture. Alliances and Open Innovation systems might facilitate the diffusion of knowledge over firms and within firms much better, adding to the chances of recombining mature and emergent knowledge [21]. Open Innovation today has a much broader application than first proposed by Chesbrough [22], e.g. the “Lead User Concept” or “User-Centred-Innovation” [23], or “Interactive value chain” [24]. The emerging research field of Open Innovation is in a phase that is still very fluid with many national/global [25] and regional [26] Open Innovation activities.

A new nature of innovation is emerging within companies as well as in the public sector. There are 9 innovation principles. Each of the innovation principles are based on evidence of new innovation behaviour: (1) Co-creating values with customers, (2) Users' Involvement, (3) Accessing and combining globally-dispersed knowledge, (4) Forming collaborative networks and partnerships, (5) Dynamics between large companies and entrepreneurs, (6) Environmental concerns drive innovation, (7) Needs in developing countries drive innovation, (8) Welfare system concerns drive innovation, (9) Technology's role as an enabler of innovation. The 9th principle of innovation is not considered a new principle in itself. What is new? It is the future role of technology [27].

Open Innovation systems are characterized by complexity, long-time completion and high risk initial capital. In the aftermath, the solution could be to facilitate innovation systems by stimulating learning of how to change the way of thinking and acting in new environments [28]. The modern system innovations must be reflexive, namely that people must adore the challenging and changing the presumptions, current practices, methods and techniques and sometimes selecting the pathway of improvisation. Reflexive institutions and enterprises such as state, science, society and entrepreneurship, should not behave as stable and strict functions but as leaders of change and reflexive learning [30]. According with the literature there are some problems:

1. System innovations are made by many different social and technical parts that cannot be identified in advance. The results of such innovation projects are completely unknown and cannot be pre-defined, due to the fact that they are perplexed without a linear path of progress [29].
2. Entrepreneurial paths, business strategies, innovation activities, research directions and routes, solutions and many other features of system innovations have to be able to change. The adjustability sometimes means intelligence. The managers need to be more flexible with their decisions in order to choose new directions, according to their environment [19].
3. Reflexive innovation faces a lack of standard implementation tools and techniques. Upon this situation, reflexive innovation projects can use evaluation methodologies that support and enhance such reflexivity [30]. Such methodologies must be able to support complex projects without predefined and ambitious outcomes, facilitate by questioning participants in project and contribute to collective and institutional change. At the end, these methodologies must self-evaluate the project, comparing the changes that have occurred from past till present situation.

Reflexive Innovation Systems is a term to denote dynamic systems that produce innovation, while evolving in parallel with the technology that is innovated. Reflexive Innovation is the process where growth is created by positive feedback, while at the same time guided by anticipatory negative and positive feedback [31] [32]. Feedback loops are included to describe systems that grow and at the same time change the dynamics of their own growth [33]. The functions are not only influenced by endogenous growth, but also by exogenous actions, events and structures. The positive feedback could lead to a close system insensitive to less forceful signals of negative feedback. Negative feedback may slow down growth or cause abandonment of technology that would like to evolve. Negative feedback could be positive feedback for exogenous factors. Thoughts for democratizing innovation process could transform negative feedback into positive for other actors. Two paradigms are stated below.

1. Health Technology is a good example of continuous innovation and it is also a result of health policy from the government. Health Technology Assessment could be an approach to reflexive innovation, through surveillance, audit, measuring and evaluating [31]. Many innovation projects try to use standardized measures of technologies which are the key dimension of technical and socio-political ordering and control, but technical developments simultaneously undermine these standards [34]. Nowadays, innovation findings abolish conventional boundaries among species, machines and humans. It is recorded a continuous shifting from the incumbent, technocratic innovation system of the 1950s and 1960s to the current situation of the knowledge-based society that creates proper conditions for reflexive innovation systems [35]. Health Technology Assessment is also a good example of the way that social actors develop new tools and also new institutions that enable reflexive innovation systems. This can be standardized into a common evaluation of cost-benefit and risk-benefit analysis, known as systemic reflexivity [36].
2. An approach for reflexivity on system nanotechnology innovations was occurred in Sweden which analyse three crucial spheres of Swedish society: science, industry and politics. At the end, the study came up with the following results. The missing system components within national boundaries do not imply that the system itself does not work properly, but simply that the system transcends national boundaries. The conclusions for the spheres are negative marks of influence on the meaning and engagement of society into the system innovation outcomes, so the number and the type of actors are reduced. The key negative mark is the lack of interconnectivity within

the nanosystem. A more reflexive system of innovation would be able to alter continuously its direction and content of growth, during growth [31]. The term of *Reflexive Open Innovation* could be the solution to the non-linearity of a system innovation for abandoned ideas, while fluctuations in risk indicators could be decreased by opening innovation system to modern society.

### 3. Reflexive Open Innovation in Central Europe

We can look at the future of Open Innovation from the spatial, structural, user, supplier, leveraging, process, tool, institutional or cultural perspective. Creating a culture that values outside competence and know-how is crucial for open innovation practice. This culture is influenced by many factors: besides being influenced by the values of the company, it is also influenced by concrete artifacts such as incentive systems, management information systems, communication platforms, project decision criteria, supplier evaluation lists and its handling and so on [37].

Beyond recognized drivers of innovation in other policy domains, such as education and entrepreneurship, some countries in the EU and beyond have started looking at drivers of innovation not previously looked at in a policy context. Notably, some of Europe's leading innovation nations such as Finland, Denmark and the UK have included *user-driven* or *user-centred* innovation as cornerstones of their national innovation strategies [38]. The small country Denmark has five dedicated University Chair Professorships on „User-led Innovation” or „Open Innovation” (while Germany or the US has none” and spend 160 million kroner a year for these activities [12].

Examples of good Open Innovation practices in Western Europe are all very interesting, but only callow people would believe that the answer is to copy these practices and to emulate them in Central European Region [39]. Several studies suggest that there are cultural and ethnical factors influencing the acceptance and diffusion of Open Innovation among customers in different countries [25]. Finally, the acceptance and diffusion of Open Innovation related phenomena is contingent on customers' cultural orientation, specifically their interdependent or collectivistic tendencies [40], which is important for implementing Open Innovation in the special cultural context of Central Europe. Because of these cultural differences in Central European Region, not only traditional management practices differ across countries [45], but also Management of Uncertainty in Open Innovation Processes differ in Central Europe. Individuals, groups, organizations, networks and institutions should think of Open Innovation from the reflexive point of view.

### 4. Conclusions and further research

Reflexive Modernization leads to the Field of Action *Management of Uncertainty*, which can be regarded as a core practice of successful innovation management. *Reflexive Open Innovation* could be the solution to the non-linearity of a system innovation for abandoned ideas, while fluctuations in risk indicators could be decreased by opening the innovation system in modern society. Central European Region with its cultural diversity should find their own way to make profit from *Reflexive Open Innovation* and should not copy Western European best practices on Open Innovation.

Government should assist and support new infrastructures where individuals, users, companies etc. can meet and interact to each other. In order to understand and feel the influence of all those aspects on Reflexive Open Innovation culture in Central European Region further research should gain more from the psychological field, in order to find and outreach the cultural limits which handicap the openness of innovation process.

Reflexive Open Innovation can be supported by foundations, similar to Living Labs. The interconnection among the actors is the most crucial brick piece of Reflexive Open Innovation structure. Every actor can shape the preferences of its character and their mechanisms of reflexivity, too. Preferences and mechanisms should demand for interconnectivity in order to be more flexible and agile on continuous non-linear changeable conditions. Living Lab is a good paradigm of flexibility and accuracy into an interconnected system of actors. Infrastructures of Living Lab concept could support and engage Reflexive Open Innovation in a Reflexive Modern Society.

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# Quality of employee hotels in Novi Sad - system of continuing education as a measure to enhance development

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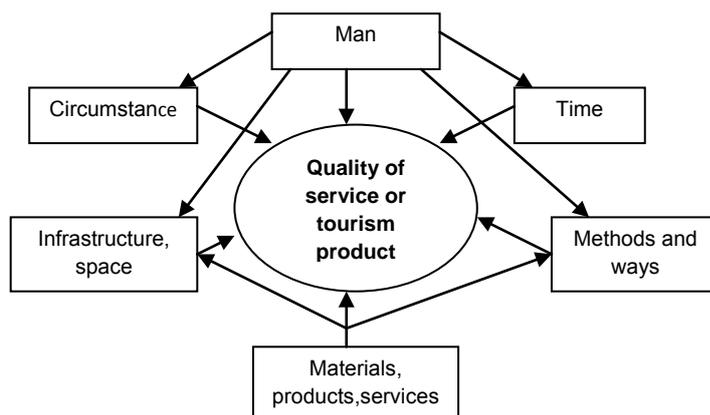
Consideration of the needs of tourist consumers during the implementation of service delivery can be understood as a full appreciation of consumers. The way of communication with travel consumers is only part of the realization of quality of service providers. In terms of major changes and increasing international competition, which is a direct result of flows of globalization and internationalization, quality has become an imperative for survival, growth and development. The leading problem of modern tourist business is certainly the quality of employees in the tourism and hospitality facilities. The burning issue of quality human resources in tourism imposed itself in preparation of this study, which presents the data obtained by survey of secondary publications, and survey made by the authors in the hotel facilities in Novi Sad. Among the issues that are in major focus for theorists is how to reduce the impact of existing problems and the increasing quality of employees as key segments of each of the tourist business. The study was primarily to point out the increasing importance of education in the tourism sector and intensive application of measures for permanent education in this field.

## **Keywords**

Quality, employees, hotels, education, Novi Sad.

## **1. Introductory discussion and literature review**

In the modern world needs of people become more diverse and are not satisfied with anything and in any way (any product or service). Today's more demanding tourists insist that the services which settled their needs have exactly certain quality, which level is growing up with the development of society and the material standard [8]. However, the problem of quality is not only directly related to the services and products, but also to those who are in direct contact with the direct consumers of services concerned [16]. In this work the problem of the quality of employees has the special place and importance [12]. Education is not just a positive activity from the human aspect but it is a pure business activity and probably the most profitable investment, which has long been not just a question of individuals but a matter of people and the wider society because the dimensions of these investments often exceed the capabilities of a nation. It is known that many companies spend a lot for training their staff and they spend only for the management team more than 10% of the total earnings of all employees [5]. Poor quality is actually a consequence of poor regulation, technical, technological, organizational, but the main factor in setting the criteria and the implementation of discipline is finally the man himself [17]. Man is the only factors that in the whole process work with the mind and creates a logical base for all, more than any other factor. Only man is able to react and if he cannot remove he can at least give information on the negative.



**Figure 1** The influence of certain components on the quality of tourism products and services

That quality has a huge importance and that it is a segment of business that every organization needs to have tells the example from 1987. When the Malcolm Baldrige Award was established for the quality (Malcolm Baldrige National Quality Awards) [9]. The winner of this award is the Ritz Carlton hotel for the quality of its services and offers where the quality of employees is included of course. In order to receive the European Quality Award these are the criteria: customer satisfaction, human resources and leadership [3]. It can be assumed that the improvement of service quality will increase the satisfaction of tourists, which will result in increased sales and profits. The key to providing quality services is understanding and meeting the expectations of tourists. To achieve this it is necessary to create a clear picture of the criteria on which to form expectations, whereas we need to bear in mind that tourists do not only evaluate the outcome of service but also the experience of participating in it. It is clear that research of tourist market is an important and vital aspect of management. This is the main weapon to improve the ability of suppliers to understand and comprehend the dynamics of markets and effective decision making [13]. Model of tourism development of Novi Sad is based on the approaches and principles of total quality assurance, whereas we need to take into account the need to ensure the satisfaction of tourists quantitative and qualitative factors of offer, the satisfaction of participants in local tourism expressed through opportunities for professional development and productive employment, satisfaction with local population, always taking into account the quality of the environment by pointing to the positive and negative impacts of tourism on the environment and the like.

## 2. Analysis of survey results obtained in the hotels of Novi Sad

Tourism is a special branch of the economy at all but also for the fact that some studies range from the simplest to the carefully planned empirical research. Today the survey is the most commonly used method because tourism organizations have much more to know about your end-users and their satisfaction with services provided in certain tourist destinations [6]. In survey that was conducted the human factor was included as one of the most important elements in managing the development of tourism. Tourists evaluated some of the features that employees in the tourist restaurants should have. Issues are mainly related to training personnel and their attitude towards work and guests. Survey had a broader significance and the main goal of this research was to show how the tourists are satisfied with certain service and thus come to know whether and to what extent their demands and expectations are met on one hand and how it is possible to make any corrective action consistent with the results on the other hand in order to achieve positive results in the tourism industry and survival of the destinations on the tourist market in general [7].

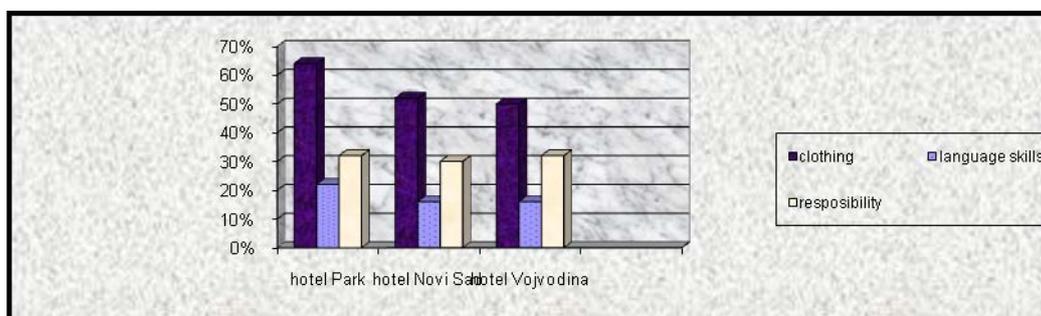
**Table 1** Data of a survey

Total questionnaires 450		Total	%
Total answered questionnaires 280		respondents	
<i>Tourists</i>	domestic	189	67,6%
	foreign	91	32,5%
<i>Sex structure</i>	male	167	59,4%

Total questionnaires 450 Total answered questionnaires 280		Total respondents	%
	female	113	40,35%
Age structure	< = 40	149	53,21%
	41-55	119	42,5%
	>55	12	4,28%
Educational structure	High school	91	32,5%
	University	189	67,5%

The survey was conducted in May 2010 in three hotels in Novi Sad: Park Hotel (5 \*), Ile de France (3 \*), Hotel Novi Sad (3 \*). The totals of 450 questionnaires were given of which only 280 were taken in processing. Survey data can be seen in Table 1. However, due to poor response and return of the questionnaires and the objective difficulties in the access to hotel facilities, only indicative data were obtained which should serve as a good example and a possible starting point for a representative survey of service quality in tourism. Based on the answers given and processed, it can be concluded on the degree of the quality of certain segments of offer and of course the possibilities for their improvement.

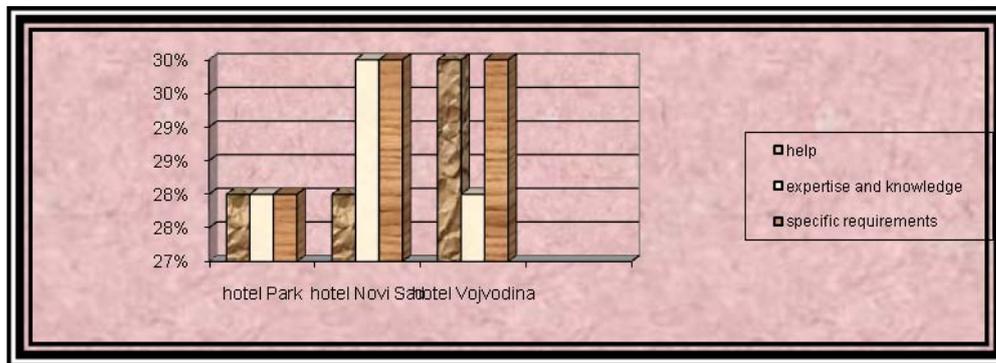
**Figure 1** Percentage display of very satisfied tourists with dress code, language skills and responsibility of personnel employed in hotels



Done by survey data obtained

Hotel Park is a facility that has been completely renovated. Management of the hotel did his best to all work according to European standards and it is logical that the management of human resources is at a high level of development too. Tourists have assessed a dress code positively, 64% were satisfied with the dress of employees and of course this only further highlights the professionalism of business of the hotel. Hotel Novi Sad is also similar to the situation where 52% is satisfied, and in the Ile de France 50%. This data shows quality of the management of employed personnel but looking back a number of years dress code was always there especially in the tourism and hospitality facilities. As far as knowledge of foreign languages, it refers primarily to speaking English and German. The largest part of the employees does not know sufficiently and does not speak English. When it comes to accountability and conscientiousness of the employees it can be seen that in all three hotels have just a little over 30% of satisfied tourists, and it must be noted that there was even a few tourists who gave negative ratings to this issue: exceptions are always present because the structure of the guests are different with regard to age and emitting area. In Graph 1 we can see the percentage value of tourist satisfaction with offered segments of professional skills of staff. The lowest rated knows foreign languages as we have already mentioned. Characteristic of people from the province is hospitality and friendliness and it is logical that the question of the willingness of employees to help at any time will bring a positive evaluation or pleasure of the visitors. In all hotels there is the largest percentage of satisfied and the minimum degree and those who are partially satisfied: 12% Hotel Park, Hotel Novi Sad 2% and 6% Hotel Vojvodina. The professional skills of tourists have also got satisfactory grades (4) and yet it is noted that the employment structure changed significantly as well as education and skills requirement for the commencement of employment in the tourism and hospitality industry. In the Park 28% were very satisfied with prominent expertise of employees, then at the Novi Sad 30% of them and at Vojvodina 28% of tourists from the whole number of people who were taken into analysis. On the question of whether the employees could respond to specific demands of tourists who stayed and were surveyed in a given hotel most of them gave a satisfactory rating. Figure 2 reveals the percentage of estimated value of services in all three hotels.

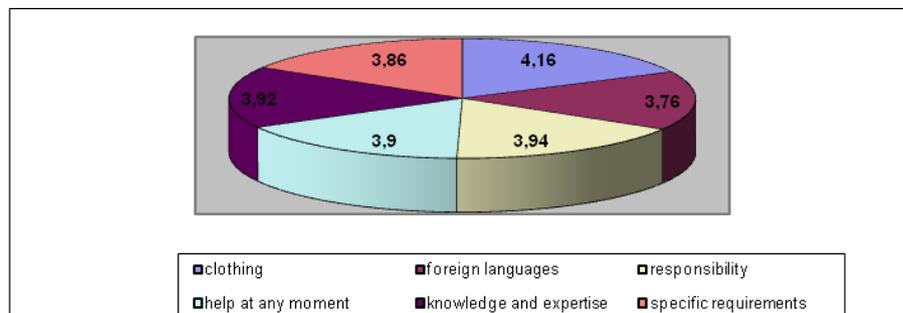
**Figure 2** Percentage display of very satisfied tourists with the willingness to help, expertise and knowledge of staff employed



Done by survey data obtained

As for the staff employed in tourism-hotel services based on a survey it is also possible to note that the situation is relatively good or satisfactory. The highest average rating took a part which was related to adequate training of employees 4.16. This can best be seen from the data in a chart obtained by descriptive analysis of the survey. As for the responsibility, the willingness of employees to help at any time has been evaluated with an average grade above 3.9. The lowest ratings were given in terms of knowledge of foreign languages (3.76) and understanding the specific demands of tourists (3.86). Training of personnel in the field of tourism is of great importance for the development of this activity and to increase the service quality in tourism. Implementation of the system of continuing education which will be shown later will affect the increase in the level of knowledge as well as other specific characteristics of personnel which they must have in their work and relationship with tourists.

**Figure 3** Average scores of individual parts of the tourist offer in the hotels in Novi Sad



Done by survey data obtained

It can be said that the main characteristics of today's tourism market is dynamics because of the appearance of technical development as well as competitive pressure and continuing increase of the expectations and demands of tourism consumers. Of course the introduction of new products and services and new strategies creates instability in the tourism market because companies are constantly struggling not only to accept the papers but also to maintain the position they occupied. However, in the constant struggle to survive or maintain a solid position in the market quality is definitely a key part of success.

### 3. Continuing education as a restrictive measure to improve tourist business

Education is an activity within the social division of labor which improves the knowledge of man and improve his skills and which contributes to the formation of human personality. It must be pointed out that education has an economic function as educators are one of the important factors for the development of productive forces and increase the productivity of labor in society and thus also to

promote social development. The accumulation of knowledge understood as the production of knowledge in educational research and knowledge transfer as well as in education has been given the quality in contemporary society. According to recent research it points out that primary education increases working capacity for 30-40%, medium for 100%, and higher education up to 300%. Russian experts have calculated that each ruble invested in expanded production increases national income for 0.39 rubles while a ruble invested in knowledge and education increases income for 1.45 rubles. It can be concluded that education is the most important factor in success of each development and consequently the tourism industry, too [15]. According to some research knowledge can for period of 8 years drop almost by half. The development changes the structure of personnel employed in tourism. On one side it happens that the staffs with new experiences and education are looked for and yet on the other hand in certain sectors of the economy there is a surplus of such labor. In some countries a large number of occupations disappear completely and yet on the other side entirely new profession are created. Obsolescence of acquired knowledge requires renewal, updating, acquiring new ones [1]. Content of permanent education may be gaining a new education or professional training and development of existing tourism personnel who already have some degree of education. Some of the principles of continuing education may include: ensuring continuity of education, prevent leakage, the linking of various forms of action and goals and ways of education, adapting education systems to social systems which they refer to, use of a large number of funds of education and information and to prepare people at all levels of education for a way of life and work in constant change. Tourism and Hotel Management are business areas where the dynamics of education is of particular importance. The development of modern tourism and tourist traffic in the national and international level increase the need for quality services provided in different shapes, kinds and types of economic organizations that deal with the service and using the achievements of modern science and technology. In this way they adapt to the growing and more various demand for these services. These tourism businesses are once again connected or associated with other business and nonprofit organizations where the role of the staff who must have certain qualifications, skills, and the quality of their work is also emphasized which still requires continuous training and education. Also, It is emphasized the need for new staff profiles, their specialization, broadening knowledge, training for new kinds of jobs. In this way we recognize the importance of education in tourism and hospitality industry because it must provide employees to adjust to new personnel and the ever increasing demands in terms of education and provision of services [14]. What is really needed is to determine the main problems of education taking into account the faster transformation of this economic activity from the classical, local tourism and hospitality in one industry. We should start with the following questions: What is the main goal of training? What kind of education will give the best results in terms of the tasks? What profile of participants should educational programs include? Education must aim at improving knowledge of tourist-hospitality workers in specific places. Seminars should last only three to five days depending on the subject because every course should be completed as a whole. The form of the seminar depends on the subject that is treated and experts must take part in. Training required extensive preparation and consultation in connection with the curriculum that were referred for consideration to renowned scientists in the field of tourism and hospitality and other directors and management of work organizations. The curriculum must provide the expertise needed to operate [10]. According to a survey in 12 tourism businesses in Novi Sad, out of 60 of them interviewed 88% said they were satisfied with their jobs but do not specify many details about why they are satisfied and whether they are satisfied with the external (salary) or internal aspects of the work. It must be pointed out that tourism organizations are looking to achieve top tourist market and condition to achieve this is that they provide quality service to tourists which in turn depend directly on the staff. Average income per capita and wages in the tourism sector in Novi Sad was 15,610 dinars in March 2009. Year. In the same period the highest average salaries and wages was recorded in the municipality Beočin with an average of 36,030 dinars, after that in Novi Sad with an average salary of 34,930 dinars. The highest average salary for the period from March 2009. was registered in the sectors of financial intermediation and mining and quarrying with more than 56,554 dinars. The key to happy work force is in several business steps: motivation and involvement in communication with managers, disclosure of awards based on positive feedback from tourists, to make jobs more interesting by rotating jobs, affect the perception of the importance of teamwork and a sense of belonging to an organization, conversion of work into a career and so on [4]. According to ILO (2002) employment is the effect of quality education and training. It includes the knowledge, expertise and ability that people get and keep a job if laid off, career progress or enter the job market in various seasons of their life and duty cycle [11]. However, there are exceptions to the rules, since the current education of employees is very often not the safety of competitiveness and economic development. The workforce may be inadequately trained, educated; it may not have the necessary knowledge and the like. The main task of managers

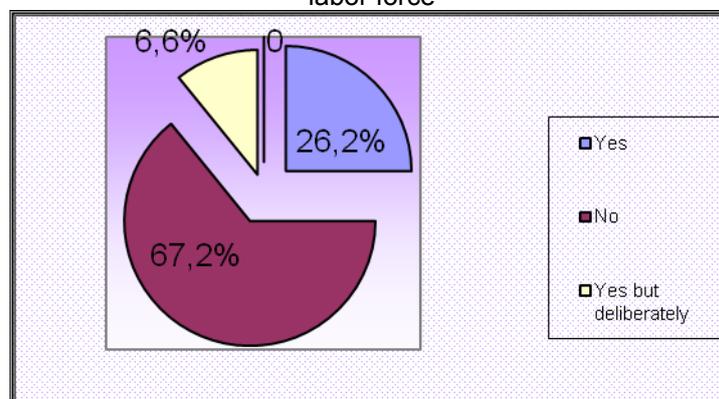
is to create an agile, capable person, willing to take risks and solve problems, think independently and who are willing to work in a team. According to data from the Statistical Office of Serbia, the largest number of unemployed is among the persons with first degree qualification (33.81%), and least of unemployed is among PhDs or those who have the eighth level of education, a total of nine in the Province of Vojvodina. There is also evident that the majority of employees in hotels of Novi Sad is with secondary education, namely 72.72%. A small part of the staff has high (22.72%) and higher vocational education (4.54%). Statistical data show that the employment is in favor of women is 69.09% and 30.91% of employed men. Development of hotels and other tourism enterprises in Novi Sad requires the acquisition of knowledge through continuous training of management and other personnel, but also in the field of learning about new management skills, which should contribute to the overall development of the hotel's destination as a whole. It is necessary to motivate all employees to participate in the education system, and reward their contribution to raising the quality of offer and achieving better physical and financial results. The importance of the qualitative development of tourism highlights the need for personnel who possess superior knowledge and continuous education and training of all employees, instead of the now present trend of inflow of human resources, which lead to changes in social structure at the level of destination.

Educational center of this type would provide introducing the international standards of education and a high degree of comparability between national and the leading European and international programs, and thus the smooth integration into the European Credit Transfer System (ECTS) as a form of cooperation in the European academic community and references to international positioning in tourism. In these frameworks it will be possible to ensure the acquisition of various forms of continuing education and training, and otherwise ensure the possibility of improving knowledge, skills and abilities. Educational tourism is acceptable form of bids for the younger population who are involved in tourist movements; they then become active participants in the attractive educational programs (particularly school trips). Besides it is the best way to get to know the value of this destination, and their family members become customers of other tourist services.

This raises the key issue in human resource management in tourism:

*Does intensive tourism development requires inflow of labor force, whether it is acceptable or not?*

**Figure 4** Opinion of the management of hotels in Novi Sad on the impact of tourism on the influx of labor force



Done according to the survey data obtained through interviews, 2010.

At Graph 4 information are given about what management thinks of influx of labor force in Novi Sad in developing large-scale forms of tourism trends. For the most part the responses were positive in the sense that influx of seasonal workers will not happen (67.2%), because tourism itself has no seasonal nature of business in Novi Sad.

## 4. Conclusion

In recent years the study of tourism as an important socio-economic phenomenon has been given a great consideration, and primarily it has been studied service quality as the imperative of success in the market. Quality of supply is a key segment that dictates the direction and intensity of tourism development. It is generally accepted assessment and conclusion that in the last period tourist services in Serbia developed in an extremely unfavorable environment. The last decade of the

twentieth century is characterized by well-known events (economic isolation, the war in the former republics, Kosovo issue, bombing, etc..) that are deformed relations in the economic and social development of Serbia, and thus in the tourism sector. A new stage in economic development began in late 2000 with the cancellation of the process of economic and political sanctions and involvement in world economic developments. These changes were especially significant for the development of tourism, which by nature of its activities operates difficult in conditions of isolation of the national economy. Stagnation and decline of Serbia in the international tourist trade comes just at a time when other European countries generally recorded high growth rates of foreign tourists and foreign exchange revenues. Quality of services is newer dimension in the contemporary market conditions and the quality policy inevitably the main segment of each business in the tourism and hospitality. Profit is not an adequate measure of success in today's competitive arena, and certainly is pointless, if we look at it static, that is not parallel to assess the changes of position in the market. Expanding markets and achieving a solid position in mind of the perspective certainly has the closest correlation with quality not only of products and services, but also employed people in tourist restaurants. The modern tourist business started investing in the quality of human resources, because it provides a quick and sure success. This paper presents data of a research on the issue of tourist satisfaction with personnel employed in hotels in Novi Sad. The aim was to see what degree of quality human resources meets in terms of the various segments of the supply, from clothing to expertise and knowledge. The data obtained suggest that there is a need to take a lot of corrective measures and actions to improve the quality of workers, because they are key to secure the success of the tourism market. In fact, already mentioned situation or the conditions of developing tourism in Serbia, led to poor quality offer in services and products as well as employees themselves. Unfavorable situation that affected the entire economy has affected the education of employees, and a large number of unskilled labor are employed in tourism, which must be recognized as the leading problem today. It takes many years to change things and take corrective measures to employ in this sector more professional and skilled people, because it is the only sector of the economy where human labor is most responsible for achieving quality and success. For all activities related to improving the quality and reliability the human factor is certainly always present as a prerequisite for the implementation of all activities and to achieve optimal efficiency of activities, especially in tourism, where a man is a direct consumer of services and products. In Novi Sad there are a number of educational institutions that are slowly being introduced more directions for education of personnel for the tourism and hospitality industry. It must be pointed out that apart from education it is necessary to conduct a series of other measures and activities to improve situation, starting with the economic situation. Many people believe that working in tourism is actually one of the easiest tasks, and in recent years there has been an appreciable inflow of labor from the primary sector to the secondary. The conclusion is that the basic condition for ensuring the viability of tourism and hospitality businesses actually is the quality of services and products, and at the first place staff personnel. In order for services received the epithet of a complex tourism services it is necessary to meet the expectations of tourists in all areas of offer. This will of course be achieved only with quality as the imperative of survival of each company.

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# Product Lifecycle Management as a Business Strategy

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**Product Lifecycle Management (PLM) is recognized as one of the most effective approaches for better, fast and cheaper product development and management. Mass customization is one of the key technologies in PLM to provide tailored product to end customers with the cost of mass production. In the modern global economy, companies are facing ever-increasing challenges for short time-to-market to enter into the market early, for reduced time-to-volume to occupy the market quickly, and for decreased time-to-profit to get return from market shortly. Product lifecycle management (PLM) is recognized as one of the key leading technologies to facilitate companies to overcome these challenges, which will offer companies a new way to rapidly plan, organize, manage, measure, and deliver new products or services much faster, better, and cheaper in an integrated way. Following this trend, this study proposes a full scenario of technology solutions for PLM based on the complete analysis of business drivers, industry requirements, limit of current solution, and recent state-of-the-art review in the domain related to PLM. Potential industrial impact of the developed PLM technology solutions is analyzed. It is hoped that the proposed PLM technology solutions will form the frontier basis for further research, development, and application of PLM systems to quickly adapt to the dynamic changing market for industry companies to pursue the most advanced competitiveness.**

## **Keywords**

Product Lifecycle Management (PLM), Business strategy, Technology requirements.

## **1. Introduction**

In today's highly competitive environment, business requirements always drive technology solutions. In response to increasing customer demand and dynamic competition, companies are under high pressure to shorten time-to-market by providing tailored products to the customer for the economy of scope, to reduce time-to-volume via mass production for the economy of scale, and to decrease time-to-profit by increasing the efficiency of the entire lifecycle for the economy of service. These business requirements drive technology needs: (1) to speed up product development, (2) to enhance manufacturing and supply capability and capacity and (3) to improve revenue from lifecycle efficiency. To tackle such challenges, in past decades, with the support of advanced manufacturing technologies, manufacturing industry has shifted from mass production, which takes the advantage of scale of production, to concurrent engineering, which optimizes internal enterprise processes, and virtual enterprise, which leverages intellectual capital via collaborative innovation [1]. In such a virtual enterprise environment, companies need to closely collaborate with customers, manufacturers, and suppliers in a real time manner so as to quickly respond to dynamic market changes.

Accordingly, the business model in the manufacturing industry has shifted from make-to-order, to build-to-order, to engineering-to-order, to configure-to-order, to design-to-order, and in near future to innovate-to-order.

Key technologies to support these business models have changed as well from mass production, to a flexible manufacturing system, to manufacturing knowledge management, to product customization, to product knowledge management, and to product lifecycle management (PLM) [1,2,3,4,5]. As such, PLM is recognized by world's leading universities, institutes, and solution vendors as the next big wave in enterprise application software market.

Product lifecycle includes the processes of portfolio management, product design, process design, supply, production, launch, service, and recycle. Throughout the entire product lifecycle [6], there exist three major objectives, which are:

- customer benefit such as product quality and serviceability,
- company benefit such as product cost and profit, and
- society benefit such as clean and green environment.

These benefits become the 'WHY' aspect of product lifecycle. Bearing these benefits in mind, the 'WHAT' aspect of product lifecycle can be created, which is to model product specification, function, behaviour, structure, geometry, topology, machining process, schedule, supply chain, operation service, recycling, and disposal. The next step is 'HOW' to model the product lifecycle, which are lifecycle processes including specification management, conceptual design, detailed design, process design, production, supply, service, and recycle.

To reach customer benefits, mass customization, time-to-innovation, product quality, and reliability are recognized as the key approaches enabled with technologies e.g., product family design, platform based design, modular product design, design process modelling and management, design knowledge management, collaborative design engineering, function/ behaviour/ structure design, etc.

To achieve company benefits, time-to-market, time-to-volume, and time-to-profit are known as the key approaches enabled with technologies, e.g., collaborative product service, product lifecycle process management, product lifecycle information and knowledge management, etc.

To obtain society benefits, design for service, design for reuse, design for recycle are justified as the key approaches enabled with technologies, e.g. product/ service co-design, collaborative early design for lifecycle efficiency, environmentally conscious design, etc.

This article will focus on the discussion of technology solutions to achieve company benefits in product lifecycle, namely, product lifecycle management (PLM), which is also the dominant direction in the current market of enterprise software application. PLM provides customers, developers, manufacturers, and suppliers with the most effective means by collaboratively managing business activities throughout entire product lifecycle [4,6]. PLM supports the capability of collaborative creation, management, dissemination and use of product assets (including data, information and knowledge) in virtual enterprise integrating people, processes, and technology [1,2,3]. PLM systems manage a portfolio of products, processes, and services from initial concept, through design, engineering, to final disposal. As such, PLM offers companies a new way to rapidly plan, organize, manage, measure, and deliver new products or services much faster, better, and cheaper in an integrated way.

Following this trend, in this article, ever-increasing business drivers and industrial requirements are analyzed. PLM is proposed as a new weapon to satisfy modern needs for new business model of innovation-to-order. A recent state-of-the-art review for PLM, including both academe and industry is done.

To effectively manage these product lifecycle processes for competitive advantages via efficient collaboration, technology solutions for PLM are proposed as the future trend. Accordingly, the impacts of PLM technology solutions to industry are analyzed.

## **2. Challenges in Product Lifecycle**

### **2.1 Business Driver**

The current business environment faces new business challenges for effective management of whole product lifecycle [3], e.g., shorter product lifecycles, increased outsourcing, mass customization demands, more complex products, geographically dispersed design teams, inventories subject to rapid depreciation, and rapid fulfilment needs. In general, these challenges include increased speed, increased demand; increased outsourcing, and the use of Internet.

To effectively tackle the above challenges in a modern collaborative enterprise environment [1,6], new industrial capabilities are required in order to obtain business success in today's Internet economy:

1. Geographically scattered design teams and supply chain partners need to collaboratively design products on a virtual basis.
2. Static designs need to be replaced by mass customization often using predefined modules or building blocks to rapidly configure new product platforms that can be flexibly managed through lifecycle.
3. A new approach needs to be created to leverage net centric technology to liberate the inherent value in today's extended business model.
4. Such a new approach should enable business to use and leverage information needed by each partner to accelerate and enhance product development predictability.
5. That approach should provide a system to exchange and control product information and to perform real-time program/project management.
6. A system needs to emerge as the dominant technology for managing inter-enterprise data, information and knowledge.

To meet these requirements, a new system is imperatively required:

- to provide an information continuum in order to deliver pervasive, real-time analytics, querying, and reporting throughout the entire product lifecycle,
- to provide a collaborative environment bringing together multiple roles, constituents, and stakeholders in threaded discussions beyond four walls of enterprise,
- to enable interactive viewing upon product development through multiple devices, channels, and systems involved with the product lifecycle,
- to be an open but integrated solution supporting key enterprise value disciplines of product leadership, customer intimacy, and operational excellence.

Such a new system will provide customers, developers, manufacturers, suppliers, and partners with the following capabilities:

- product lifecycle collaboration across virtual enterprises,
- common product lifecycle processes management,
- effective management of product lifecycle activities, convenient integration with other enterprise systems.

### **3. Review of PLM Approach**

#### **3.1 PLM Concept**

As companies move towards providing better customer-centric products and services quickly to maximally satisfy customer requirements, to improve market share and market size with continuously growing revenue, the efficiency and effectiveness of product lifecycle management becomes much more important in modern enterprise application systems [1,7]. To address these needs, PLM has recently been recognized as a new strategic business approach in support of collaborative creation, management, dissemination, and use of product assets, including data, information, knowledge, etc., across extended enterprise from concept to end of life – integrating people, processes, and technology. PLM systems support the management of a portfolio of products, processes, and services from the initial concept, through the design, engineering, launch, production, and use to final disposal. They coordinate and collaborate products, project and process information throughout the product value chain among various players, internal and external to enterprise. They also support a product-centric business solution that unifies product lifecycle by enabling online sharing of product knowledge and business applications [2,3,4].

As such, PLM enables manufacturing organizations to obtain the greatest competitive advantages by creating better products in less time, at a lower cost, and with fewer defects than ever before. In summary, PLM not only provides service throughout the entire product lifecycle, but also enables effective collaboration among networked participants in product value chain, which differentiates it from traditional enterprise application systems, such as Enterprise Resource Planning (ERP), Manufacturing Execution System (MES), etc.

### 3.3 Gap Analysis

However, to get the most competitive advantages in the modern dynamic global manufacturing era, there is still a big gap between increasing demands from industrial companies and available solutions from vendors. The gaps in PLM include:

1. CAD/CAPP/CAM integration versus collaboration product development and real time design to manufacturing collaboration;
2. Product structure and configuration management versus collaborative product family design for mass customization;
3. Design for manufacturing versus design for supply chain and lifecycle efficiency;
4. Product planning versus product portfolio management;
5. Design workflow management versus product lifecycle process management;
7. Product and part maintenance versus extended product service.

Therefore, it is imperatively required that new technology needs to be identified and further developed to enable current commercial PLM solutions to satisfy increasing industrial requirements.

## 4. Collaborative PLM Strategy

### 4.1. PLM Strategy

As a business strategy [2,3,4], PLM lets distributed organizations innovate, produce, develop, support, and retire products. It captures best practices creating a storehouse of valuable intellectual capital for systematic and repeatable re-use.

As an information technology strategy, PLM establishes a coherent data structure that enables real-time collaboration and data sharing among geographically distributed teams. PLM lets companies consolidate multiple application systems while leveraging existing legacy investments during their useful lives. Through adherence to industry standards, PLM minimizes data translation issues while providing users with information access and process visibility at every stage of the product's life.

PLM systems support the management of a portfolio of products, processes and services from initial concept, through design, launch, production and use to final disposal [8]. They coordinate products, project and process information throughout new product introduction, production, service and retirement among the various players, internal and external, who must collaborate to bring the concept to fruition.

The PLM concept gives the strategies to organize and to manage product information the entire life cycle, from concept to re-cycling of the product through:

- Share the updated product information's within the organization to design, manufacturing, marketing and procurement divisions,
- Collaborate internal team with external users, suppliers and customers for iterating new designs,
- Maintain a repository of product information for design reuse and to reduce part redundancy,
- Systematically gather and analyze customer or market product requirements,
- Streamline sourcing team to identify a list of preferred suppliers for purchasing custom and standard parts,
- Streamline resource management and analyze the cost-benefits of allocating resources for specific projects.

Management and distribution of enterprise information by PLM system is realized on different data levels, as:

- ICT
  - Compliance with existing legacy system
  - Integration of PLM and ERP/CAD systems
- Processes
  - Fragmented and unalterable
  - Modeling, controlling, improving
- Data & Objects
  - Different data formats; Standard data representation (IGES, STEP...)
  - Preserving data integrity along the time; Supporting data evolution
- Methods & Tools

- Specific tools (CAD, CAE)
- New development methodologies (Six Sigma, Axiomatic design...)
- People & Organization
  - Functional organization promotes incommu-nicability
  - Supply chain approach

## **4.2. Establishing PLM**

There are companies that supply software to support the PLM process. That software itself is just a tool and cannot make many contributions if the PLM process is not defined first and understood by its users whom it should contribute to at the end. Setting up PLM within the company is a process and project itself [6].

Select operations that should be managed as a part of the PLM across the company business would be:

- Customer relationship management (CRM) system for managing customer record,
- Enterprise resource planning (ERP) system for managing financial records,
- Supply chain management (SCM) system for managing supplier support,
- Human resource management (HRM) system to manage the employee record,
- Requirement management (RM) system for managing of requirements,
- Project management (PM) system for managing capabilities provide project scheduling, tracking, and resource management while the change management is driving the execution of these projects via the process workflows and part/document management capabilities.
- Product data Management (PDM) system for managing product data and workflows.

Fist step in establishing PLM would be understanding and analyzing the company way of work, organizational structure, roles and responsibilities within the organization. Each of the PLM operational systems should be defined to specify who is contributing to the system, how the information is shared and responsible person appointed for each of the systems. It is not necessary that all those operation systems are integrated within one software tool, and usually for small and medium companies they won't be, while on the other side big companies might need to adopt available software and tools to their specific needs.

## **4.3. Application of PLM in medium to large enterprises**

In the current economic climate, addressing global business challenges is the top priority of most medium and large enterprises. Whether they want to expand their customer base in new markets, or to leverage more cost competitive resources, conducting their business globally is a necessity [1,7]. To sustain an advantage, they have to overcome the challenges of a dispersed organization, while still empowering individual team members.

PLM concept offers comprehensive solutions to help enterprises address their challenges and create competitive advantage. Five areas where medium and large enterprise should have achieved success include:

- Managing new product introduction, to create a winning product portfolio.
  - Achieving concurrent engineering globally, to be faster to market.
  - Creating platforms for reuse, to reduce cost and speed product customization.
  - Managing product and manufacturing complexity, to avoid program problems.
- Supporting products currently in-service, to ensure they are available for use at minimum cost.

## **4.4. Application of PLM in small to medium enterprises**

Small and medium enterprises have special needs and limited resources. PLM concept brings a complete solutions designed specifically for them; solutions that help them respond better to their customer's needs.

Small businesses need a product lifecycle management solution designed from the ground-up –one that is pre-configured with the industry's best practices, and offers fast and affordable deployment. Fully integrated PLM solutions are designed to provide what small and medium enterprises need to maximize their innovation strategy, and easily scale to meet their needs tomorrow.

One producer of that type of PLM software solutions is Siemens PLM software [8]. It helps mid-sized

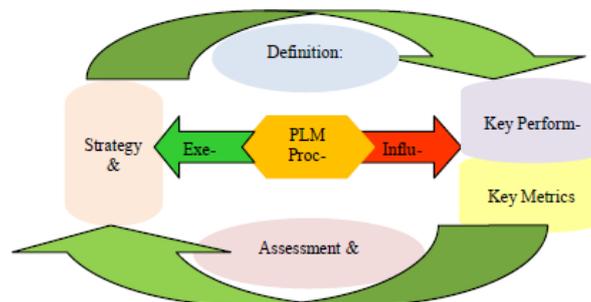
manufacturing companies to transform their process of innovation by applying preconfigured best practices to everyday engineering tasks and processes. Companies using PLM software benefit from:

- Securing their corporate design data while facilitating access by authorized personnel
- A more successful move from 2D to 3D
- Increasing their design reuse, facilitated by a powerful and flexible search capability
- Streamlining their engineering process with simple design review and release workflows and effective change management
- Error reduction through more effective collaboration between their departments and the elimination of mistake manual handoffs to manufacturing
- Rapid deployment of a full-featured product data management (PDM) solution
- Low total cost of ownership.

## 5. PLM Metrics Development Process

The questions often asked in business and commerce are how well do we know we're doing, and how do we know what we're doing is working? There is important to find out the metrics process for measuring what is important and meaningful [3,5,7]. The only way to find out answers to these questions is to measure the processes and outcomes of these processes. As PLM transforms the way companies do business, it is important that companies understand how well they are doing. To determine the effectiveness of PLM implementation within any context, PLM processes and outcomes need to be measured. Measurement of PLM requires the development of metrics that are important and meaningful to the process. It is essential that what is identified as a metric is relevant, appropriate and important, since typically what gets measured gets done.

The objective of the metrics development process is to identify, develop, and articulate PLM metrics that would help companies implementing PLM determine the extent to which their PLM efforts are paying off. The PLM assessment process model shown at the Figure 1, conceptually presents the metrics development process.



**Figure 1** PLM Assessment Process Model

The PLM processes, including ideation, design, build, service, disposal, and recycling, on one hand influence the determination the key performance indicators of success on the other hand the execution of the strategies and initiatives depends on them. The key performance indicators are directly impacted by the organizational strategies and initiatives. In other words, the organizational goals and objectives define what the organization considers success which should determine the key performance indicators. Key metrics are derived from the performance indicators. The key metrics measure what is relevant and important to the organization as outlined by the organizational strategic plan. Outcomes of the assessment and analysis using the key metrics impact the organizational strategic plan. These metrics are all tied to business objectives related to growth, revenue, and profitability.

PLM metrics can be applied at various levels of complexity.

- At the very basic Level 1 Input metrics are measured. At this level, the question is whether the organization is applying appropriate resources to the PLM process, i.e. investments.
- At Level 2, metrics are used to determine if the appropriate PLM processes were implemented, e.g., Requirements Management, Sourcing and procurement, Distribution Quote/order generation.
- Level 3 focuses on customers being reached.
- Level 4 and 5 metrics examine the efficiency whether the outputs meet the needs of customers are being met (e.g., requirements traceability, visualization, concepts, design capture & accessibility, change control & change capacity, configuration management, commercial cost of risk, product

quality) and effectiveness, if desirable results are being achieved (e.g., generation of new business, software integration, cost performance, market share, cost reduction, design reuse).

- At the highest Level 6 metrics are used to measure the impact of the implementation of PLM by measuring the extent to which procedures and controls have been integrated and the return on investment. Level 6 metrics are the most complex and difficult to measure. These include waste reduction, innovation/ new products, continuous improvement, and sustainable green manufacturing.

## 6. PLM Business Value

When the enterprise implements the PLM concept in work, than it can move forward strategically while achieving near-term results and can establish a platform for innovation. As the enterprise address specific business issues and builds a solid foundation for future success through PLM platform, it will be able to realize measurable innovation benefits both immediately and over the long term, shown on the Figure 2.

Traditionally, companies brought their products to market in time-consuming serial processes that delayed the participation of downstream contributors, such as suppliers, manufacturing experts and service/maintenance providers. By allowing to the enterprise to execute as many lifecycle tasks as possible in parallel processes, PLM enables to the enterprise to streamline and collapse critical stages in the product lifecycle. PLM delivers aligned, accurate, and highly synchronized product knowledge to multiple disciplines early in product lifecycle – thereby avoiding the cost and scheduling impact that comes when late suggestions and unexpected concerns arise from downstream players. PLM enables to the enterprise to beat the competition to market with innovative product content that carries first-to-market advantages and drives early product sales.

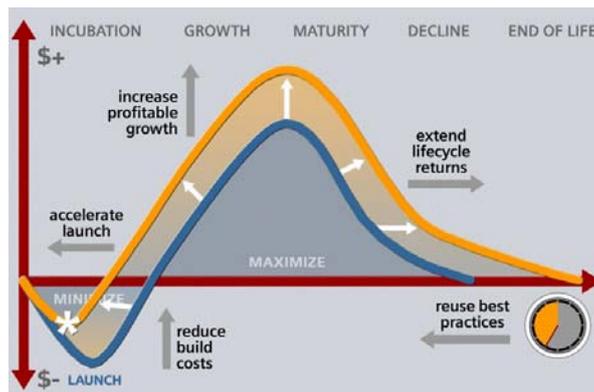


Figure 2 PLM business value

### 6.1 Increase profitable growth

PLM allows the enterprise to create, capture and share the product-related requirements, expectations and preferences of targeted customers and markets and align these requirements with specific innovative content that customers want for a price they can afford at the time when it is needed. PLM concept gives new product ideas against quickly rising customer requirements and cost effective manufacturability. Global cross-functional teams collaborate in real time on the development process, each contributing their unique experience and perspective. Knowledge and “lessons learned” are captured for potential re-use in a process of continual innovation. PLM facilitates mass customization by enabling to rapidly and costs effectively deliver customized product offerings that satisfy the needs of individual customers and targeted market segments. PLM combines the advantages of configuration management with option and variant management. These state-of-the-market capabilities allow the enterprise to perform portfolio planning in as flexible and continuous a process as possible.

## 6.2 Reduce build costs

PLM allows the enterprise to reduce cost across all of the stages in the product lifecycle – which in turn, enables to minimize the cost of the product offerings that plan, develop, manufacture, and support.

For example, by leveraging PLM to understand the time and resource impacts of proposed design changes and requirements changes, the enterprise's team can make decisions that minimize lifecycle and product costs. By using PLM to catch design flaws up front in the lifecycle, the team can avoid the cascading rework and cost associated with changing the products during the manufacturing stages of the product lifecycle. Also, the enterprise's team can use PLM to incorporate the concerns of the maintenance and service groups into the product designs and minimize warranty costs. By digitally creating and re-using the manufacturing plans, plant information and manufacturing processes, the enterprise can reduce the overall operational costs. The enterprise can also use PLM to implement virtual prototyping that enables to reduce the validation costs associated with physical prototyping.

Implementation of the PLM concept in the enterprise enables to cost effectively deliver product enhancements, derivatives, niche offerings and add-ons that extend the profitable duration of the product lifecycle. PLM facilitates this objective by enabling to create product platforms that accelerate start up processes, minimize take to market cost and maximize the revenue generated by a product's initial release.

PLM enables the enterprise to maximize the re-use of the best-practice processes, intellectual capital, human resources, product plans, production plans, production facilities and value chains across a continuing set of take-to-market programs and complete set of product and production management capabilities.

## 7. Idea for Joint Programme of PLM Master Studies

The basic principles for offer the master study programme in PLM in the Western Balkan region are that the curriculum of joint PLM master programme is committed to excellence in European-wide PLM interdisciplinary education and training of engineers to deliver and manage high quality and trustworthy systems for all phases of PLM that meet the local industrial, economical, environmental and social needs. The knowledge in PLM offers an approach complete and comprehensive to the most acute problems of economic development on the whole, as well as the competitive positioning of the individual company.

The intention of this joint programme is to promote a new type of expert who will have all the necessary theoretical and practical knowledge, not just engineering, but business, economical and environmental as well, covered by new ICT techniques. That kind of expert needs to have the ability for research in those disciplines, also as specific skills in product development and management in all phases of its lifecycle with environmental sustainability and corporate social responsibility view. They need to be prepared to apply the learnt methods for product and process management in different areas, such as production, services, and public activities in practice, all of this supported by latest information technologies.

The beneficiary partner institutions from Western Balkan (WB) made needs analysis in order to improve the higher education curricula, to develop and to offer new one, based on the experiences of Italian partner institution, in the field of competitive Product Lifecycle Management (PLM) by integrated Sustainable Development (SD) view. Partner institutions developed Joint Programme of Master Studies in PLM under coordination of Technical University of Turin from Italy and University from Maribor, Slovenia established at the universities from WB region: Macedonia, Serbia and Croatia.

Joint Programme of Master Studies in PLM is established in continued process during two years of development the structure, the teaching contents, the teaching methodologies adopted for blended learning, new teaching ICT environment and implementation of new programme at the postgraduate university level in accordance with Bologna Declaration principles.

This new introduced Joint Master studies programme in Product Lifecycle Management is new offer on postgraduate level in WB countries with interdisciplinary and contemporary contents in fields of industrial engineering, management and sustainable development with business and management subjects, ICT technology driven subjects and environmental sustainability subjects. Development and implementation of the joint programme of master studies in PLM is realized in frame of the Tempus IV MAS-PLM project: Master studies and continuing education network for Product Lifecycle Management with Sustainable Production, funded by EC with the Agreement No.144959-TEMPUS-2008-IT-JPCR (2009-2012) ([www.master-plm.net](http://www.master-plm.net)).

## 7. Conclusion

Although a quite new method with short history PLM has proven itself to be useful for all management levels within the company in both vertical and horizontal organization. By making relevant historical information structured and available PLM is used both for those who are doing execution and decision makers within the organization answering to the rapid changes in the business environment. A business approach for coordinating design process through the implementation of PLM systems is proposed for improving design coordination in SMEs. Firstly, this business approach is based on a method for analysing informal collaborative practices and modelling detailed design processes. Secondly, these processes are implemented by using PLM technologies. Multi-level workflows are implemented to control progress of design schedule from project management level to document lifecycle management level.

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# Towards the Development of Web-based Business Intelligence Tools: Co-creation Strategy Components in Technology-driven Firms

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This paper focuses on using web search techniques in examining the co-creation strategies of technology driven firms. It does not focus on the co-creation results but describes the implementation of a software tool using data mining techniques to analyze the content on firms' websites. The tool was used in other research projects to identify the ways firms engage in value co-creation with customers.

## Keywords

Business intelligence tools, search engine, value co-creation, quantitative analysis, qualitative analysis

## 1. Introduction

This paper describes the results from a research project focusing on using web search techniques in examining the co-creation strategies of technology driven firms. The research methodology was first developed by Hicks et al. (2006) and then introduced to the study of value co-creation by Steve Allen et al. (2009) and by Tanev et al. (2010). It is based on using data mining techniques and principal component analysis to analyze the content on firms' websites in identifying the ways firms engage in value co-creation with customers. A key component in the methodology is the use of a search engine and all the works so far have focused on using Google. The research methodology is visualized in the figure below.

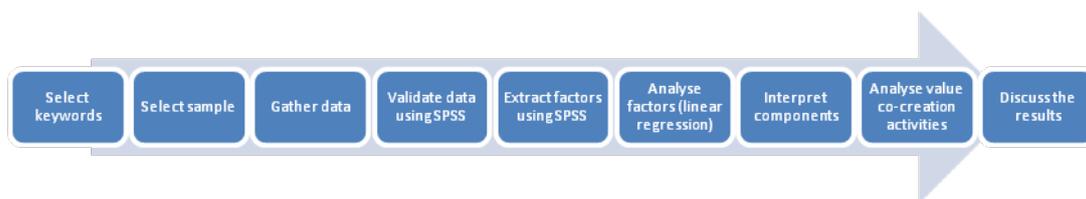


Figure 1 A step-by-step description of the research methodology

The present study will extend the above methodology by using data from multiple search engines. This approach will validate the research methodology and will attempt to provide valuable insights on the coherence of the results from the different search engines. The focus however will be on the enhancement of the functionality of the search tool. The main deliverable therefore is the development of a user friendly search tool. In order to be able to validate and further expand the methodology, the present study will be based on the same keywords and the same sample of firms as in Allen et al, 2009 and Tanev et al., 2010. The key difference in our approach can be summarized as follows. First, a new data collection was done by three different web search engines (Google, Yahoo, Bing) to measure the frequency of the keywords on firms' websites. Second, the data was collected by newly developed multi-functional search tool.

## 2. Development of the Search Tool ‘LuckySearch’

This section will focus on the details of the development and the functionality of the search tool.

### 2.1 Description of the functionality of the LuckySearch tool

The application is developed as a Windows Desktop program. It executes searches on Google, Yahoo! Search and Bing. The search queries are constructed for each keyword and each company's web site. Also one additional search is executed only with the company's web site, to get the count of the pages in the web site. The output of the application is one (287x30) matrix (corresponding to # of firms X # of keywords) saved in Microsoft Excel file with the results of the searches executed against one of the search engines. The results are structured in a table with columns – the selected 29 keywords entered as an input + one column for the pages size of the web site; and rows – the 287 companies' web sites. The data in the table is normalized: the number of pages beneath the site and the keyword counts normalized by the number of pages beneath the site. The application is able to execute simultaneous searches against one of the three search engines. The number of the simultaneously executed search may be preconfigured by the user of the application. The application is constructed in a way that supposes further development and integration with the SPSS software. The user interface is shown in Fig. 2.



Figure 2 Preview of the LuckySearch user interface

To use the software application, the following steps must be executed:

- Import a text file that contains the predesigned keywords. Each keyword should be placed in a new line in the file or in the “**Keywords**” text area in the keyword application window.
- Import a text file that contains the web sites. Each web site should be placed in a new line in the file or in the “**Websites**” text area in the application window.

- Select a folder in the field “**Output directory**”, to specify the output directory where the excel file and the text files results should be collected.
- Choose the “**Number of threads**”, which specifies the parallel web searches executed at a given moment. It is recommended that this value is preset to 2, otherwise the search engine may reject the request to execute the web searches.
- To save the text content from the first found web pages should be parsed and saved in the specified output directory, check the field “**Save text results**”.
- To specify the number of the first found web pages, from the search engines, which are going to be parsed and their text content saved, choose the number from “**Number of links**” field.
- Click the “**Search**” button to start web search executions.

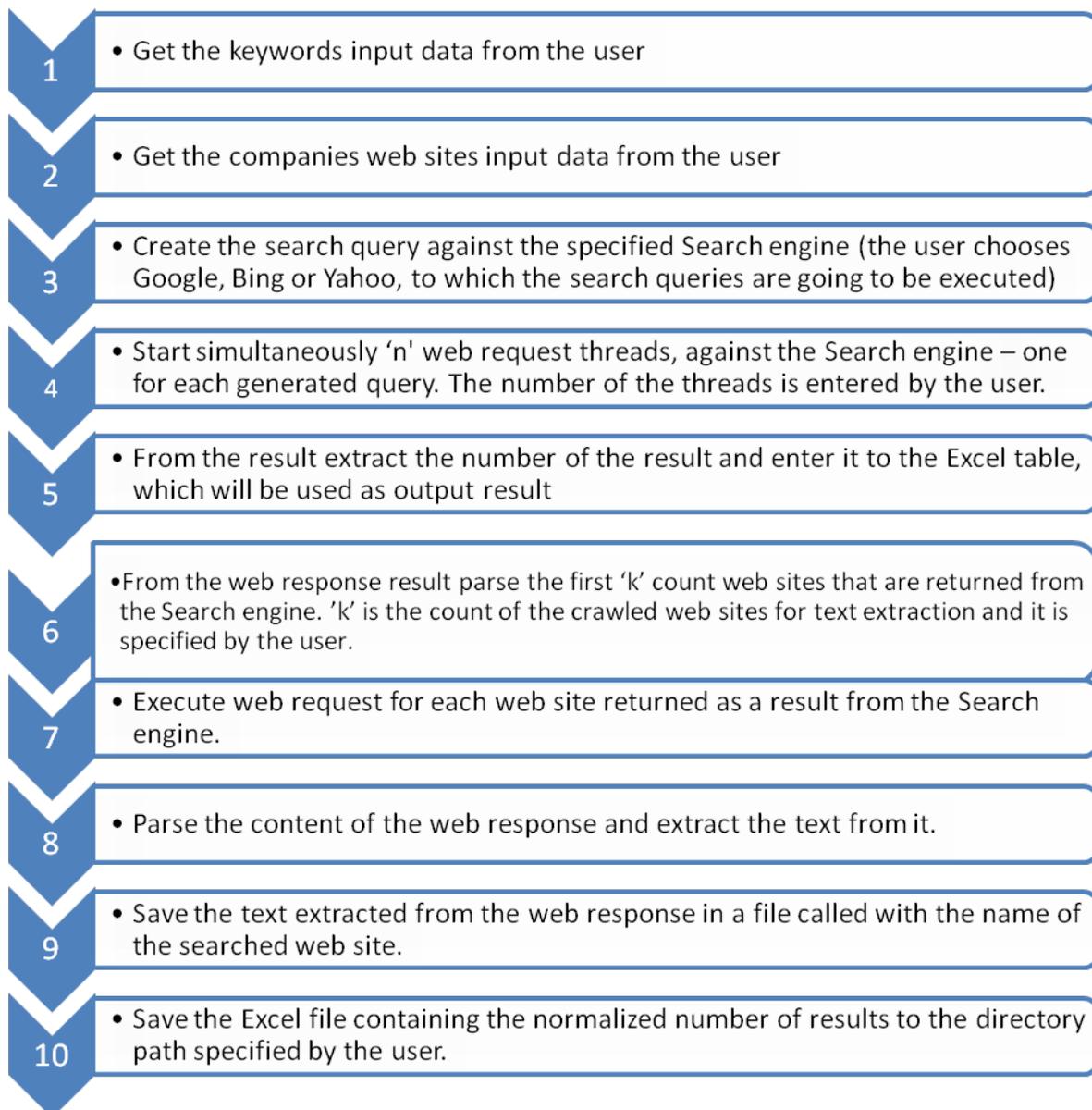
## **2.2 Technical description of the LuckySearch Tool**

1. **Development platform.** As the Bing and the .NET platforms have a common owner - Microsoft, there is plenty of documentation, articles and examples how the Bing API can be used with the .NET development platform. There is an available Bing library written in .NET that can be used for the execution of web search requests. Yahoo! Search has its own .NET Developer Center with HOWTO articles and Community Resources where one can join mailing list and discuss the Yahoo! APIs (as well as OAuth Authorization class source in C# and VB.NET). The OAuth Authorization source saves a significant development tie and is appropriate to be used in this project. For Google there is an available .NET Client Library Developer’s Guide, which includes many tutorials and examples in .NET. From version 14 onwards SPSS can be driven externally by a Python, R and .NET program using supplied "plug-ins". So for the sake of convenience for the further development and integration with SPSS, one should focus on using development platforms such as: Python, R or .NET. Since the application uses Microsoft Excel file as the output of the application, the development platform should have integration and possibility for output Excel files with filled results in it. Microsoft distributes MS Office libraries that can be used by external sources. They support almost all Windows development platforms including .NET. One advantage of .NET over Python is the possibility to use integrated modules for Windows Forms and the nice compatibility between .NET and Windows’ Desktop. Having in mind all of the above, it was found to be most appropriate using the .NET platform and its most popular language C#. As a coding convention for the development we have chosen the one recommended by Microsoft.

2. **Software application design.** All the search engines’ API supports a web response in XML, JSON and SOAP protocols. In this software XML responses are chosen to be used, as this is the most affirmative method today. For the development of the Bing part in the application, Bing API SDK was used. It provides automatic authentication and search query construction. It is recommended to be used by Microsoft MSDN. The application - "LuckySearch" is developed with three subprojects:

- The user interface is separated in individual sub-project. It contains the user settings, the windows forms interface and the class that outputs the Excel data file with the matrix results. This project manages the executed simultaneous threads.
- Module responsible for extracting the text from the web site content. It parses the web page and removes its HTML, Javascript and Flash code.
- Module responsible for executing web requests to the Google, Yahoo and Bing. It is also responsible for parsing the results from the Search engines. It determines the total number of results for a given requests, and also gathers the returned links in a lists.

3. **Application process flow.** The diagram shown in Fig. are described the process actions steps that the application LuckySearch must execute to gather the search engines Excel data results and the text data results from the sites linked by the search engines.



**Figure 3** Process diagram of the LuckySearch application

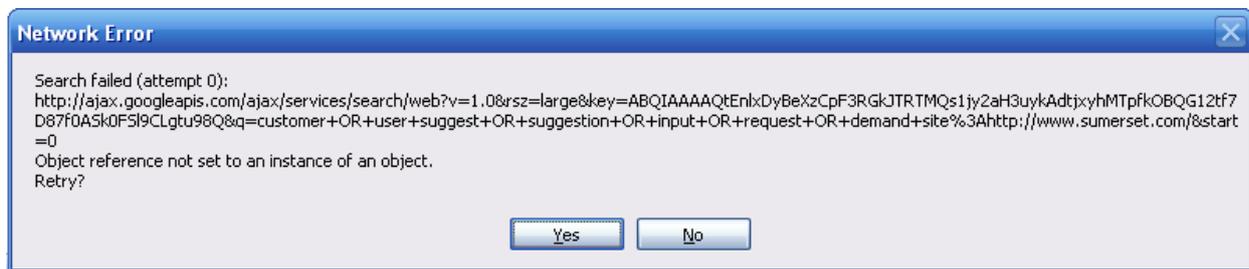
4. **Constructing the search queries.** Before executing the search requests, the application must be registered in the search engine's web site:

- Yahoo: <http://developer.yahoo.com/bbauth/appreg.html>;
- Bing: <http://www.bing.com/developers/appids.aspx>;
- Google: <http://code.google.com/apis/accounts/docs/RegistrationForWebAppsAuto.html>.

Before filling any of these registration forms one must have an account for the corresponding search engine. After the registration is done, specific keys and passwords given during the registration must be used for authentication when creating the web requests to the search engines.

5. **Technical challenges.** One of the most serious problems when using the tool came from the fact that, if there is a bigger web request load from one single place to their API, the connection is rejected without the possibility to open a new one for an unpredictable period of time. This can be resolved by executing the requests with a lower flooding and smaller amount of threads used in the application. The number of threads can be predefined in the application, but it must not increase three threads at one time. Also if the problem occurs again, the search requests for all web sites can be executed at two, three or more parts with a gap of, for example, 20 min. When using the Google API, the maximum simultaneous threads must be no more than two. Also the group of 287 company's web sites was loaded and executed in groups of four with group of 70 companies each. When using the Yahoo! Search API it is suggested that the threads must be no more than 3 and for Bing they must be no more than 5. Even with these precautions, because of using the application very often or because

of any other reason, the Search engine can decide to block the web requests for a period of time. Than LuckySearch receives error 403 from the server and waits for 30 seconds. If the error occurs again it shows message box shown on figure 11 that stops the thread until the user doesn't click OK.



**Figure 4** Error window shown when LuckySearch is blocked

When searching for a keyword in Google, Yahoo and Bing, the engine could show millions web pages. Actually, it shows only ten results on the first page and when you click on the next twenty pages the number of results decreases. It can decrease, for example, from 1 600 000 results down to 450. Most of the results are claimed to be in the “Invisible Web”. The Search engines calculation of the total number of search results is an estimate. As this makes one uncertain about the validity of the results, one can assume that it will be proportional for each search result and, thus, empirically correct. For Bing there is specifically developed tool “Bing Sharp”. It calculates the total number of search result not as estimation, but as a sharp value. It is not used in the current thesis, but is suggestion for further research. Although the results are not as many as the first totals search estimation, it is still a large amount of data. Therefore in the application will be available text box, by which the user can configure what number of web sites to be parsed.

Another challenge was related to the question how to remove the useless content of the web sites and be able to extract only the text. The approach that was undertaken can be summarized as follows.

- All the html code must be removed. To be properly removed, the HTML must be a valid xml. This helps the code to find, for each opened xml tag, the closing one. The html removal can be applied by depth first search algorithm for the XML tree, also each opening and closing XML tag will be removed, as it is not valid text (in HTML, the < class is &lt; and > is &gt;). Exception from the removal of each XML tag is, if it is not included in <pre> tag that stands for preformatted text and excludes all other inner tags.
- The script code must be removed. All the js and vb files are ignored. Rare there is a text in these files. All the scripts are enclosed in <script> tag and that's the way it can be found and removed, as it is useless code.
- The style sheets must be removed. All the .css files are ignored too. All the styles in the html file is enclosed in <style> tag and that's the way it can be removed.
- The video and flash animations are removed while removing the html tags, because in the HTML files they are presented only as one <object> tag. The Flash and Silverlight only sites (that doesn't use HTML) are ignored by the Search engines too, so they are not problem for gathering its text.

Another smaller challenge was that there were lots of symbols (more than 250) of the text in the HTML document, which are presented as encoded ones. As an example &lt; stands for <, &gt; stands for > and &amp; stands for &. They must be decoded, to be entered properly as text results in the data storage that will save the text results. The extracted text from the web sites must be stored in files, to be available for further data mining provided by external tools or further developed in LuckySearch. For each company there must be created a text file, to which the text must be added. After the LuckySearch is finished with the web site text gathering, there must be 287 files with extracted text data for each keyword. If needed later the LuckySearch might be easily redeveloped to store the extracted text for each keyword in separate file.

### 3. Conclusions

The paper focused on the description of the implantation of LuckySearch – a software business intelligence tool using online data to study the customer interactive behaviour of technology driven firms. The focus on the technical description was intentional. The reader could find more details on using the tool for value co-creation research in related research publications (Allen, 2009; Tanev et al,

2009). The implementation of the tool opens the possibility to explore other areas of research including competitive strategy, online cooperation etc.

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# Knowledge Transfer Flows in the Life Sciences

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This paper investigates knowledge transfer process in the life sciences. We analyze traditional knowledge transfer activities, contingent on industrial funding of academia, and “new-type” knowledge transfer activities, including patenting, licensing and the creation of spin-off companies. Previous studies of the impact of knowledge transfer on knowledge flows in life science communities have produced equivocal findings. While some authors supported modest evidence of the restrictions in knowledge diffusion due to patenting and exclusive licensing of basic technologies, others pointed to significant limitations in the dissemination of research inputs and results, particularly in genetics. The key research question of this paper is: How does the involvement of researchers in different forms of knowledge transfer with the industry influence the particular forms of knowledge flows among researchers? Based on the literature review we established the theoretical framework of knowledge transfer process from an individual researcher perspective. Our research model included two dependent variables, formal and informal collaboration, and predictor variables, that refer to involvement in “traditional” and “new-type” knowledge transfer activities as well as to scientists’ human and social capital. The model developed within this research should be the first seeking to identify the influences of different types of knowledge transfer on the extent of particular forms of collaboration between fellow researchers. As such, it represents an original contribution to the existing literature dealing with the complex problem of withholding of research results and limitations in formal collaboration among the members of the scientific community, which may derive from their involvement in knowledge transfer. This is relevant because of potentially detrimental effect of knowledge transfer on the progress of fundamental science. The empirical findings on knowledge flows in the academic community, the norms of sharing practices and causes of such behaviors have important implications for researchers, managers and policy makers.

## Keywords

Formal knowledge flows, Informal knowledge flows, New-type knowledge transfer, Traditional knowledge transfer

## 1. Introduction

The adoption of the Patent and Trademark Amendments of 1980 in the USA, known as the Bayh-Dole Act, is historically viewed as an event that marked the beginning of the global upsurge of knowledge and technology transfer activities from academic and other non-profit research institutions to the business sector. The Bayh-Dole Act gave non-profit institutions the privilege to retain the property rights to inventions deriving from the state-funded research. Prior literature on the subject matter examined how links between academia and industry enable the realization of complementarities between applied and basic research, the generation of new research ideas and the overcoming of the shortage of funding of basic research through the private sector [1]. Other stream of researchers explored how engagement of individual researchers into knowledge transfer activities could undermine their commitment to the norms of open science, in that way leading to secrecy and publication delays

[2, 3]. The most often examined challenges of the Bayh-Dole Act include: threat to scientific progress due to increasing disclosure restrictions; declining patents' and publications' quality, biasing research efforts toward commercial priorities and crowding-out between patents and publications [4]. These issues have been examined on the individual and institutional levels of analysis, taking into account either the academic or the industry perspective [5]. Recently the level of analysis shifted to an individual's perspective to fully capture the predictors, characteristics and effects of knowledge transfer process, particularly in relation to scientific knowledge diffusion [6].

Drawing from this body of literature we identified several gaps. First, empirical studies have for the most part dealt with the impact of patenting on the open science environment, without paying specific attention to other knowledge transfer activities [7, 8]. Second, the studies that did consider the impact of different forms of knowledge transfer on knowledge flows among researchers have mostly examined only one aspect of knowledge diffusion - informal cooperation between researchers [9-11]. Third, the empirical findings with reference to formal knowledge flows have typically been restricted to investigations of the relationship between knowledge transfer and quantity and quality of the researchers' scientific output [12]. Thus, only few studies attempted so far to consider the determinants of other forms of formal collaboration among researchers, such as collaborative research projects or personnel exchange between laboratories.

In this study we first seek to provide a broad perspective on knowledge flows in the life science community, by considering both the individual and the environmental determinants of different forms of collaborative efforts among researchers. Second, we plan to extend the work of other scholars that discuss the conflicts between the norms of free circulation of knowledge and the rules of market competition [13], arisen following the expansion of patenting in the life sciences. Specifically, our research aims to investigate a wide range of knowledge transfer activities in assessing their role in the diffusion of formal and informal scientific knowledge. By separately evaluating different forms of knowledge transfer we intend to account for their diverse characteristics and consequently, their potentially diverse impact on knowledge flows. Moreover, we suggest that it is possible to draw generalized conclusions regarding the actual extent of impact of knowledge transfer process on knowledge flows in the life sciences only by considering a full spectrum of available knowledge transfer activities on one side, and a variety of knowledge flows among researchers on the other.

In so doing we propose a comprehensive conceptual model of knowledge transfer process from the perspective of an individual researcher. This model and the related key propositions will capture the relationship between particular forms of knowledge transfer activities and particular forms of dissemination of research inputs and research results among researchers. The propositions will be tested by combining personal interviews with researchers and questionnaire surveys. Based on our findings we will estimate whether the present concerns of scholars and policy makers over increasing secrecy in biomedicine and biotechnology fields have been targeting the factual cause of problems.

## 2. Literature Review

A significant fraction of the articles published in the field focused on the impact of patenting, as one form of knowledge transfer, on knowledge diffusion among researchers. On one hand, patenting in biomedicine is viewed as a means of providing investment incentives, essentially due to long product development time horizons and high associated risks. On the other hand, the expansion of proprietary interests to life sciences is assumed to have the strongest influence on endangering free knowledge flows among academic researchers. It seems that patenting and exclusive licensing of fundamental technologies could in fact restrict future innovation, by increasing costs and hindering the access to technologies and the free flow of scientific knowledge needed for subsequent research and even redirecting the research [14, 15]. This concern has been captured in the phrase "*the tragedy of the anti-commons*", which has been used extensively to point to the problem of existence of multiple holders of rights to separately patentable inputs which combined from one product or resource [7, 16].

In a qualitative study of the impact of patenting of research tools in biomedicine on innovation, Walsh and colleagues [16] find that university research has not been substantially impeded by an increase in patenting; with an exception of patented genetic diagnostics. Relying on the analysis of citation rates of scientific publications before and after the grant of associated patents, Murray and Stern [8] test the anti-commons hypothesis and find a modest evidence of the restrictive impact of patents on knowledge diffusion. Furthermore, Caulfield and colleagues [17] show that even though researchers view patents negatively in terms of their impact on research environment by increasing secrecy, there is little evidence that patenting in reality interferes with the research process through increased withholding of protected materials. Academic competitiveness, and not patents, is viewed as a principal reason for the denials. Only a limited number of studies have considered the heterogeneity in

university-industry interactions when assessing their relationship with knowledge diffusion. In a study aimed to reveal the reasons behind two forms of data withholding, publication delays and refusals to share biomaterials and data, Blumenthal and colleagues [9] find that involvement in academic-industry research relationship and engagement in the commercialization of university research are both associated with publication delays, whereas only the latter is associated with refusal to share research results upon request. Shibayama [18] on a sample of Japanese natural scientists finds that not all entrepreneurial activities discourage cooperative relationships between scientists: while commercial activity facilitates secretive publications and non-compliant behaviors in material transfer, no significant effects are shown for collaboration with industry and funding from industry. These findings are particularly interesting because they point to the need for distinguishing between particular forms of knowledge transfer in investigating their impact on knowledge flows in the life science communities. Thus, some authors report modest or no evidence of increasing restrictions in knowledge sharing due to involvement of researchers in knowledge transfer activities. Instead, they attribute the limitations in knowledge flows to reasons such as academic competition or logistical difficulties. On the other hand, others point to significant limitations in sharing resulting from knowledge transfer activities. Next, the published articles only to a certain extent take into account other forms of knowledge transfer in addition to patenting. Moreover, informal knowledge flows, such as sharing of materials and data, are mostly in the focus of attention of such studies; the empirical findings with reference to formal knowledge flows have been poorly represented in the literature. Existing gaps could be addressed by integrating the effects of involvement of researchers in different forms of knowledge transfer with the industry on particular forms of knowledge flows among researchers in one theoretical model. This approach arises from the assumption that the lack of consideration of diversity of knowledge transfer activities or concentration on only one aspect of knowledge diffusion obscures drawing general conclusions regarding the real scope of impact of knowledge transfer on knowledge flows.

### 3. Theory and Hypotheses

Knowledge transfer activities may take various forms. In this paper we categorize knowledge transfer activities from the academia to industry in two distinct groups and separately analyze the impact on knowledge flows of (1) “traditional” knowledge transfer activities, which are contingent on industrial funding of researchers and research institutions, such as consulting, sponsored research or university-industry joint research projects, and (2) “new-type” knowledge transfer activities, which erect from the value of intellectual property rights, including patenting, licensing and the creation of spin-off companies [19, 20]. When discussing the knowledge diffusion pathways between members of the scientific community, we recognize that informal collaboration between researchers, in the form of exchange of research information and research materials, is as important for the continued existence of the open science paradigm as formal collaboration due to creation of “learning intensive” opportunities [21]. The latter can be realized through joint research projects, personnel exchange, co-authorships on publications and dissemination of results in scientific journals, books and at professional conferences.

#### 3.1 “Traditional” Knowledge Transfer Activities as Determinants of Knowledge Flows

Government funding of research has been declining during the last two decades. This change has forced the researchers to diversify the sources of their finance, either through applying for competitive supranational funds or by chasing different sources of funding of industrial origin [3, 19]. Different forms of university–industry collaboration have increased in magnitude also due to the emergence of the biotechnology industry, which relied heavily on the expertise and social capital of basic academic researchers [22]. These may include collaborative research projects, sponsored research, consulting, equity holding in companies, personnel exchange, joint supervision of PhD students or joint publishing and can be called “traditional” knowledge transfer activities [adapted from 20] as the consideration of intellectual property rights, although possible, is not of primary concern.

##### *“Traditional” knowledge transfer activities and formal knowledge flows*

This research focuses on publication contents and timing dimensions of formal knowledge diffusion in scientific journals. Shibayama [18] shows that collaboration with industry and funding from industry has no significant effect on secretive publications or intentional exclusion of information from a publication. On the other hand, Blumenthal and colleagues [23] show that involvement in various forms of research relationships with industry is associated with publishing data sharing restrictions or

publication delays. Haeussler and colleagues [24] find that consulting is negatively related to dissemination of findings at scientific conferences and publishing timing. Davis and colleagues [25] show that the award of an industry research grant is positively associated with the likelihood that the scientist would be skeptical about the impact of academic patenting on the norms of open science. All in all, there is a considerable amount of previous findings showing that academia-industry relationships have to a certain extent adversely influenced the adherence of researchers to the norms of open science with respect to formal knowledge diffusion. This leads us to argue:

*Proposition 1 The extent of an academic researcher's involvement in "traditional" knowledge transfer activities will be negatively related to the extent s(he) formally collaborates with members of the scientific community.*

*"Traditional" knowledge transfer activities and informal knowledge flows*

Concerning the impact of "traditional" knowledge transfer activities on informal knowledge flows, the evidence is more straightforward. In general, biomedical researchers with connections to industry seem to be more likely to engage in data and materials withholding than their colleagues without such connections [26]. Hong and Walsh [27] obtain diverse results when assessing the impact of industry-related activity of mathematicians, physicists and experimental biologists on secrecy with respect to discussing ongoing research with other researchers: industry funding is related to greater secrecy, while having industry collaborators is associated with less secrecy. This hypothesis however, is confirmed only for the overall sample, whereas none of the industry-related activities is shown to have a significant impact on secrecy in the experimental biology community [see also 11, 18]. We propose:

*Proposition 2 The extent of an academic researcher's involvement in "traditional" knowledge transfer activities will be negatively related to the extent s(he) informally collaborates with members of the scientific community.*

### **3.2 "New-Type" Knowledge Transfer Activities as Determinants of Knowledge Flows**

"New-type" knowledge transfer activities have its focus in the value of intellectual property rights, although there are many historical examples of consideration of commercial value of knowledge generated from non-profit organizations' research [19, 20]. The expansion of proprietary interests to a broader range of scientific findings in the life sciences and biotechnology as well as to new parties, academic and other non-profit institutions, created various new opportunities for scientific development [22] with the help of activities such as patenting, licensing, spin-off companies founding and marketing of new products and services generated through the use of academic-based resources.

*"New-type" knowledge transfer activities and formal knowledge flows*

In this research timing and contents of scientific papers dimensions of publishing knowledge flows are considered. Blumenthal and colleagues [9, 23] show that university research commercialization endeavors are associated with publication delays, whereas Shibayama [18] finds that commercial activity facilitates secretive publications. Haeussler and colleagues [24] confirm a negative relationship between the number and importance of patents and general sharing among academic researchers, in the shape of conference presentations to the broader community or publishing timing. Despite limited and often disagreeing evidence with respect to the impact of commercialization on other formal collaboration forms, such as personnel exchange or collaborative research projects we propose:

*Proposition 3 The extent of an academic researcher's involvement in "new-type" knowledge transfer activities will be negatively related to the extent s(he) formally collaborates with members of the scientific community.*

*"New-type" knowledge transfer activities and informal knowledge flows*

Several empirical studies focus on different forms of commercialization activity: while some authors assess merely the impact of patenting [24], others include a range of business activities, from invention disclosing and licensing, to business planning, spinning-off or product placing on the market [10, 11, 18, 28, 29]. In practically all examined cases the authors reach consensus with respect to the adverse impact of commercialization activities on research materials and information sharing between researchers. Based on this rationale we hypothesize that:

*Proposition 4 The extent of an academic researcher's involvement in "new-type" knowledge transfer activities will be negatively related to the extent s(he) informally collaborates with members of the scientific community.*

### **3.3 Human and Social Capital Determinants of Knowledge Flows**

#### *Academic rank and formal knowledge flows*

Previous studies have mostly found no significant effect of academic rank on formal knowledge sharing [18, 24]. Yet, Blumenthal and colleagues [9] find that higher academic rank is associated with publication delays. Since these studies produced mixed results and only partially examined different formal knowledge diffusion forms, we recognize the need for further empirical studies, which will take into account a wider range of components of formal collaboration between researchers. Our assumption is that the higher up a researcher is on the academic ladder, the better the sign that one has shown capacity to attract resources and a broader range of collaborative and disseminative endeavors. We propose that:

Proposition 5 *The academic researcher's academic rank will be positively related to the extent (s)he formally collaborates with members of the scientific community.*

#### *Academic rank and informal knowledge flows*

While some studies indicate that untenured faculty is less likely to share materials and data than tenured faculty [24], other studies find no significant associations between research results or materials sharing restrictions and respondents' academic rank [9, 10]. In contrast, Shibayama [18] finds that full professors are more likely than associate professors to deny material transfer to colleague researchers. We explain this conflicting evidence by considering the differences in sample sizes, scientific fields examined and cultural settings in each of these studies. One can argue that researchers of higher academic rank will have more professional experience and thus deeper and more extensive contacts with fellow researchers. We hypothesize that:

Proposition 6 *The academic researcher's academic rank will be positively related to the extent (s)he informally collaborates with members of the scientific community.*

#### *Scientific values and formal and informal knowledge flows*

Scientific openness or unimpeded access to research results [30] have been traditionally considered to be the most important norms of the scientists' profession. The outcomes of academic prestige such as publications, citations and peer status emerge from adherence to this system. Merton observed more than 40 years ago that "the communism of the scientific ethos is abstractly incompatible with the definition of technology as 'private property' in a capitalistic economy." Evidently, the attitude of the majority of scientists towards commercial involvement has in the meantime changed, i.e. evolved from resistance to compliance to acceptance, primarily thanks to the departmental and institutional norms and policies, such as academic workload reduction and part-time appointments. Yet, a significant concern, perceived as an obstacle, has remained present with some researchers concerning the delay and secrecy in the dissemination of results and possible interference with academic pursuits and freedom to select collaborators or enter informal modes of cooperation, which could arise from knowledge transfer activities [31]. Based on this reasoning and prior findings we propose that:

Proposition 7 *The more inclined is the academic researcher to the concepts of open science, the extent (s)he formally collaborates with members of the scientific community will be more intensive.*

Proposition 8 *The more inclined is the academic researcher to the concepts of open science, the extent (s)he informally collaborates with members of the scientific community will be more intensive.*

#### *Research productivity and quality and formal knowledge flows*

Overall, we expect that researchers who publish and receive many citations will have more ongoing research projects, personnel exchange programs and publications in co-authorship with other laboratories than the researchers of lower scientific productivity and quality. The same refers to the extent of dissemination of knowledge at scientific conferences. When it comes to publications timing and contents, it is expected that researchers with high scientific quality will publish their results without delays once the research project is completed. Also, we argue that they will be less likely to conceal information from the publication than their less productive colleagues [24]. We propose:

Proposition 9 *The extent of an academic researcher's research productivity and quality will be positively related to the extent (s)he formally collaborates with members of the scientific community.*

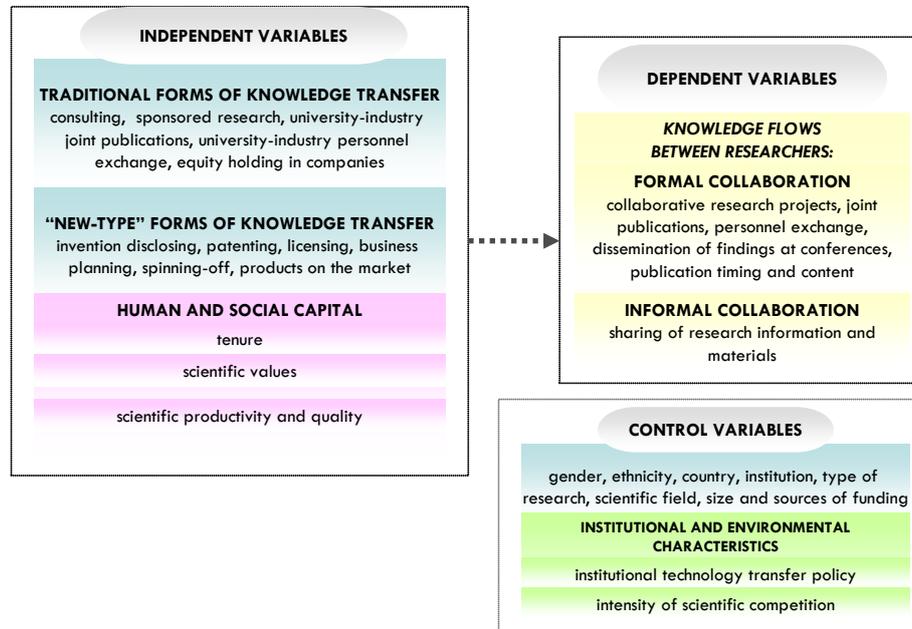
#### *Research productivity and quality and informal knowledge flows*

Interestingly, prior research has shown that those researchers who publish more are more likely to refuse requests for data and materials to other researchers. The justification lies in the increase of the opportunity cost of compliance; namely, it is probable that more eminent scientists are less likely to respond to requests due to time limitations [9-11, 16, 18, 27, 28]. Based on this argumentation we presume that:

Proposition 10 *The extent of an academic researcher's research productivity and quality will be negatively related to the extent (s)he informally collaborates with members of the scientific community.*

Based on the evidence presented above we have identified the conceptual model of knowledge transfer process from the perspective of an individual researcher (Figure 1). The model is controlled

for certain demographic, professional, institutional and environmental traits relating to individual researchers. It is expected that the results of the empirical study will vary depending on the researchers' gender, ethnicity, country of work, affiliation, life science field, type of research conducted, size and sources of funding. Moreover, it is expected that the degree of aggressiveness of university technology transfer policy as well as the intensity of scientific competition in the area will also affect the extent of knowledge diffusion in the life science communities. This framework should provide a useful outline of the existing literature; explain the determinants of knowledge flows in the life science community as well as direct future empirical studies on this topic.



**Figure 1** The theoretical model of knowledge transfer process from the perspective of an individual researcher, with dependent, independent and control variables shown.

#### 4. Conclusion and Implications for Future Research

Researchers, public institutions managers and policy makers are increasingly interested in the impact of knowledge transfer activities on knowledge diffusion in science. Knowledge transfer has become widely understood as desirable and appropriate activity for research universities. In the same time concerns over potential negative impacts of these activities on the norms of open science have arisen, particularly because of high-profile patenting controversies regarding patenting of research tools or inputs for subsequent research as well as expansion of proprietary rights to life forms. Encouraged by increasing debates, scholars have sought to investigate whether the information flows have truly been compromised due to knowledge transfer activities, and if so, to explore the consequences of these limitations on the progress of science. The evidence from the conducted studies is mixed; thus, the majority of the questions still remains open and calls for further research.

In this paper we provided a broad overview of knowledge flows in the life science community, in which we considered both the individual and the environmental determinants of different forms of collaborative efforts among researchers. Furthermore, we expanded the existing research on knowledge transfer from academia to industry by taking into account a wide range of such activities in assessing their role in the diffusion of formal and informal scientific knowledge. Through recognizing the heterogeneity in knowledge transfer activities in a comprehensive individual-level conceptual model, we invoked the assumption that the extent of impact of knowledge transfer process on knowledge flows cannot be fully measured if the studies neglect the diversity of knowledge transfer activities or concentrate on only one aspect of knowledge diffusion. Thus, the framework developed within this research offers some new insights that should help increase our understanding of determinants of formal and informal knowledge flows in the life sciences in relation to knowledge transfer activities as well as guide prospective empirical studies.

The pilot empirical analysis is currently being conducted in frame of this study. It should result in seventy in-depth interviews with researchers from the academia and the biotechnology industry, conducted with the aim of revealing their experiences, attitudes and predictions regarding the problem of restrictions in the access to research information and research materials as well as restrictions in their formal interaction with other researchers due to their engagement in knowledge transfer activities. The in-depth interviews will also help with the pre-testing of the questionnaire developed for the purposes of empirical testing of the model. In addition, the study will be put in a cross-national context, to check whether there are significant differences in the results when researchers from ten different countries, including Croatia, Slovenia, Germany, Italy, Israel and USA, are taken into account. This represents an important contribution because so far, the majority of the published articles in the field have focused only on one country, predominantly the USA [4]. The final results of the study will shed light on the determinants, both positive and negative, of knowledge sharing in the life science communities. Previous studies have produced mixed results, with the sharing restricting factors ranging from scientific competition and logistical difficulties, to patents. Based on the obtained findings it will be possible to estimate whether the present concerns of scholars and policy makers over increasing secrecy in the life sciences have been targeting the real cause of problems.

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# Food Innovation - A Regional Cluster Approach

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Networks and clusters of innovation are frequently promoted as effective means of facilitating regional economic development. The European Commission has launched the 7<sup>th</sup> Framework Programme (FP7) initiative “Regions of Knowledge” in order to increase the overall capacity of regional players in enhancing science and technology based development.

Euroconsultants S.A. coordinated the FP7 Regions of Knowledge project RAF Regions, ([www.rafregions.eu](http://www.rafregions.eu)) which focused on Food Innovation in the Regions of Central Macedonia in Greece, Puglia in Italy and Pazardzhik in Bulgaria. The overarching objective of RAF- Regions was to increase the capacity of the Regions in enhancing science and technology based economic development, focusing on the Food Sector. The RAF Regions consortium comprised Regional Authorities, SME Associations, Research Entities (the “triple helix of innovation”) and Technology Consultants. The main project results were as follows:

- Identification of Food Research and Technological Development (RTD) actors and Small and Medium Sized Enterprises (SMEs) from the food sector, capable of adopting new technologies;
- Mapping and analysis of policies and initiatives for food RTD; Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of RTD capacity;
- FP7 Training regional workshops of SMEs and RTD entities; Conference “Mind your Food!”; Review of funding mechanisms available for Food research;
- Joint Action Plan for Food RTD adopted by the 3 regional clusters;
- Awareness raising about the potential that innovation proposes to the food sector; organization of 3 Joins events for SMEs and RTD actors; organization of European Conference “Mind your Food!” in Thessaloniki with more than 200 participants;
- Capacity building of Bulgarian partners: organisation of Training trips to Central Macedonia and Puglia and Follow- Up Workshop in Pazardzhik and Plovdiv;
- Dissemination of project objectives & results: Project website; Partner Search Database with ~150 registrants; Project Publications;
- Cooperation with other EU projects & initiatives; participation in Food Cluster Initiative;
- Developing partnerships with a view to furthering food RTD and innovation cooperation [new proposals submitted under FP7, Mediterranean (MED), South East Europe (SEE) and Interreg IVC programmes].

This paper discusses the RAF Regions project which provided to the regional stakeholders the opportunity to make the first steps for the development of innovation clusters with a focus on the Food sector. The main characteristics and results of this initiative are discussed and particular recommendations for similar future activities are presented.

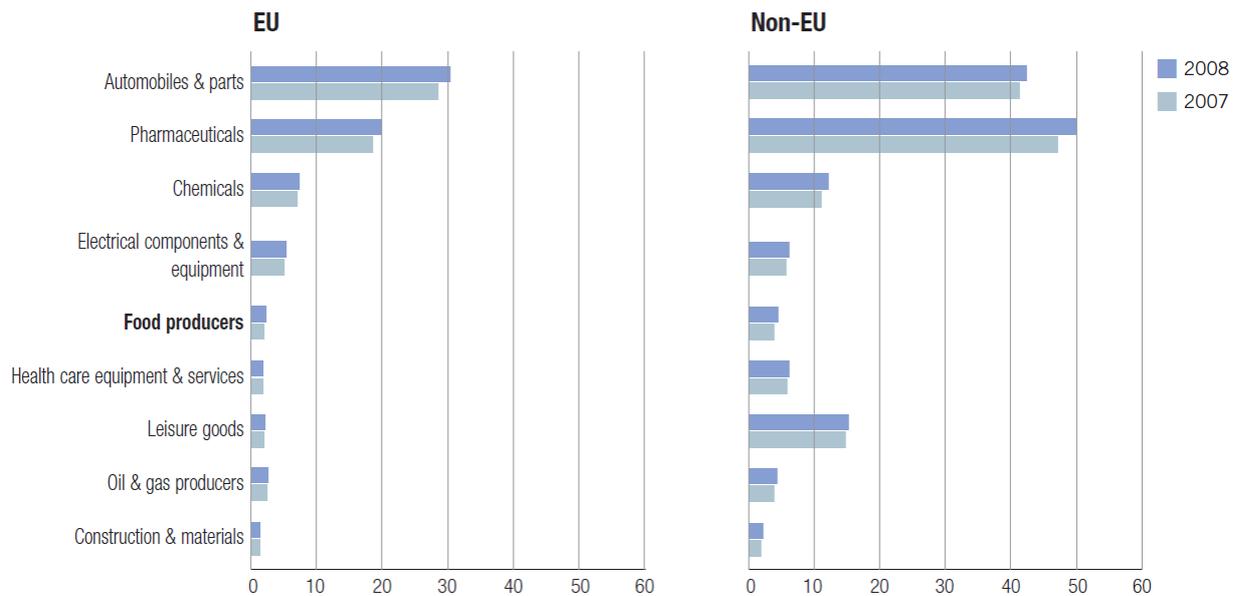
## Keywords

Clusters, Food, Innovation, Regional, SMEs.

# 1. Challenges for the European Food Industry

The Food Industry is the largest manufacturing sector in the European Union in terms of both turnover (approx. €965 Bn) and the number of active companies (approx. 310,000). It is also the leading employer in the EU with 4.4 million employees. Research and Development (R&D) investment of food and drink manufacturers has traditionally been relatively low in comparison to other industries. R&D expenditure (R&D investment as a percentage of output) in EU-15 has been the lowest when compared to a majority of developed countries (see Figure 1). The R&D expenditure levels are higher and continue to increase in Japan, the USA, Australia and South Korea, while EU-15 countries experienced marked levels of stagnation of approximately 0.37% in 2006, close to 2005 levels (0.38%).

**R&D investment in EU and non-EU countries (€ billion)**



Source: The 2009 EU Industrial R&D Investment Scoreboard, European Commission, JRC and DG RTD

**Figure 1** R&D investment in EU and non- EU countries (€ billion) by productive sector (Source: The 2009 EU Industrial R&D Investment Scoreboard, European Commission, JRC and DG RTD)

European food sector SMEs face significant challenges in terms of their participation in the pan-European and global commercial competition, a trend expected to increase. Additionally, changing attitudes and behaviour in society, as well as new and emerging consumer trends necessitate constant renewal of food products and product concepts at an ever increasing pace. The food industry must, therefore, constantly innovate its processes and products in order to remain competitive and SMEs need to invest towards the adoption of new technologies, developed through research.

The European Food industry is dominated by SMEs which, in most cases, do not invest the necessary financial, human and other resources to ensure increased uptake of R&D outputs into their processes. Furthermore, the SMEs in question often lack the inherent capacity to develop their own R&D activities. Many Food SMEs confront difficulties in making the most of the existing opportunities, their awareness of the technological solutions is low or they are not well positioned to adopt R&D results.

According to the European Technology Platform Food for Life (an initiative that aims to strengthen the European-wide innovation processes, improve knowledge transfer and stimulate European competitiveness across the food chain), research in the AgroFood sector should address the following issues in order to ensure that the market and consumer needs are met:

1. Ensuring that the healthy choice is the easy choice for consumers,
2. Delivering a healthy diet,
3. Developing value-added food products with superior quality, convenience, availability and affordability,
4. Assuring safe foods that consumers can trust,
5. Achieving sustainable food production,
6. Managing the food chain, and

## 7. Communication, training and technology transfer, competitiveness and consumer interaction

Several trends guide food innovation in Europe. They can be divided into 15 trends, grouped together in 5 axes: Pleasure, Health, Physical, Convenience and Ethics (see Figure 2 below). At a global level, the pleasure axis continues to drive innovation all over the world. At a European level, the two leading trends are sophistication and variety of senses. The health category is equally composed of medical and natural trends.

<i>Axis</i>	<i>Trend</i>
<b>Health</b>	Medical
	Natural
	Vegetal
<b>Pleasure</b>	<b>Sophistication</b>
	<b>Exoticism</b>
	<b>Variety of senses</b>
	<b>Fun</b>
<b>Physical</b>	Slimness
	Cosmetic
	Energy, well-being
<b>Convenience</b>	Time saving
	Easy to handle
<b>Ethics</b>	Nomadism
	Ecology
	Solidarity

Source: XTC world innovation 2008. Copyright XTC 2009

**Figure 2** Trends of food innovation in Europe,  
(Source: XTC world innovation 2008. Copyright XTC 2009)

## 2. Innovation in the Food Industry in Central Macedonia, Puglia and Pazardzhik

The Food industry is a major manufacturing sector for the Regions of Central Macedonia (Greece), Puglia (Italy) and the district of Pazardzhik (Bulgaria), and local economies heavily depend on it for their development and prosperity. Indicatively, in the Region of Central Macedonia, Food industries constitute around 20% of the total number of industries, provide around 28% of the employment and around 30% of the gross and value added production of the overall industries in the region. This makes Central Macedonia the main producer of Food and Beverages in Greece. The food sector is of equal importance for the Regions of Puglia and Pazardzhik.

It is, nonetheless, evident that the Food sector in the participating regions is slow in the adoption of new and innovative technologies and the introduction of suitable research results in their processes (from the selection of the raw material to processing and marketing their products). There is a need to identify the needs of the Food Industry, to employ innovative actions, exploit the research results and introduce new technologies in their processes.

Initiatives have been implemented in recent years at a regional, national and European level in order to bring together R&D entities, regional and local authorities and enterprises in the Regions of Central Macedonia (Greece), Puglia (Italy) and the district of Pazardzhik (Bulgaria). However, levels of success remained low when it came to efficient uptake of research benefits by private sector entities, especially in terms of sustainable initiatives ensuring the basis for long-term and fruitful cooperation between Industry and the R&D partners. In most cases breakthrough science was not supported for the food sector because the focus has been largely centred on food quality and safety.

Furthermore, in most cases regional initiatives undertaken in view of promoting innovation and research development focused on support and development of domains such as the Information and Communication Technologies. The Food sector, although a significant contributor within the local

economies, and despite evident room for improvement in terms of the introduction of research-based benefits into operations, remained out of the spotlight.

### 3. The objectives of RAF Regions

The goal of RAF Regions was to increase the overall capacity of the targeted Regions of Central Macedonia (Greece), Puglia (Italy) and Pazardzhik (Bulgaria) in enhancing science and technology based economic development, focusing on the AgroFood Sector. This was to be achieved by targeting the following specific objectives:

- Supporting the development of innovative “Research-driven Clusters” in the AgroFood sector;
- Promoting synergies between regional and research policies in each participating Region, primarily by producing regional research strategies for the AgroFood sector,;
- Fostering transnational cooperation in the AgroFood sector;
- Assisting the Food sector SMEs of the 3 Regions in becoming more competitive, by adopting new technologies and solutions;
- Facilitating the exchange of best practices between the partners;
- Mentoring of the participating partners through mutual exchange of experience and best practices;
- Cooperating with respective projects in other European Regions in order to increase regional economic competitiveness through research and technological development activities in the AgroFood sector;
- Increasing the capacity of the 3 Regions to participate in the RTD Framework Programme and the Competitiveness and Innovation Programme.

### 4. Activities and results of RAF Regions

The project objectives met to a significant degree; the main project results were as follows:

- Identification of Food RTD actors with research potential and food SMEs capable to adopt technologies & research results: 56 RTD actors from the 3 regions were profiled and 47 food SMEs were technologically assessed;
- Mapping, analysis and assessment of policies, strategies and initiatives for food RTD in each region;
- Identification of strengths, weaknesses, threats and opportunities (SWOT analysis) of the 3 regions concerning their Food RTD capacity;
- Training of SMEs and RTD entities to enhance the participation in FP7; networking and exchange of ideas and best practices: Organisation of 3 regional workshops in Central Macedonia (Greece), Puglia (Italy) and Pazardzhik (Bulgaria), October to November '09; Conference “Mind your Food!” in Thessaloniki; Study and analysis of the funding mechanisms available for Food research;
- Regional plans for AgroFood RTD: a Joint Action Plan was adopted by the 3 regional clusters;
- Raising awareness on the project, the potential that innovation proposes for the food sector and the RTD funding opportunities available: 3 Joins events for SMEs and RTD actors; Organization of 2-day Conference “Mind your Food!”, 5 & 6 March 2010, Thessaloniki with more than 200 participants;
- Enhancing the research profile and increasing the capacity of Bulgarian partners: Organisation of Training trips to C. Macedonia and Puglia and Follow- Up Workshop in Pazardzhik and Plovdiv;
- Dissemination of project objectives & results: Development and Operation of Project website, [www.rafregions.eu](http://www.rafregions.eu) with more than 4246 hits; Partner Search Database with more than 150 registrants; Project Publications (brochures and flyers);
- Cooperation with other EU projects & initiatives funded by FP7, Structural Funds (SFs), Competitiveness and Innovation Programme (CIP), etc.: participation in all Food Cluster Initiative meetings, links with other projects, links with the European Technology Platform (ETP) Food for Life, etc.
- Developing partnerships with a view to furthering food RTD and innovation cooperation (proposals submitted for funding under FP7, MED, SEE and Interreg IVC programmes).

Pictures from selected activities of RAF Regions are presented below:



**Figure 3** Visit to the Institute of Agrobiotechnology- CERTH during the 1<sup>st</sup> training trip in Thessaloniki, 23 November 2009.



**Figure 4** Visit to PELOPAC S.A. food industry during the 1<sup>st</sup> training trip in Thessaloniki, 24 November 2009.



**Figure 5** Opening of the “Mind your Food!” Conference in Thessaloniki, 5- 6 March 2010.

## 5. The European Food- Cluster Initiative

In order to enhance its scope and operational links with other food clusters from other European regions, RAF Regions actively participated in the Food - Cluster initiative (<http://www.foodclusterinitiative.eu/>). The Food-Cluster initiative has been launched with the ambition of involving different European Commission (EC) funded research projects within an exchange of knowledge and experiences, learning about each other's strengths and weaknesses, defining regional strategies and investing in the strengths through integral use of national and regional funding (Research Framework Programmes, Structural Funds, Competitiveness and Innovation Framework Programme, etc.) as a basis for establishing EU consortia in food science - in fact building the European Research Area (ERA) in Food. This EC initiative currently brings together 14 EC funded projects and initiatives in the field of "food science" in order to strengthen this scientific area and increase its competitive advantage.

## 6. Follow- up activities

Five of the RAF Regions partners will expand their cooperation in the framework of the Inno- Food SEE project which will start its operation in the next months and will be funded by the South- East Europe Programme, (<http://www.southeast-europe.net/en/>). The project is coordinated by the Institute of Agrobiotechnology of the Centre for Research and Technological Development Hellas (INA-CERTH) and includes partners from Greece, Italy, Bulgaria, Romania, Hungary, Slovenia, Serbia, Moldova and Ukraine. The Inno- Food SEE objective is to set up the appropriate mechanisms to facilitate the exchange and coordination of innovation approaches and policies for the food sector and to increase awareness on the importance of food innovation for the wider SEE area. The partnership comprises key players from the RTD and Innovation Cycle (RTD entities, industry and SME support entities, regional authorities, etc.) which have the capacity to influence the development of support mechanisms and raise awareness on the potential of food innovation.

It is also worthwhile mentioning that INA- CERTH is coordinating a regional initiative for the establishment of a Bio- Agro- Food Cluster in Central Macedonia with the objectives of improving the added value of the agricultural and the processed food products and the fulfilment of the consumer needs of specific population groups (diabetics, celiac disease patients, pregnant women, etc.). The Cluster brings together food companies, RTD institutes, technology providers, consumer associations and other interested groups and will seek funding from the national structural funds. The Cluster activities will comprise support of entrepreneurship and innovation; support of development of spin- off & spin- out companies; provision of access to high end technologies and RTD infrastructure for SMEs; RTD project funding; international dissemination and networking; marketing and branding of companies and products.

## 7. Main findings- Conclusions

The readiness of the regional authorities to adopt food clustering measures is considered a critical factor for success. The 3 Regions that participated in RAF Regions shared a common objective, namely the development of effective strategies and action plans to boost science and technology based economic development, focusing on the Food Sector. Although the Regions utilized a common methodology to develop their activities, their approaches were redefined, in line with individual particularities present in each region. For example, the different levels of regional integration and autonomy in decision making at the 3 Regions necessitated a different approach in the involvement of the public stakeholders. Particular SWOT and Strategic Orientation Rounds (SOR) methodologies with wide participation of stakeholders were employed to cater for this need.

RAF Regions benefited considerably from its participation in the FOOD CLUSTER Initiative. It provided a wide and systematic framework for enriching and validating the project methodologies. In addition the examples set by some of the most important and successful food clusters in Europe (e.g. the Dutch Food Valley, <http://www.foodvalley.nl> and the German Food- Processing Initiative, <http://www.foodprocessing.de/>) were valuable as an exchange of knowledge and experiences. The FOOD CLUSTER Initiative was and will continue to serve as a solid and relevant basis for establishing EU consortia in food science. It is therefore highly recommended that any clustering efforts aim to benefit from more mature schemes and network with international key players.

Securing the commitment and availability of the different stakeholders is of critical importance. A clear vision and benefit for everyone involved should be communicated from the start. The introduction of pilot actions that could bear tangible and early results may provide a good incentive for the activation of stakeholders.

The sustainability of the food cluster should be in the centre of its activities. It is important that all stakeholders (industry, RTD entities and regional authorities) invest resources in a permanent management body that would coordinate the activities beyond the limited timeframe of any EC funded project.

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# Innovativeness of enterprises in Kujawsko-Pomorskie voivodship as an object of interest of the Kujawsko-Pomorskie Regional Research Centre

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Innovation and innovativeness are considered to be one of the most progressive factors in the development of the economy in XXI century, in which knowledge and the resulting technological progress are gaining significance, and the dominant factors (land, natural resources and large reserves of low-qualified manpower resources) move into further positions. This causes a change of the existing social, economic and cultural order in the world. Owing to the technological revolution, the existing barriers related to the necessity of overcoming considerable distance (sometimes the following costs), no longer have essential significance. The processes of globalization, which are one of the effects of these changes, have contributed to the transition in thinking about development from the national to the global level and simultaneously reinforced the importance of actions taken at the regional or even local level.

Innovativeness of the region is shaped by the innovativeness of the entities operating on its territory and their willingness to cooperate in the range of innovative activity. Among these entities enterprises have a special role, because in the process of producing and providing services, they introduce products, services, technologies and organizational solutions, that is to say what may signify of innovation. Above-mentioned issue is an object of interest of the Kujawsko-Pomorskie Regional Research Centre founded in Statistical Office in Bydgoszcz. The conducted researches of the dependencies between the potential for innovation and demographic and economic potential show that Kujawsko-Pomorskie voivodship belongs to regions with low potential of development, average dynamics of socio-economic changes and low tendency to create innovation. The experience of developed countries allow to claim that the regions in which ideas for supporting innovative activities of enterprises cannot be found, have no chance to be called an innovative region. Thus, the idea of Kujawsko-Pomorskie Regional Research Centre is to create a knowledge center for the region, which would help to shape the long-term development strategy for Kujawsko-Pomorskie voivodship tending to create regional innovation systems.

## Keywords

innovation, industry

## 1. Introduction

Innovations are considered as one of the most progressive factors in the development of the economy in the XXI century, in which the importance is gained by knowledge and technological progress, followed by: land, natural resources and large reserves of low-qualified workforce. This causes a change in the existing social, economic and cultural world. Thanks to the technological revolution, the existing barriers associated with space, time and costs arising do not play such an important role as it used to be. The globalization as one of the effects of these changes have

contributed to the transition in thinking about development from the national to the global level, while reinforced the importance of action taken at regional or even local level.

Regional innovation is shaped by innovation of the transistors located there as well as their willingness to cooperate in the innovative area. Among these entities special role is played by the company because of producing and providing services, introduce products, services, technologies and organizational solutions.

Mentioned problems are the subject of research activity in Kujawsko-Pomorskie Regional Research Center, which is the part of the Statistical Office in Bydgoszcz. Analyses indicate that, kujawsko-pomorskie province is regions with low development potential, the average dynamics of socio-economic changes and a low propensity to innovate. The experience of developed countries show that the regions in which ideas cannot be found to support innovative activities of enterprises, they have no chance to be called an innovative region. Thus, the idea of Kujawsko-Pomorskie Regional Research Center is to create a knowledge center for the region, which would help shape the long-term development strategy for Kujawsko-Pomorskie province to create a context of regional innovation systems.

## 2. Definitions and origins of research innovation

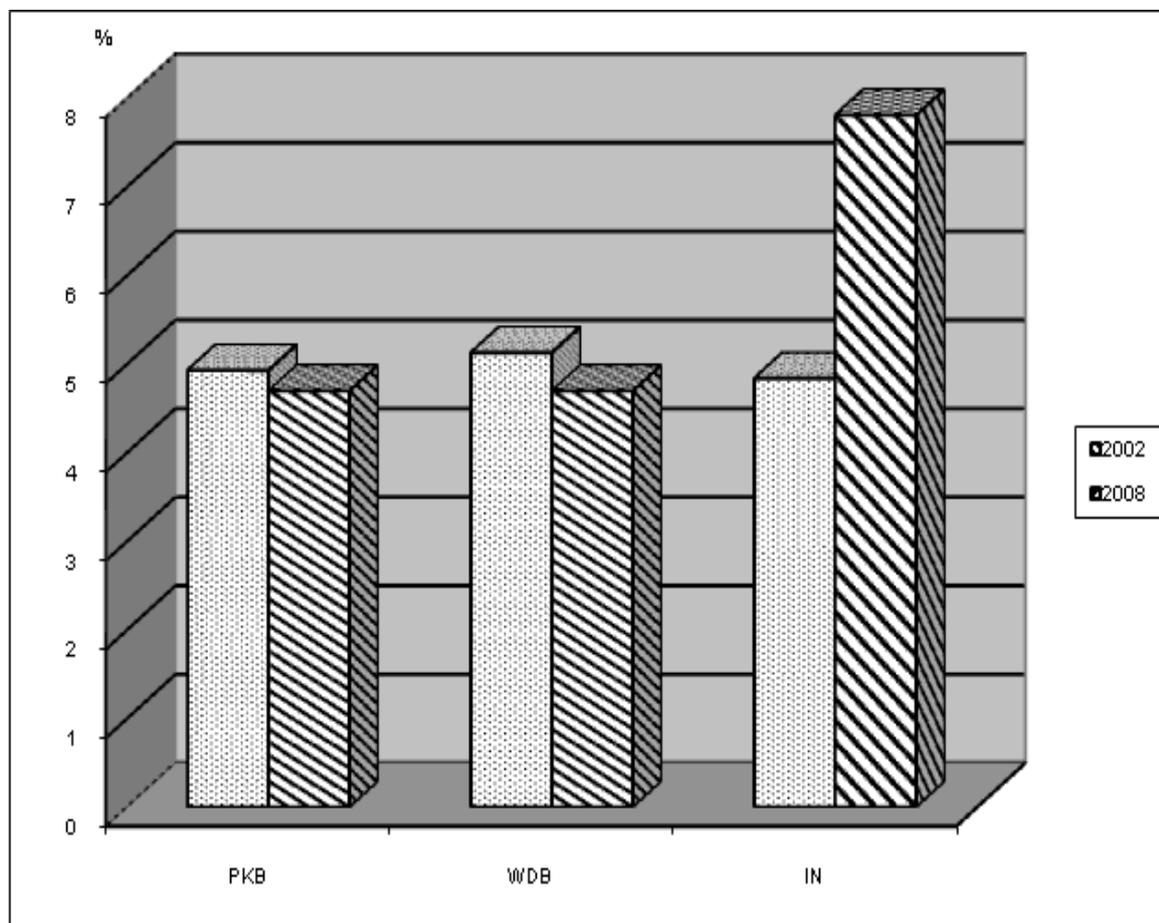
The ideas of innovation and innovativeness were introduced to the world economic literature by J. A. Schumpeter. In his writings he pointed that, besides traditional exogenic factors, the increase in productiveness is boosted by entrepreneurs who in the face of competitors and decreasing income show inclination to innovativeness. Schumpeter's ideas, not very popular in his times, were continued by economists in the latter half of the 20th century as it was then that the shift of techno-economic paradigm took place. Innovations became specific tools and actions of entrepreneurship which gave the resources new economic opportunities (Drucker 1992). The specialist literature contains a number of definitions of innovativeness which differ in their substantive range. In most cases the definitions refer to the changes of ideas, practices or objects with which innovations or creativity based on human ingenuity are connected, as well as their successful application (Grandstrand 1999). Generally, it can be accepted that innovation is a change in products and the methods of production connected with application of some technical knowledge in the production process, which in turn leads to increase in effectiveness of using economic resources available to a given economic system (company). Thus, according to this most general definition, innovation is a successful exploitation of new ideas (Porter 1990). Seen as a continuation of techno-organizational changes, innovation includes activities from simple modifications of the existing products, processes and practices, which can be new for a given company but not necessarily for industry, to fundamentally new products and processes. Innovativeness remains a sign of implementation of new ideas into economic practice. Some authors identify innovativeness with technical progress, while others relate it to the actions which use the results of research or processes leading to applying an invention in a product or a method of production (Zarys...2006). In a classical form of definition, innovativeness means undertaking new economic activity or providing new services as a result of a new combination of production factors, new goods or new ways of distribution of goods and services (Sundbo 1998).

Similarly to classical functions of production, the main determinants of economic innovation include capital and labour. The capital means funds spent on research and development (R&D), while the labour factor means human resources connected with the R&D sector. Both innovative actions and actions which support innovation also refer to upgrading the level of education, development of infrastructure, especially of the ICT sector which increases growth and transfer of information, knowledge and skills, and increase in synergy between science, technology, economy and society. An important area which is responsible for creating positive conditions for innovativeness is the activities undertaken to protect industrial and intellectual property which supports patenting. In the international scale, the effectiveness of innovation is represented by the share of advanced technologies in foreign trade.

## 3. Company innovations of the kujawsko-pomorskie province

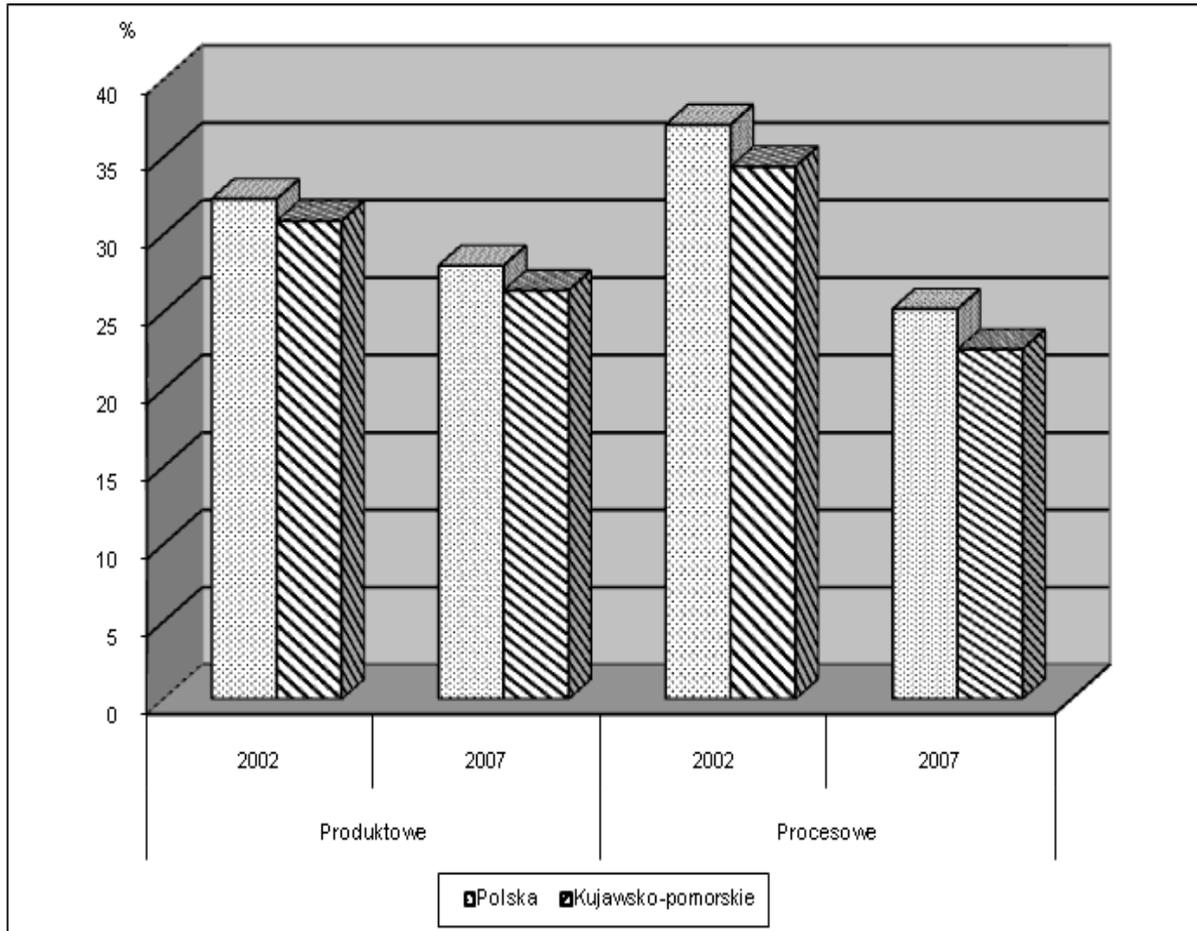
Launching the region's innovative potential is one of the biggest challenges faced by all participants in socio-economic life in Poland. The relationships between innovation and regional development are interdependent due to nowadays, regions are becoming one of the most important common ground supporting the processes of creating, absorption and diffusion of innovation. It should be noted that,

possibility of creation innovation not only depend on business but also on an organized network of cooperation which become more regional than trade (Parteka 2002). On the other hand, regional development and it's competition strongly dependent on the innovation of its resources, which gives an opportunity to generate permanent competitive advantage. As existing possibilities for economic growth such as: relatively low labor costs, the availability of cheap raw materials, favorable geographical location are exhausting, the new sources of competitive advantage must be sought. Growth's tendencies of high developed countries show that permanent development in the short and medium term could provide advantage build on the knowledge and innovation.



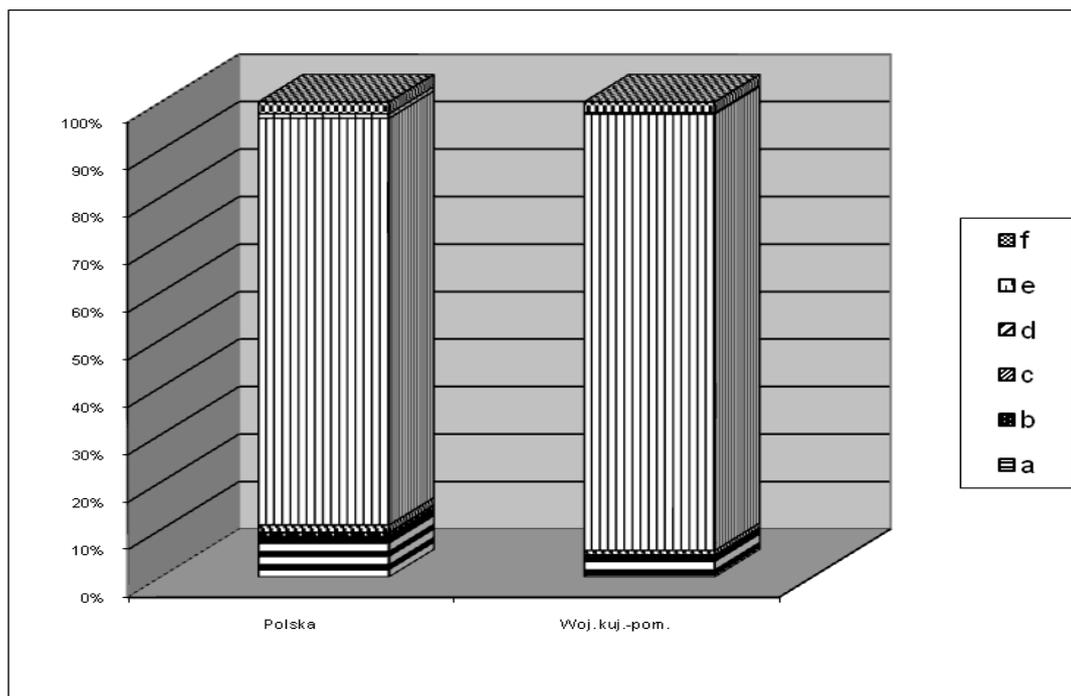
**Figure 1** Expenditures on the 1 employed in the industry section (in thousand zł) in Poland and in Kujawsko - Pomorskie in (K - P) in 2002-2008.

Kujawsko–Pomorskie, both in terms of economic and innovative potential, do not belong to the leading regions in Poland, it is noted that in 2002-2008 the share of the region in the economic potential decreased, while the value of resources spent on innovation increased (Figure 1). As a result, the average value of inputs on one worker in 2002-2008 was about 1/3 higher than the average in Poland. The interest of Kujawsko – Pomorskie business section in introducing the innovation was shaped below the national average. In Kujawsko – Pomorskie in 2008 the percentage of enterprises that have made the expenditures on innovation was 16,9 % and was by 3.4 p.p. lower than the average in Poland. The level of innovation in this region mostly was determined by industrial enterprises. Their expenditures (expenses) on innovation activity was accounted for 98,8% of total expenditures on innovation activities in the province, but as it is noted by Domański (2001) the changes in industrys' structures, rapprochement to the consumer, less standard and more flexible production during postfordyzm time, have made the innovative activity in the industry similar to the innovative activity in the services sector. Accordig to Cappelin (2004) industrial innovations has its own characteristics, which unlike to "scientific" innovation are not a formal and intended effect of the planned research process conducted to develop new product or services. It stems rather from the informal "searching" or the long-term knowledge exchange between interdependent entities.



**Figure 2** The participation(share) of industrial enterprises, which have introduced technological innovations in Poland and in Kujawsko – Pomorskie in 2002 and 2007.

The studies indicates that in the first decade of XXI century industrial enterprises in Kujawsko – Pomorskie, as in Poland, more often introduced process innovation rather than product innovation, but the share of industrial enterprises which have introduced technological innovations in Kujawsko – Pomorskie decreased as well as in Poland (Figure 2). During the study period primary there was a limitation in introducing innovation, which were new from the point of view of the market. In 2008 this type of innovative activity showed only one in ten company, which seems to be insufficient , because the necessary condition for the development of every company operating in a saturated and demanding market is a successful introduction of new and very modern products. Their creation is the essence of today's business innovation activities and guide their development, and knowledge that arises in innovation process became crucial to achieving and maintaining competitive advantage by business (Żmigrodzki 2006). Results of tests which were carried out in two hundred U.S. companies indicate that the benefits generated by new products in the years 1976 – 1995 XXI century have doubled and are getting higher (Zimonik 2003). However, the introduction of a new product is expensive. Costs are mainly generated by research and development, where in result the ideas are materialized. Meanwhile, in Kujawsko – Pomorskie the expenditures spent on innovation were mostly located in fixed assets (91,5% - Figure 3.) which, like the average in Poland, were mainly earmarked for the purchase of machinery and equipment.



**Figure 3** The structure of use the expenditure on innovative activities in industrial enterprises in Kujawsko- Pomorskie and in Poland in 2008 (a-research and development (R&D), b - acquisition of knowledge from external sources, c - the purchase of software, d - investment in fixed assets in general, e - staff training, f - marketing associated with the introduction of new or significantly improved products).

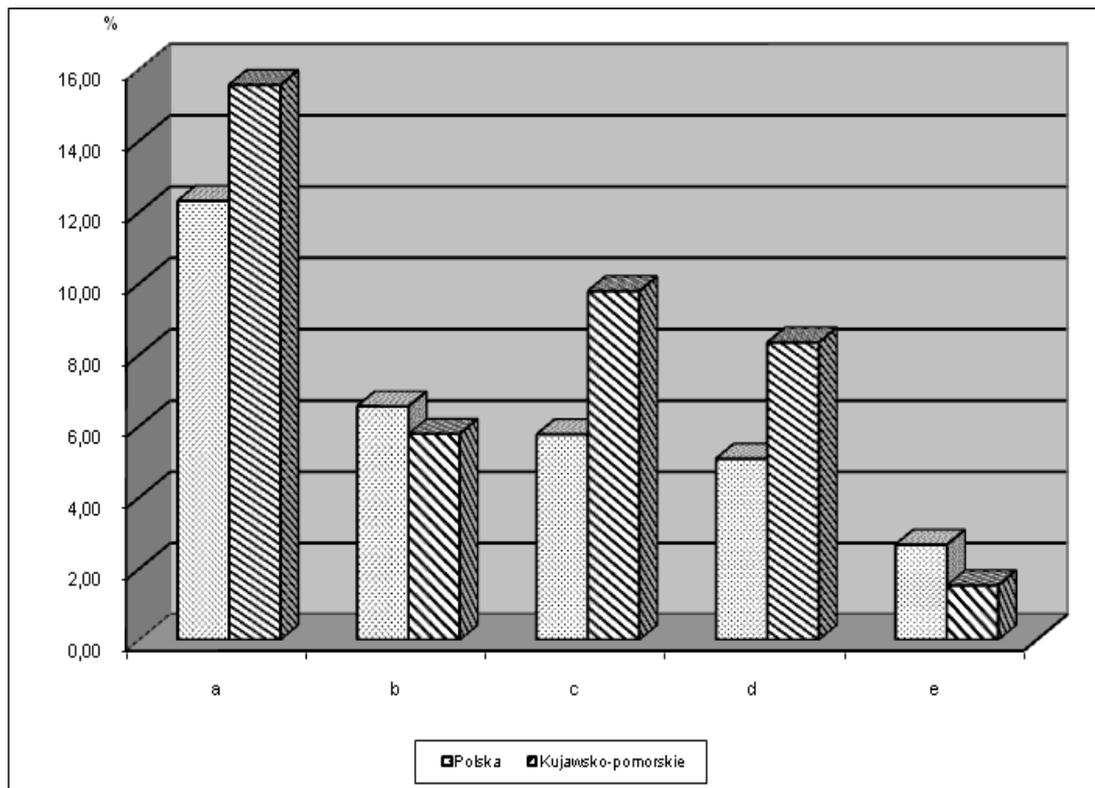
Such a structure of use the resources intended for innovative activity indicate that companies try to reduce “the technological gap” by using the external material technology, which allow them to modernize machinery and introduce the innovation process (Gaczek, Strykiewicz 2008), wherein Kuyavian – Pomeranian entrepreneurs more often than average in Poland have benefited from the technical achievements, which were developed abroad. In 2008 the value of imported machinery and equipment was accounted for almost 60% of the total funds allocated for this purpose. An important group of expenses on innovation in Kujawsko – Pomorskie were connected with buildings and lands. For that purpose allocated 33,1% resources for innovation, ie. 5 pp. more than average in Poland.

In the province Kujawsko – Pomorskie invested in the purchase of new technology in the form of documentation and rights in a lesser extent than the average in Poland, marketing for new and improved products and personnel training related to innovation activities, although spending on the latter two positions have increased significantly.

There should be paid a special attention that since 1999 in the structure of the expenditures on innovative activity in industrial enterprises, both in Poland and in Kujawsko – Pomorskie, the share of expenditures on R&D in overall expenditures on innovative activities is small and steadily decrease. Small share of expenses on R&D and large share of expenses on investments in total expenditures in investing activity indicates that generally Kujawsko – Pomorskie does not create innovation, but adapt already existing solutions. Observed tendency to reducing the share of expenditures on R&D is a negative phenomenon, because it is generally recognized that the most effective way to economic progress are skillfully directed and used in development of technology science researches. The stimulations of scientific research are the subject of any modern innovation policy in every region and state. On one hand scientific and technical achievements are a valuable and south-after commodity in the world, which can be a source of significant incomes such as sales of licenses, know-how and technology, on the other hand material products produced by industry, and incorporating modern technological thought, are among the most attractive products on the market, especially in the foreign trade. The ability of companies to use the results of research and development works in the form of introducing new and modern goods and at the same time improving the products already produced provides a competitiveness of the economies in the international arena. This ability, as it says Bossak (1998), largely depends on the level of development the innovation system, that is mechanisms, structures and connections between public and private institutions, domestic and foreign, which

guarantees the rapid flow of information and capital needed to implement new technical and organizational solutions.

The most commonly used measuring instruments of the effectiveness innovative activities are patents and sales of new and improved goods. Patent statistic is used to measure the results of innovative activity that create the most desirable innovation, which are new in the world. Kujawsko – Pomorskie in the field of industrial property protection is rather at the end of the list of provinces. Patent applications, patent designs, patent obtained and given protective rights are around 5% of their total number in the scale of Poland, and there is no clear trend to change this situation. In 2005 from Kujawsko – Pomorskie reported on average 36,3 inventions per 1 million inhabitants, while in Poland reported on average 53,1 inventions per 1 million inhabitants.



**Figure 4** The share of net revenues from sales of innovative products in the net revenue from sales of industrial enterprises in the total in kujawsko-pomorskie province and Poland in 2008 (a - total b - innovative products for the market, c - just innovative products for the enterprise, d - innovative products for export, e - innovative products for the export market.)

Analysis of the economic impact of innovation, measured as a share of revenues from sales of innovative products in industry in kujawsko-pomorskie province indicates that, in 2008 there were more innovative than the average in Poland but mainly decided by the only innovative products for the enterprise (Figure 4). This means, that innovative activity was only a consequence of emulating existing ideas and solutions. Revenues from sales of innovative products for the export market accounted for less than 2% of sales.

Beside low activity in R&D, shortcoming of industry in kujawsko-pomorskie province is, low tendency to cooperation in innovation area. In 2008 innovation's cooperation indicated less than 7.3% companies', including 3% small's and 39.1% of large's'. Lack of developed networking cooperation as well as communication and interaction in the triangle: education, business and administration are the conditions without which it is difficult to start a mechanisms of competitiveness based on innovation.

## 4. Summary

Regional innovation is shaped by innovation of the transistors located there as well as their willingness to cooperate in the innovative area. In time of knowledge-based economy region ceases to be associated only with physical space, regarded in traditional economic theories of location in terms of

cost of land, capital, labor and transportation costs. It is started to be perceived as a form of organization, reducing uncertainty and risk, which constitutes a source of innovation, accumulation and transfer of knowledge and skills (Pietrzyk 2003). Numerous studies indicate that the ability of regions to assimilate and transform local resources, including knowledge in effective economy is varied. Also, the creation of innovative capacity of the region is complicated and lengthy process, requiring a comprehensive and dynamic view, depends on a number of the social, cultural, economic and organizational conditions. The research Rodriguez-Pose'a (1999) shows that absorption of innovation is inhibited by factors as: the gap between economic and social sphere of life, rigid labor markets, lack of high-skilled, low participation of women, or aging of the economically active population.

The studies of the relationships between innovation, demographic and economic potential indicate that Kujawsko-Pomorskie province belongs to regions with low development potential, the average dynamics of socio-economic changes and a low propensity to create innovations. Referring to the typology of the results presented by A. Kuklinski, and supplemented by Z. Rykiel, we can conclude that Kujawsko-Pomorskie province is imitated region to which the innovation reaches with a considerable delay, and in which are rarely adapted to local peculiarity. The main centers of innovation are the foreign companies that generate the import of foreign machinery and equipment. They also bear the highest spending on R&D. In other companies the resources devoted to R&D are far too low in relation to the needs of an innovative economy and constitute a serious barrier to improve innovations in the region. Kujawsko-Pomorski Centre for Regional Studies in the Statistical Office in Bydgoszcz in the face of the situation presented indicates the need to create a platform for cooperation and information exchange between the sphere of administrative, scientific and economic situation in the Kujawsko-Pomorskie province, which will contribute to strengthening the innovative capacity of the region based on their specific circumstances and supremacy.

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# ICT System re-engineering as a change initiative

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In the beginning, a long, long time ago, almost 20 fiscal years before the present day, three types of companies existed: those making things possible, those just looking around, and, those asking what is happening. Nowadays, only two types exist: those changing themselves and those that disappear. In this way, even “the future isn’t what it used to be”!

Most Macedonian SMBs, both successful and disappearing, have ICT systems built over the course of many years, with solutions based on procedures and rules established by the owners in the very early days. Also, a bunch of equipment and software is present, de-organized and broken up in islands of data and applications.

The lack of managerial knowledge and structure results in managers tired of working both as executives and as decision makers on all levels, or concurrently filling the roles of general manager, general engineer, secretary, driver and many others.

Today companies focus on streamlining operations, acquiring customers, increasing revenues and profitability and outpacing the competition. And while your company has continued to improve its operating efficiency (sometimes by quickly learning from past mistakes), you feel it should be spending more time analyzing what’s going on and predicting and planning for the future, rather than having employees constantly run around trying to solve operational problems based on past experience and putting out fires. In a world where business agility – the ability to quickly and efficiently adapt to changing markets, competitive actions, regulatory and legislative mandates, or other challenges – is a hallmark of successful organizations, information technology plays a critical role. In fact, the role of IT systems has become interwoven with how organizations operate, enabling significant productivity and efficiency improvements.

The re-engineering of ICT systems is a revolution – at some point companies must change many (or all) of their components (hardware, system software and applications) because of technological advances. Even though the computers (or other devices) themselves are working fine, the requirements of Internet, e-banking, e-business and all other e-things, are an absolute necessity. Even in the situation of a malfunction or breakdown, replacing hardware or software with an identical part is almost an impossible mission. Each project for re-engineering of an ICT system involves all business processes. Creating new hardware, software and communication solutions requires the participation of not only top management, but all levels of management, and, more importantly, the intimate knowledge of all processes, procedures, reports, etc. The first checkpoint is here – companies have two choices:

- the new system will be an exact replica of the old system, i.e. will follow the already established workflow in the company, or
- the new system’s solutions will provoke changes in business processes, procedures, reporting systems, etc., which means synchronized changes in the company structure.

These choices are the same regardless of whether the change of the ICT system is done at once or gradually during some period. In this paper, we are going to present a few cases from our portfolio. There are both successful and unsuccessful projects. In addition, an analysis of success factors and reasons for refusal is provided.

Many of our SMBs are eager to change themselves, to find an escape route from the current situation. They all know that change is not only initiated by the market – each company must change itself during its natural period of growth – it is change by evolution. However, many of them also do not know how or do not have enough

**internal power to do these changes. ICT system re-engineering could really be the right way for most of them to do the necessary changes. Innovation could start here.**

## **Keywords**

re-engineering, ICT system

## **1. Introduction**

In today's fast-paced, highly competitive world, change is inevitable. Organizations must respond to change to remain competitive and customer focused. Change is not only driven by forces outside the company, from enhancement requests to bug reports. It is also driven by economic, organizational and regulatory changes.

It pays to work smarter, not harder. According to a recent study of the IBM Institute for Business Value, organizations that are significantly outperforming their industry peers also happen to be making more headway on newer approaches to work. They are using dynamic, collaborative and connected ways of working to get things done effectively within a constantly changing environment. However, most organizations are not yet meeting their ambitions in these areas. For those at the forefront and those lagging behind, this research offers insights into the critical practices and technologies that are fundamentally changing the nature of work.

Organizations today have no shortage of data, but many lack integrated information and insights they can easily use to execute their business processes. Even more information is produced as processes and systems – both natural and manmade – become increasingly instrumented with billions of sensors and smart devices at work. Businesses need a strategy for making sense of it all. Information must be delivered in context to the people and processes that need it.

## **2. Why changes in the IT system mean business model changes?**

Visibility into IT is no longer an IT thing. It is a business thing. Accurate, up-to-date, easily accessible insight into the inner workings of the IT environment yields improvements across a wide range of IT functions that have a direct impact on business success.

Almost every function of every business subject exists thanks to IT system support.

According to this, all changes applied on IT system mean changes in the company's business model. That's why we stressed that even a simple request for IT system enhancement, should (or will) cause big structural changes in the company model – changes requested by a "new reality" present on the market, changes which management and the company itself could not have initiated or done.

Internal IT systems must also fulfill necessary standards and provide the level of flexibility and adaptability to change that are required by new technologies.

The problem is that the communications for implementing change often come from various sources and in many different formats, including change requests, defects, bug reports, enhancements requests and problem reports.

Change data is generally managed using standard tools (such Excel sheets), but, even more frequently, the data is described in e-mail threads, phone conversations and staff meeting minutes.

In addition, many organizations lack a common process and supporting products for handling change requests because they appear to be overly expensive. Some change management systems are costly to maintain – you must implement processes, document workflows, automate reporting and integrate the change management system with other IT systems.

With an enterprise change management (ECM) solution, organizations have a major opportunity to reduce operating costs while managing change effectively and efficiently.

## **3. Re-engineering instead of consolidation?**

IT systems, if we could even talk about systems, at our SMBs are built during long periods according only to the current need and budget. Most of them do not have system architecture, dedicated server, backup or security procedures, etc. Usually, there are few, sometime tens of PC desktops and

laptops, a local network, a file server computer and some resource sharing. According to our experience, most of this equipment is usually more than 5 years old.

IT systems consolidation is a process of resource optimization, replacement of ineffective components with new, sophisticated ones. This process often aims to obtain better ROI, system usability and efficiency, and, of course, lower maintenance and support costs.

Re-engineering is a process of designing from scratch: completely new hardware, network and system software configuration, new or enhanced applications, new working procedures, a new level of required knowledge and skills.

In natural language, consolidation is evolution, whereas re-engineering is a revolution.

The re-engineering process should promote a new dialogue between business itself and the IT system, striving to speed up deployment of mission-critical IT solutions while demanding that ongoing IT operations improve resource utilization and make staff more productive.

With the burgeoning availability of cloud computing services and enabling technologies, IT decision makers can take full advantage of these architectures both on premises and over the Internet, making the security, performance, and cost decisions that are the most appropriate for their specific performance, security, and business resilience requirements.

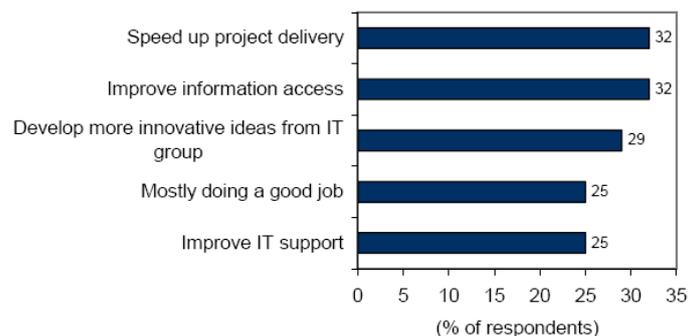
Today's business is conducted across highly connected environments where geographic borders and time zones blur and business transactions flow 24/7. To make informed decisions, executives need real-time access to accurate information about products, customers, markets, and competitors. They need to extract the utmost value from every investment by maximizing resource utilization and holding down cost.

A decade of IT-enabled innovation has significantly contributed to the establishment of highly fluid and dynamic business environments. The Internet and mobile computing allow employees, contractors, and partners to work as virtual teams – anywhere and anytime. Simultaneously, embedded computing and smart sensors permit organizations to track, route, and optimize types of resources on the fly.

For business to succeed in today's competitive real-time markets, senior executives need IT teams to speed up all aspects of IT solution provisioning, reporting and operations. In a recent IDC survey (Fig. 1), senior business leaders stated that the top messages they want to communicate to their own IT leaders are:

- increase speed of IT project delivery
- improve access to information
- develop more innovative ideas
- improve IT support

Most Important Messages That CEOs Want to Impart to CIOs and Senior IT Managers



Note: Multiple responses were allowed.  
Source: IDC's Enterprise Panel, 2008

It goes without saying that senior business leaders want IT to ensure that the technologies, processes, and management tools used to deliver business services are secure, compliant, resilient and cost-effective. Those solution attributes are table stakes needed for any kind of IT investment to be considered in the current global economic environment.

## 4. What triggered these changes?

It is very important to find what the main reasons that triggered the changes are. Our analysis shows that the most common are:

- problem escalation (hardware or software malfunction is in more than half of all cases)
- software problems (unlicensed software, application changes or upgrades, data loss...)
- communication issues (accessing bank accounts, government institutions, distant locations, Internet....)
- legal obligations (personal data protection, data exchange, data storage....)

These conclusions are based on our more than 25 years' experience in IT systems design. During the last few years, we have been preparing case studies both for successful and not so successful projects. We intentionally do not use the term 'unsuccessful projects' because there is no such IT project - what is unsuccessful is the business itself. The IT system always works: sometimes fully supporting the business processes and sometimes failing and possibly causing damage or even total destruction.

Many years of mindset evolution was needed to reach today's situation described in the next chapter. Not so long ago, the major problem was to exclude the general manager or business owner from the design phase of the process. Our SMB's owners want to make the decisions in each step of every situation, ranging from core business process to buying hygienic supplies.

We (the IT business community in general) have spent a lot of time explaining that "finding solutions at the speed of light", ordering new products or services by mobile phone, because "business will stop" since "there is some main board failure" or something similar, is not the right way at all. However, many of us keep working this way, trying to make some profit in situations where business has problems. The truth is that nobody is satisfied after such deals.

Before any further action, we must slow down the whole process. Yes, there could be very urgent or very important matters, among which the above-mentioned reasons, that must be done in a few hours or during the working day. We should not ignore them and we must find a temporary (or sometimes final) solution. However, immediately afterward and no later than the next workday, we must approach the manager or owner with an offer for the right solution, following the process described below.

Slowing the process down does not mean that we want to ignore the customer's problem. Completely the opposite – this will show our devotion to find the right solution, because the business bottom line – the one that really counts – only benefits when money is invested productively in *doing* business, not proposing it.

## 5. Change process

The changes need to be implemented in several steps.

The first step is the appointment of a Change Advisory Team (CAT). The main duty of this team will be advising the company management (most often in our SMBs – the business owners) about the "new reality", and the changes that have to be made. This team should compensate for the lack of company IT manager and department, or a dedicated IT decision maker – role(s) that our SMBs usually outsourced, or which general managers (aka owners) used to "play".

The team should consist of three to five members: one top management individual (not the general manager or owner) as a team leader, representatives of major company parts, and mandatorily at least one external person in the role of technology and business consultant.

The role of this team will be to complete a system diagnostic process that will result in:

- an overview of the current situation in terms of hardware, software and human resources
- a detailed overview and analysis of the current needs of the IT system's users
- definition of the differences between the current and the desired state of the system
- a strategy to resolve these differences
- contact with suppliers in order to obtain information, budget offers and other data from the IT market
- a project solution containing a method, resources and a schedule of activities required
- a budget proposal complete with specifications of the required equipment and services
- an upgrade strategy detailing development of the IT system over the course of the next 3 to 5 years

The second step involves the presentation of the proposed solution to the firm's top management and a reality check to determine whether the solution really fixes the underlying problem. This step should entail several meetings in which all aspects of the solution must be considered in detail. The result of this activity is the creation of a Change Implementation Strategy – a document that will demonstrate the actual needs of the company. A mandatory section of the document is the Needs Specification, containing required equipment, services and everything which is to be outsourced: hardware, software, services.

The third step is the collection, presentation and evaluation of offers by the CAT. The CAT then needs to compile a short-list containing the best two or three offers that will earn the chance to be evaluated by the actual top management.

One very fresh approach is to create a case study for each of the preferred solutions and build a framework for measuring ROI. It is a multi-step process that will produce standardized reports and will ease the evaluation. To create a business case for any investment and select the right option, organizations should follow a 7-step process:

- Describe the business challenge
- Assess the potential benefits of the investment
- Assess the potential costs of each option
- Assess risks and issues that might arise during the implementation
- Recommend the preferred solution
- Describe the implementation approach
- Measure potential and actual ROI

By following this 7-step process, organizations have the tools they need to precisely measure the value of any investment to their operation and to compare all solution alternatives. They can also use this analysis as the basis for estimating potential ROI prior to the investment — and actual ROI results after implementation.

During the fourth, final step, the CAT needs to recommend the best solution using the conclusions drawn from the individual offer presentations. This recommendation should contain:

- a procedure and timeframe for the solution's implementation
- the required funds and method of payment
- a recommendation for the creation of a Steering Committee (SC) – a body which will take over the responsibility of implementing the chosen solution

In practice, it is common for two different companies to be involved in the realization of the project – one in charge of infrastructure (hardware, system software, network and other communication equipment) and the other in charge of the application software. In such a scenario, two SCs must be formed. No more than three individuals should take part in each SC: one or two representatives of the IT project customer and one representative of the IT company in charge of that part of the project. If the project solution is of significant value or if it is deemed necessary, the CAT consultant may be included in place of a second company representative. Considering that the basic task of the SC is to coordinate and control activities at the highest level, the members of the company may be the same in both SCs.

The SC has to insist from the very beginning that all activities undertaken as part of the project have to be defined by industry standards, procedures and timeframes in accordance with the chosen solution offer.

At a glance, the procedure detailed above may seem unnecessarily complex and overly bureaucratic. However, in reality both our SMBs and their IT service suppliers work at 'the speed of light' from the very beginning, discussing solutions over the phone and with no paper trail or signed contracts. In this situation, it is completely normal that neither party is satisfied with the end result – neither the customer has received what they actually asked for, nor the IT company made any profit, often ending up at a significant loss due to wrong assessments and the delivery of inadequate equipment as a cost-cutting strategy.

In this way, the main trend in the business world today – the use of complex IT solutions (such as ERP software) and their components could be integrated in current SMBs. Although this seemed impossible due to the low budget SMBs have at their disposal for IT projects, recent technology advances have brought prices down, opened the market to a number of "small" players and shifted the focus of large IT companies toward the huge number of SMBs in need of solutions. This is a completely logical and expected turn of events since large companies such as banks, enterprise

companies and corporations have not only already solved these problems, but in fact are not even thinking at this level.

High technology's availability (hardware, software and services) in terms of price does not automatically make it available for direct and simple implementation. Nothing has changed in the conditions necessary for deployment and use of such advanced solutions, but this is in fact the best part! Some of these conditions and requirements are:

- completion of a diagnostic process which will determine the current state of the system, current and future needs and the most suitable products and solutions
- well-defined company structure and existence of a decision hierarchy
- well-defined procedures
- delegation of authority

These and other conditions must be fulfilled in the everyday functioning of the SMB – some before using the new technology, but all during the implementation process.

The existence of an outside consultant – commonly regarded as a waste of money by SMB managers and owners alike – is actually a fundamental need for the success of the project. Although the cost of the project will probably increase by 5-10%, the benefits of having a consultant are numerous:

- takes the burden of boring market research for compliant solutions off company management;
- company management is no longer responsible for the numerous meetings and presentations by IT service providers and the evaluation of their offers;
- the consultant's neutrality will inject the necessary objectivity into the decision process, ignoring possible personal and business relationships between the company employees and the IT companies or their representatives

Apart from these roles, the consultant may also act as a catalyst. What does that mean?

No one likes change, neither in corporate America, nor in developing economies. However, change is sometimes necessary and the consultant may be brought in to "start rolling the ball". In other words, the consultant may make decisions without taking into account company culture, employee morale or other effects of changes in the company.

The consultant should be employed to bring the necessary objectivity, since who could better identify possible problems than an individual who has experience gained in numerous IT projects? A good consultant provides a new, objective viewpoint on the problem, without regard for employee opinions on the subject.

The consultant may be employed to train – especially if he or she is an IT consultant.

The consultant may also be employed to do the "dirty work". Let's be realistic: no one wants to be the person who imposes new, stricter rules, additional work or is responsible for firing employees or eliminating entire departments.

The existence of a consultant will be a replacement for mid-level management, which is generally missing in our SMBs. Successful SMBs have a huge need for the inclusion of this level of management, which will reduce or even eliminate the connection between workers and top management. When the consultant leaves the company, he will create a perfect situation for the implementation of such a management level, making his presence justified and beneficial both financially and in business terms.

## 7. Conclusions

Innovation is the only path out of a crisis. Large companies have an advantage over smaller ones in such a situation, since SMBs have neither the means nor the capacity to innovate. Even when a minor company has an idea for a new product or service, it will be easier for the large company to buy the idea or even the entire company than for the small company to materialize their idea.

A well-designed and functional IT system can provide SMBs with more time, better financial management, easier access to information and excellent opportunities to conduct market research and testing in order to easily commence and commit to the development of innovative solutions and products.

Change is inevitable, but refining the ways that your organization responds to change represents an opportunity for competitive advantage.

Poorly managed change is the main cause of more than 50% of all problems causing delays or decreased productivity. Only a structured and well-supported process of change management,

augmented with automation wherever possible, can enable a company to effectively slash costs and risk caused by change while increasing overall business performance.

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# Entrepreneurship Disparities among Regions in Syria

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In this study, the Entrepreneurship Activity Rate in Syria has been analysed, the related characteristic in general, and the distribution of the entrepreneurs across the five different regions of Syria. Additionally, the paper concentrated on the regional disparities in term of entrepreneurship since there is a vast imbalance regional development. The study analysed the main factors determining entrepreneurship in Syria.

The main results of the paper show that the age and level of education, training on starting a business during primary/ secondary schools or after completing education, household income and gender are the main determinants of entrepreneurship in Syria. When we control the above variables the region factors will be insignificant.

## Keywords

Entrepreneurship, Regional Development, Innovation, Syria.

## Abbreviations

- 1- APS, Adult Population Survey
- 2- CBS, Central Bureau of Statistics
- 3- GEM, Global Entrepreneurship Monitor
- 4- TEA Rate, Total Entrepreneurship Activity Rate

## 1. Introduction

Syria is in the middle of the transformation situation toward social market economy. Part of this transformation process is to enhance the entrepreneurial spirit to lead to innovative and competitive economy.

In this regards, the government had adopted some initiatives to create an enabling environment for entrepreneurship to accelerating the capabilities of entrepreneurs. For instance, the entrepreneurial curriculum had been integrated into the official education curriculum of the Ministry of Education in vocational schools and intermediated institutes (2007 to present).

This study analyzed the Entrepreneurship Activity Rate in Syria, the related characteristic in general, and the distribution of the entrepreneurs across the five different regions of Syria. Additionally, the study concentrated on the regional disparities in term of entrepreneurship since there is a vast imbalance regional development. For example, most of poor people are living in East Region, and the industry is concentrated in the North and South Regions, etc.

The main two questions of the study are: 1) what are the main factors that determined the entrepreneurship in Syria? 2) Is there a significant difference of entrepreneurship among regions in Syria?

The study will use quantitative analysis to describe the current entrepreneurship characteristics among regions in Syria. This study depends on the available dataset of the Adult Population Survey (APS) of the Global Entrepreneurship Monitor (GEM) that was administered across the 52 GEM countries, in 2009. The researchers used the SPSS software to analyze the available datasets.

## 2. Literature Review

Schumpeter (1942) referred that entrepreneur "can no longer be seen as the sole vector of innovation" but innovation would in fact mainly be through managerial business owners who direct big companies, yet, their activities are restricted to routine work Wennekers and Thurik (1999). Accordingly, many studies show that innovative activities are affected by the size of firm. Some advocates that small and entrepreneurial firms contribute significantly to total innovation (Feldman and Audretsch 1999), others argued that large firms tend to have innovative activities than small businesses (Cohen, 1996). Other researchers underlined the role of institutions that direct ownership, knowledge production and knowledge diffusion and its interface with entrepreneurship (Braunerhjelm, 2010).

Other studies have shown the role of "traditional determinants" on decisions to innovate, such as the characteristics of firms, market structures (concentrated markets), the degree of openness to foreign trade, technology transfer and the degree of exposure to foreign competition in the domestic market, skills in, human resources have been identified in various studies (Baldwin and Johnson, 1995). Other studies assumed that "monopoly power" helps firms to acquire the products of innovation, while, others have supported competitiveness (Arrow, 1962).

The different entrepreneurship theory, explain entrepreneurs as the ability to recognize and utilize opportunities what and where these opportunities might exist. Regarding entrepreneurship that refers to a set of abilities embodied within an individual, rather than those who starting a new venture; self-employed consists of a very mixed group may involved in creative entrepreneurial activities, but it could just also be job creator, (Blanchower, 2000).

Alternatively, related measures of entrepreneurship are density of firms (Klapper et al 2008), or business ownership (Carré, van Stel and Thurik 2002). Net birth rate has also been suggested as an indicator of entrepreneurship (Dejardin 2008).

The most commonly defined determinants of entrepreneurship at the macro-level in the literature are the level and growth of GDP, unemployment, investments, cost levels, inflation and the interest rate level (Bosma et al, 2005). Also factors like government spending on education, infrastructure and health seems to be positively correlated with start-ups (Reynolds and Storey, 1993). Specifically, human capital (education) seems as one of the basic variable which explains entrepreneurship (Kim et al 2006), which is important for exploiting an opportunity. Human capital refers to qualified workers who rise above barriers such as getting credit, as well as improving network.

In addition to regional differences, Braunerhjelm and Feldman (2006), had presented positive effect of concentrated environment on the location of firms and entrepreneurs. This include, access to finance and services, better flow of new business ideas, larger markets and less fluctuating in demand, lower entry costs, access to knowledge, skills, density, opportunities, networks, (Nijkamp, 2003), low fixed cost industries (Glaeser and Kerr, 2009), which are very important for innovative and entrepreneurship.

In the previous literature there are many references to demand and supply side determinants of entrepreneurship (Koster and Karlsson, 2009) is likely to be a consequence of local norms, traditions, unexpected events, (Glaeser and Kerr 2009).

The aim of this paper is to find out the main determinants of the entrepreneurship activity rate in Syria and to investigate if there is a significant difference of entrepreneurship among regions in Syria.

The following section is a background about Syrian economy including demographic, employment, unemployment, education level and the economic activities among regions in Syria.

## 3. Background about Syria

The total number of the Syrian population (who live in Syria) had increased from 13.8 million in year 1994 to 20.4 million in year 2009 although the population growth rate was decreased from 3.3% between "1981 to 1994" to 2.45% between "2000 to 2009", yet it is considered as one of the highest growth rate worldwide. The increased population had associated with the increased population in urban areas out of total population (43.5% in year 1970, 47% in year 1981 to 53.5% in year 2009),

which indicate the internal immigration to big cities in Syria such as Damascus, rural Damascus and Aleppo (CBS, 2009).

The highest percent of employed population is in the southern region (30%), middle region (26%), and northern region. The employment status is varied by educational level. The highest percent of employed population in Syria is the elementary level of education 40% while university and more is 9% (per each). Among each region, the highest percentages of employed people with secondary, university and more are in the coastal region (17%, 14% respectively), compared to other regions.

Moreover, the disparity among regions is noticed regarding the percent of employed population with elementary level of education and less which is high among eastern region (74%) out of total educated population in this region, compared to the lowest which is among population in coastal region 37%.

Further regional distinction is observed regarding the distribution of employed population among sectors. Commonly, on national level, the distribution of employees is high among service sector (26%); then among the industry, building and construction, hotels and restaurants sector (16%, per each); agriculture (15%); transportation (8%) and the lowest is the insurance and real estate sectors (2%).

Among each region, the highest shares of employees in the north region are in the industrial sector (19%). While the highest share, in the eastern and the middle regions region is the agriculture sector (30%, 21% respectively). Whilst, among the coastal region the service sector is constitute the highest shares of employees (22%). Whereas, the south region represents the highest shares of employees in insurance and real estate sectors (19%).

We can conclude that the descriptive analysis of statistics among the five regions in Syria reflects clear differences regarding the population distribution, household expenditure, and employment concerning to education levels, unemployment rate, and the distribution of employed population based on the economic activity. In the following section the paper will illustrate further disparities in Syria concerning the characteristics of the Total Entrepreneurship Activity Rate (TEA Rate) based on analyzing the GEM APS data, 2009.

### **3.1 Entrepreneurship in Syria**

The TEA rate in Syria (8.5%) is low compared to other factor-driven economies (FDE) (17.7%) and other MENA countries (12.6%) that include: Algeria, Jordan, Lebanon, Morocco, Palestine, Saudi Arabia, Tunisia, UAE and Yemen (GEM MENA Report, 2009).

TEA Rate is the sum of the Syrian adult population who were actively trying to start business (3.4%) and who were owners of new business (less than 42 months old) (5.1%) (GEM MENA Report, 2009). This rate is low compared to FDE (averaging 17.7%) and the comparison MENA countries (averaging 12.6%).

Furthermore, only 6.7% of adult Syrians were owners of an established business (more than 42 months old). This is a less than the average of FDE (8.9%) and the MENA comparison countries (average 7.8%), where Syria ranked sixth of the ten.

The Syrian business discontinuation rate (7.4%) is about average among factor-driven economies (6.9%), while higher than the average of both efficiency-driven (4.9%) and innovation-driven (2.5%) economies. Due to personal reasons, most of entrepreneurs discontinued their businesses in Syria; the second most common reason was due to the unprofitability of the business. Problems getting financing, often cited by Syrians as a main barrier to establishing a business, was the third most common reason (only 14%).

GEM data, reflects the entrepreneurial gender gap in Syria which mirror the employment gender gap in the labour force. Female participation rate in the labour force in Syria is relatively low, 14% in 2009 as compared to 71% among men (CBS, 2009). Similarly, the TEA rate for males was about 13.6% to 3.1% among females. This places Syria the country with the largest gender gap in TEA among the tenth MENA countries and FDE after Saudi Arabia (APS, GEM 2009).

There is little difference in the distribution of entrepreneurs between urban and rural areas (8.8% in urban areas compared to 8.0% in rural areas). While entrepreneurship activity in rural areas is more likely to be necessity-driven than in urban areas, these findings are not statistically significant. Moreover, on gender level, the difference is not significant among men, 13% in urban versus 14%; in rural areas. However, rural women are significantly less likely to be engaged in early-stage entrepreneurial activity than their urban counterparts (1.8% as compared to 4.2%). The findings might be due to any number of factors, including differences in business opportunities and more conservative attitudes towards women's work in rural areas. The findings should be examined further.

Syria is a fairly young society. The demographic distribution in Syria shows the highest share of the population to be the 25-34 year-old age group (CBS, 2009). Interestingly, the highest TEA rates in

Syria are among these same young adults aged 25-34 (10.8%). This rate is only slightly higher than among 18-24 year olds and 35-44 year olds. After age 40, entrepreneurial activity rates drop sharply to around 5%. TEA rates in factor-driven economies exhibit a similar pattern, with the highest rates among the 25-34 year-old age group. The main difference is that TEA rates do not drop as sharply after age 40-44.

In terms of gender, the correlation between age groups involved in entrepreneurship varies significantly. Young male Syrians aged 25-34 are more active entrepreneurs than males in older age group (35-64). The analysis indicates that the correlation is significant yet, this result indicates the existing of endogenous factors that impact the relation between the age group of males and their intention to start their own business.

The education level is yet another characteristic to be explored; the higher the educational level, the more likely adults are to engage in entrepreneurial activities. The share of entrepreneurs among those who graduated from college is twice as high as the share among non-educated Syrians.

The association between higher levels of educational attainment and entrepreneurial activity holds for both men and women. However, the difference in the TEA rates is especially high between women with lower than a secondary education and those with a secondary or post-secondary degree.

Consistent with overall GEM patterns, TEA rates in Syria increase with household income, from 4.1% in the lower-third income group to 12% in the upper-third income group. This pattern holds for men. For women, the TEA rate is highest in the middle-third income group.

To summarize, the preceding described activity components of entrepreneurship concludes that the TEA Rate is low compared to other similar economies and MENA countries; the low TEA among women compare to men mainly in rural areas; the higher educational level the more TEA Rate. Also it concludes that the low TEA Rate in Syria is likely due to institutions issue such as: the government policies and support, access to finance, awareness about the regulations related to business world.

In the following section, the paper report will illustrate the main determinants of TEA Rate in Syria and the innovation determinants depending on analysing GEM Syria APS 2009 survey.

## 4. Methodology

This paper analyses the data of the GEM Adult Population Survey carried out in 2009 in order to measure the level of Total Entrepreneurship Activity (TEA) Rate. It surveyed 2002 respondents aged between 18 to 99 years old. The sample has been weighted by population aged 18 to 64 years old.

### 4.1. Model specification

The paper tried to explain the main determinants of the TEA Rate using the following potential determinants: levels of education, received training about starting a business during primary or secondary education, or after completing education, income household level, age groups, and the gender of the respondent.

However, this study tried to investigate the main determinants of innovation based on some indices that were extracted from the following variables:

- How many (potential) customers consider product new/ unfamiliar? (1= all, 2= some, 3= none)
- How many businesses offer the same products? (1= many, 2= few, 3= none)
- Were the technologies or procedures available more than a year ago? [1= Very latest technology (newer than one year), 2= New technology (one to 5 years), 3= No new technology (more than 5 years)]
- Technology level of the sector: (1= No/low technology, 2= Medium technology, 3= high technology)
- Technology sector: (1= indication, 2= no indication)
- The analysis showed that innovation indices were not significantly correlated with the TEA Rate.

This result suggests the need to do deep investigation in order to study the main determinants of innovation and its relation with the TEA Rate in Syria.

The results showed the there is no significant correlation among the selected indices. Therefore the next part of this study will focus on determinants of the TEA Rate.

## 4.2. The dependent variable

This variable is the Total Early-stage Entrepreneurial Activity (TEA Rate), which indicates if the respondent involved in starting a business or not, (variable values, 0= No, 1= Yes).

## 4.3. The explanatory variables

The selected variables have the following values as follow:

- Gender= respondent gender, 0= Female, 1= Male
- Syhhinc= ranges best describes the total annual income of all the members of respondent's household, including income of the respondent in SYP, which includes: (1= less than SYP 60,000, 2= From 60,001 to 120,000, 3= From 120,001 to 240,000, 4= From 240,001 to 360,000, 5= From 360,001 to 600,000, 6= From 600,001 to 900,000, 7= From 900,001 to 1,200,000, 8= From 1,200,001 to 1,500,000, 9= From 1,500,001 to 1,800,000, 10= From 1,800,001 to 2,100,000, 11= From 2,100,001 to 2,400,000, 12= More than SYP 2,400,000,
- Age 0\_to\_6= The group which describe the respondent age, which include: (1= 18-24, 2= 25-34, 3= 35-44, 4= 45-54, 5= 55-64)
- entri\_sec= the respondent had ever taken part in training on starting a business at primary or secondary school, (0= No, 1= Yes)
- etaftsch= the respondent had ever taken part in training on starting a business after completing education in school
- gemeduc= education attainment, which include: (1= Basic education, 2= some secondary, 3= Secondary degree, 4= Post secondary, 5= Post university.
- regions= the five regions in Syria, which include: (1= south region, 2= north region, 3= middle region, 4= east region, 5= coast region)

## 4.4. The Model

The analysis shows that the TEA Rate is associated with the set variables which illustrated in the following two models:

Model...1

$$TEA = \alpha_1 + \alpha_2 \text{ gender} + \alpha_3 \text{ syhhinc} + \alpha_4 \text{ Age 0}_{to_6} + \alpha_5 \text{ etpri}_{sec} + \alpha_6 \text{ gemeduc} + \varepsilon + \text{regions.}$$

Model...2

$$TEA = \alpha_1 + \alpha_2 \text{ gender} + \alpha_3 \text{ syhhinc} + \alpha_4 \text{ Age 0}_{to_6} + \alpha_5 \text{ etaftsch} + \alpha_6 \text{ gemeduc} + \varepsilon + \text{regions.}$$

The difference of the two models is regarding receiving training during school or after completing education in school. The results are illustrated in the table below (Table 1).

**Table 1** Regression results of Model-1 and Model-2

Variables in the Equations	Model 2		Model 1	
	B	Exp(B)	B	Exp(B)
etpri_sec	0.938 (7.658)***	2.555	.	.
Etaftsch	.	.	0.969 (11.957)***	2.636
Syhhinc	0.155 (8.167)***	1.168	0.156 (8.187)***	1.168
Gemeduc	0.266 (9.083)***	1.304	0.242 (7.423)***	1.273
Gender	1.433 (41.123)***	4.191	1.414 (39.87)***	4.113

Variables in the Equations	Model 2		Model 1	
	B	Exp(B)	B	Exp(B)
Age_0_to_6	(10.494)**		(10.924)**	
Age_0_to_6(1)	0.645 (-2.073)	1.907	0.639 (-2.021)	1.894
Age_0_to_6(2)	0.857 (3.743)*	2.357	0.854 (3.699)*	2.35
Age_0_to_6(3)	0.51 (-1.221)	1.666	0.503 (-1.181)	1.653
Age_0_to_6(4)	-.159- (-0.089)	0.853	-.197- (-0.136)	0.821
regions_MH	0.044 (-0.438)	1.045	0.058 (-0.749)	1.06
Constant	-4.964- (83.64)***	0.007	-4.975- (83.243)***	0.007

- Between two brackets we put Wald value;

- (\*) Significant at 1% level, (\*\*) Significant at 5%, (\*\*\*) significant at 10% level.

- Age\_0\_to\_6 indicates the overall age is significant impact of TEA. Yet, category age 2 (25- 35) has significant impact compared to the others.

#### 4.5. Robustness check

By using the Omnibus Test (Table 2) the two models are significant regarding the Chi-square value which means that the variables in the model are different from zero.

**Table 2** Omnibus Tests to check robustness of the applied regression

Omnibus Tests of Model Coefficients				
	Model 1		Model 2	
	Chi-square	Sig.	Chi-square	Sig.
Step	(98.57)		(94.583)	
Block	(98.574)		(94.583)	
Model	(98.574)	0.000	(94.583)	0.000

Model Summary					
Model 1			Model 2		
-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
883.496 <sup>a</sup>	0.059	0.13	887.311 <sup>a</sup>	0.057	0.125

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

In addition, the models were test by Hosmer and Lemeshow Test (Table 3). The results show that we don't reject the null hypothesis, which indicates that there is no difference between the observed and expected results (goodness of fit).

**Table 3** Goodness of fit test

Hosmer and Lemeshow Test	
Chi-square	
Model 1	Model 2
8.624	5.748

Moreover, the descriptive statistics (Table 4) show that the Cook's influence mean is close to zero.

**Table 4** Descriptive Statistics of Cook's influence statistics and normal distribution

	Descriptive Statistics									
	Model 1					Model 2				
	N	Mini.	Max.	Mean	Std. Dev.	N	Mini.	Max.	Mean	Std. Dev.
Analog of Cook's influence statistics	1613	0.00001	0.2072	0.0063	0.0205	1613	0.00001	0.2038	0.0061	0.0202
Normalized residual	1613	-.91519-	9.0523	-.0017925-	0.9903	1613	-.87755-	8.7935	0.0004	0.9992
Valid N (listwise)	1613					1613				

*a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.*

The interpretations of the results:

According to model above the main determinants of the entrepreneurship activity rate are:

- Education: the higher education level the more the probability of being entrepreneur, the relationship is positive and significant as expected.
- Household income: the higher income level the more the probability of being entrepreneur, the relationship is positive and significant which means that the entrepreneurs in Syria come from high economic class background.
- Training in starting a business after completing school: the training is playing positive role in increasing the probability in entrepreneurship.
- Age: the results show that the young people between 25 and 34 years old are more likely to start their own business than other age groups in Syria.
- Gender: the gender gap is clear in Syria in terms of entrepreneurship since female are less likely to start their own business.
- Regions: the difference between the entrepreneurship between regions in Syria is not significant in terms of entrepreneurship after we control for household income, age, training and gender.

## 5. Conclusions and recommendations

This paper concludes that the Total-Entrepreneurship Activity Rate (TEA Rate) in Syrian is low comparing to the countries in the same development. The paper tried to explain the determinants of TEA rate in Syria to understand the main reasons behind this low rate.

Additionally the paper compared TEA cross regions to investigate if there is a regional disparities. From the descriptive cross region analysis it appears that there is a difference between regions in terms of entrepreneurship, education, unemployment, level of education among employed population, and economic activities.

The main results of the paper show that the age and level of education, training on starting a business during primary/ secondary schools or after completing education, Household income and gender are the main determinants of entrepreneurship in Syria. When we control the above variables the region factors will be insignificant.

The main recommendations: The government, private sector and civil society should support young people and to increase the TEA Rate more we need further investigations about elder people or middle age people how don't significantly hesitate to start their own business.

Moreover, education and training seems to play an important role in entrepreneurship which means more investment in education and expanding of training programs is crucial for supporting entrepreneurship in Syria.

The strong correlation between high Houshol income and entrepreneurship in Syia raise the issue of access to finance since the results refer to dependency of entrepreneurs on the family standard of living. More facilities for entrepreneurs for access to finance is an important issue for improving business in Syria.

Finally the large gender gap needs more attention to support females in terms of training and access to finance.

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# National policy on entrepreneurship and innovation – Serbian case

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**Serbia has started late transition after political changes in 2000. It was successful in creating encouraging climate for overall business and especially for SME operating, mainly through legal changes and institutional development. Those measures have resulted in increasing number of new SME each year. Global economic crisis influenced Serbian economy more than expected. Global crisis in fact enforced growth limits of the national economy, as the development during previous decade was non sustainable in medium - term. Serbian companies are not competitive on the world market. Foreign trade deficit is huge. In order to be more competitive SME are seen as key factor. At the same time it is right time to transform policy for SME support from quantitative into more qualitative one. The subject of this policy would be fast growing SME and the fastest one – so called gazelles. Innovative companies and innovative entrepreneurs are essentially important for fast growth, but they are not strong enough. Those companies need financial support, institutional support, encouraging legal framework, training, project approach, clusters creation, from bought governmental and local level, as well. It is not less important fact that this qualitative shift should be in line with EU2020 development agenda.**

**The aim of the paper is threefold: firstly, to illuminate SME supportive policy framework to day, secondly, to analyze influence of economic crisis and thirdly, to envisage new, more qualitative set of supportive measures for future SME development.**

## **Keywords**

Entrepreneurship, innovation, national policy, SME

## **1. Introduction**

In the transition period 2000-2010, Serbia finished the first phase of transition toward market economy. Great deal of measures was introduced, from legal and institutional framework market oriented establishment, to restructuring on the firm level and opening to the world market. Generally speaking reform was better performed in financial then in real sector.

During the period under consideration fast GDP increase was realized. It was partially due to fast than average increase in SME and entrepreneurship development. Small and medium scale enterprises became important agents for the whole economy and their share in total figures increased considerably. It was possible as more encouraging business climate was created and supportive set of measures for fast SME development were introduced. From year to year number of new companies increased, which partially absorbed surpluses of workers from companies in restructuring.

Last two years (2009 and 2010) Serbian economy suffered as others because of Global economic crisis. Companies faced great deal of problems: from liquidity, scarce and more expensive bank credits to decrease in foreign and domestic demand. Among others, SME and shops suffered a lot and their numbers for the first time during transition period started to increase slowly and lastly decreased.

During 2010 there were the first signs of the recovery of Serbian economy and one can expect increase in GDP in 2011. For the period of economic recovery SME become important factor for speeding up economic development.

One can say that importance of SME and entrepreneurs, as factor of a positive destruction, become even more influential than before. Considering that Serbian SME are less efficient and less competitive than European it is right moment to change attitude of policy supportive to SME development to improve their efficiency. Moreover these measures would be in line with EU 2020 Agenda [1]

## 2. The First phase – improvement of overall business climate

Real encouraging climate for strengthening entrepreneurship and supportive measures for SME and shops was introduced after political changes in late 2000. Serbia has started transformation toward fully market economy as the last among Eastern and Central European countries. On the basis of others experience it was chance to avoid mistakes and define better mix of macro economic policies and market reforms. At the same time in Serbia after overall political and economic crisis during the 1990s a consensus of influential social groups was achieved about need for market reform, but atmosphere was pretty hectic because of great expectations.

During the period under consideration (2000-2010) Serbia has introduced a number of market reforms, achieved macroeconomic stability and high rate of economic growth, privatized majority of (socially owned) companies, started process of joining EU, with harmonization of number of laws and other adjustments. In the period before Global economic crisis Serbian GDP increased 5.4% per year on average, with peak in 2004 (9.3%) and industrial production increased 1.3% per year (see table below).

**Table 1 Serbia** Key Macroeconomic Indicators (Increase %)

	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>GDP</b>	5.1	4.5	2.5	8.4	6.2	5.7	7.5	5.5	-2.8
<b>Industry</b>	0.1	1.8	-3.0	7.1	0.8	4.7	4.6	1.1	-12.6
<b>Trade</b>	19.8	23.9	13.8	18.0	26.5	7.7	22.8	6.6	-11.7
<b>Traffic</b>	9.6	6.9	5.0	4.8	4.4	10.4	1.7	0.4	-14.9
<b>Export</b>	10.5	20.6	32.8	27.8	27.2	43.4	38.1	24.3	-26
<b>Import</b>	28.0	31.8	33.2	43.8	-2.7	25.9	41.5	23.3	-34.7
<b>Inflation</b>	40.7	14.8	7.8	13.7	17.7	6.6	10.1	6.8	6.6

Source: Ministry of Finance of Serbia

Macroeconomic stability was improved considerably, as retail prices index decreased from 92% in 2000 to 6.8% in 2008, with exchange rate stability and increasing foreign exchange reserves (Foreign direct investment reached maximum of 4.4 billion € in 2006, mainly due to privatization of banks and companies)[1]. It was partially due to public finance reform and introduction of hard budget constraint, as public finance deficit in the period 2001-2003 was transformed into surplus (of 2% of GDP), for the first time after years.

Although unemployment is still very high (20%), employment started to rise in 2004 (0.4%) and 2005 (0.9%). Free formation of wages resulted in their high increase – over 10% per year in real terms. At the same time average monthly salary per employee increased from 102€ in 2001 to 320€ in 2008.

Market reforms in Serbia improved overall business climate for all economic agents, including SME and entrepreneurs. For example Serbia was labeled as a leader of reforms in 2005 and improved its place from 95th to 68th position worldwide [1]. Time necessary for company foundation was shortened, for registration, as well, for license issuing and tax payment also. Time period for custom declaration (export and import) issuing was shortened. Investment climate was improved. The liquidation of enterprise was easier then before.

Overall market reforms slow down considerably during the last several years. The World Bank examination for 2008 proved worsening business climate in Serbia recently [2]. Serbia was ranked as 86th, although it was 84th in 2006. Comparing to other countries within the region it was better ranked than Croatia (97), Bosnia and Herzegovina (105) and Albania (136), but was worse ranked than Hungary (45), Romania (48), Slovenia (55), Macedonia (75) and Montenegro (81).

During the last decade institutional conditions for SME and entrepreneurship development and their strengthening were considerably improved. Increasing number of SME and shops was result of improvement of overall business climate and, at the same time even more important, encouraging measures oriented toward SME especially. A number of measures were introduced from governmental

to local level, as well. One can summarize those supportive measures, as follows [3]: 1) Improvement in overall business climate – although reforms lost momentum in the second half of previous decade, business climate was encouraging especially in comparison to the 1990s, when Serbia was faced with overall sanctions of International community; 2) Establishment of institution responsible for SME support - Ministry for economy and regional development is responsible for strategic and policy definition. Republican Agency for SME and entrepreneurship development was founded and broad network of local and regional agencies, as well. Council for SME and entrepreneurs was formed as inter – ministerial body responsible for dialog with representatives of SME sector; 3) Legal infrastructure for SME strengthening – as a part of the process of law changes toward recognizable market legal environment – encouraging for business – a number of laws was changed and set of completely new one was enacted. This was partially due to harmonization with EU legal framework for business, considering Serbian will to join EU; 4) Financial supportive measures were introduced – financial sources for SME support were established within Republican development fund and Republican employment service, as well. Important factor of financial SME support was related to international credit lines. At least, international financial sources from International financial institutions, governmental and non - governmental sources, as a sort of financial aid, were realized, as well.

As result of improved overall business climate and supportive measures for SME development number of SME and small shops increased during the last decade. Total number of economic agents reached 303.5 thousand in 2008, as the last year before Global economic crisis, due to constant increase in number of SME[2]. SME sector became increasingly important for overall economic growth and development. The SME share in total turnover was 66.6%, 59.1% in total added value of non – financial sector and 58.7% in total profit realized [4].

Total number of SME was increasing, but the structure was not improved so much. Micro enterprises are still dominant with share of 95.7% in total number of companies. At the same time they are very concentrated by industry and by region. SME are concentrated mostly in two industries: trade and processing industry. Regionally they are concentrated in two regions mostly: Belgrade city and South Backa region.

SME were very important in opening new working places. In the period 2004-2008 number of working places increased 24.9% (or 187.5 thousand), which offset number of employees who left big companies in restructuring process.

SME were very active in investment. Their share in total investment was 48.1% and the share in non – financial sector even more 58.7%. The share of its investment in GDP increased from 29% in 2006 to 40% in 2007. According to investment structure almost ½ investments is investing in equipment, but investments in construction was high 43%.

SME sector is more competitive than average due to less than average cost of employees and cost of wages per hour. It is interesting to note that after deterioration in the period 2004-2006 the proportion cost of salaries to value added was improved in the period 2007-2008 and now is on average for non – financial sector.

The comparative analysis of Serbian SME sector VS. EU pointed interesting results. Serbian SMEs are on EU average according to number of companies and employment and its share of turnover in total GDP. However, Serbian SMEs are well bellow EU average according to turnover per employee, added value per employee and profit per employee. Similar position is regarding investments. Investment per employee in Serbian SME sector was 4.100€, while in EU was 7.400€ and investments per company 12.200€ in Serbia and 31.700€ in EU [4].

If we envisage achievements in SME development in Serbia more precisely, dynamically and compared to other transitory economies than clear conclusions arose [5]. Firstly, Serbia made big step forward during past ten years, as in meantime SME became important economic agent with high share in GDP formation and total employment, as well. Secondly, it is still well behind other transitory economies, especially matured transitory economies, as they have started market reforms from 5-10 years before Serbia.

### **3. Global Economic Crisis and its consequences to Serbian SME**

Global economic crisis started as crash of US real estate market in mid 2007 and became worldwide during 2008. Serbian economy suffered as highly dependent on foreign demand, mainly from EU countries, and from foreign direct investments(FDI amount dropped from 2-3 billion € to less then 1 billion € per year). The first sign of global financial crisis appeared in May 2007, when all stock exchanges in the region witnessed sharp drop in prices of securities.

Even, before Global economic crisis negatively influenced Serbian economy, it faced limit for further growth. Growth model, which can be labeled as pure neo - liberal one, was non - sustainable in medium – term, as growth was based mainly on increase in public and personal consumption. High share of public consumption in GDP is signal of non restructured public services, from pension to governmental. Above all public companies did not start restructuring process. As a consequence fiscal policy was expansive(In the transitory period 2001-2008 the share of public consumption in GDP was 45-50% and increase in indirect tax duties was 9.8% p.a.) and as counterpart monetary policy was too restrictive in order to safe macroeconomic stability(Inflation was put down considerably and controlled better than before, but it is still higher than in other countries within the region and especially in comparison to EU countries 6.6-40.7% p.a. in the period 2001-2009 – see table 1). Inevitably GDP growth was suboptimal (lower than possible). So, one can conclude that world wide economic crisis was not caused, but sharpened problems of Serbian economy, only.

Government and National bank of Serbia – recognized first signs of the crisis in the last quart of 2008: foreign direct investment inflow has shrunk and outflow of capital has started, saving deposits (FX mainly in the structure) within banks decreased considerably, credit conditions worsened(Banks have started to calculate country risk with 1.5-2% above regular interest rate), companies more difficult collected claims, especially from government and public companies and foreign demand weakened. It seemed that both Government and NBS were surprised, were late and weak in reaction and underestimated consequences.

National Bank of Serbia reacted quicker by introduction of measures with aim to improve bank liquidity. Serbian banks were in better shape than majority of banks among transitory economies, among others due to higher legal requirement for capital adequacy (12% like in Croatia and unlike others with 8% requirement) and capital adequacy was 28% on average[1].

Government reacted lately, at the beginning of 2009, introduced weak encouraging measures. Firstly, in order to safe domestic savings, amount guarantied (insured) by the state was increased from 3 thousand up to 50 thousand €. Secondly, tax duties on saving deposits from capital gain were annulled and tax duties related to securities transfers. Thirdly, in order to curb recession Government supplied support for credit lines (subsidized interest) for: 1) Companies in liquidity problems (0.8 billion €); 2) Companies investing (0.17 billion €) and 3) Citizens (0.2 billion €)[2]

Governmental and NBS measures were mainly in right direction, but late and weak. It was clear that negative influence of Global economic crisis was stronger than expected. As inevitably, an overcome of the crisis was seen with help of IMF, only. The stand by arrangement with IMF lasting until April 2011 was based on projection of decrease in GDP (-2%), with help of 4 billion USD, emphasizing need for public services reform and decrease in public consumption, continuation of structural reforms and macro economic stability.

First signs of (modest) recovery were related to recovery of foreign economic activity and increasing foreign demand. Industrial production in 2010 was higher 3% in comparison to year before. Retail trade was increasing from July 2010. GDP increased 1.5% in 2010 and for 2011 a growth of 3% is expected[4]. Due to Dinar depreciation lasting more than one year export volume increased more than import (21% and 7% respectively). At the end of 2010 and beginning of 2011 the main economic problem is related to high inflation rate, caused by increase in agricultural prices and Dinar depreciation. Year ended with inflation rate of 10.3%[4].

In unfavorable circumstances development of SME and entrepreneurship slow down considerably. There were a lot of unfavorable factors, but the most influential seem to be: 1) Less chances for entrepreneurs then before, as it is usually case during the downturn of economic cycle; 2) More fears for those who started business or want to develop it, because of weak and decreasing domestic and foreign demand; 3) Less credit from bank sources and under more difficult conditions; 4) Decreasing demand on domestic and external market, from both companies and citizens; 5) Increasing competition from big companies and other small companies, as all economic agents try to survive and 6) Lower liquidity and more difficult collecting claims.

**Table 3** Number of newly established and closed companies and shops

	Number of companies		Number of shops		Net effect	
	Established	Closed	Established	Closed	Companies	Shops
2006.	11.536	1.528	45.693	27.010	7,5	1,7
2007.	11.902	2.027	47.951	31.619	5,9	1,5
2008.	11.248	3.068	43.375	34.572	3,7	1,3
2009.	10.014	3.597	39.365	36.441	2,8	1,1
2010.	9.391	9.340	35.036	37.168	1,0	0,9

Source: Republican Business Registry, processing Republican Development Bureau

Development of Serbian SME slowed down considerably after the period 2004-08 in which the sector became important factor of the economy in market reform and revitalization [6]. From table above it is clear tendency of slow down in number of established new companies and shops, on the one hand, and increasing number of closed companies and shops, on the other, with zero net effect for companies and negative net effect for the first time in 2010 for small shops. From 2008, as consequence of economic crisis and worsening business conditions, number of newly established companies and shops per year is decreasing, and at the same time number of closed companies and shops is increasing. During whole 2009 10.014 new companies were established and 39.3655 shops (for 11% and 9.2% less then year before) and at the same time 3.597 companies and 36.445 shops were closed (for 17.2% and 5.4% more then year earlier).

During 2010 net effect in so - called business demography was worsening further. This means that tendency of decreasing number of new established firms, on the one hand, and number of closed, on the other hand, got momentum (speed up). As result during the whole year 9.391 companies were established (6.2% less the year before) and 9.340 were closed (even 159.7% more then year before). At the same time 35.036 shops were established (11% less then year earlier) and 37.168 were closed (2% more the year earlier). Net effect for companies (number of established to number of closed) was worsening from year to year and in 2010 was 1:1 (1:2.8 in 2009). Net effect for shops was even worse 1:0.9, which means that for the first time in Serbia there were more closed than established shops.

It was already noted that SME and entrepreneurship development is concentrated by industry and by region, as well. Unfortunately, during transition period regional discrepancies in Serbia were widened. It means that entrepreneurs within developed regions have more potential chances for establishment and development of self sustained firms. The most developed region is metropolitan area of Belgrade city (12.963 or 41.2% of all newly established firms in Serbia in 2010) and South Backa region (4.567 or 14.5% of total new firms). On the other pole in Pcinja (South Serbia) region only 353 were founded or 1.1% of total.

#### 4. Innovative support – first steps

There are clear signs of economic recovery, although modest, in increasing industrial production, trade and GDP increase. SME are very important for further and secure recovery. Until now measures of quantitative support for SME and entrepreneurial development prevailed and their aim to establish critical number of new entities was achieved. Considering that Serbian SME are well bellow EU average, especially measuring certain indices per employee it is right moment to change attitude. In order to increase their efficiency policy support has to change into more qualitative sort. The aim is to transform SME into more competitive on international market, to increase export volume more than import and finally, to create surplus in trade balance.

*The first priority of policy support to SME and entrepreneurship development in the future – next phase – is competitiveness strengthening.* It should be realized through: 1) *Economic structure development in line with EU and compatible to EU structure*, which means increasing activities with value added above average; 2) *Improvement in competitive abilities of companies*, by closing discrepancy to EU average in gross value added per employee; 3) *More balanced regional development*.

Measures would be introduced for improvement in companies' competitive abilities, in order to operate more successful on the global market, and for technological improvement of products and services. Among others, it is important to strengthen and develop linkages between, on one side, educational and research institutions and companies, on the other side. Programs for improvement competitiveness are especially important and would be oriented to: 1) *Support investing in research and development and innovation*; 2) *Support companies internationalization*; 3) *Introduce strategy for productivity increase in companies*; 4) *Support cooperation and strengthen linkages between companies and developing clusters*.

Serbia was for the first time included into European Innovation Scoreboard in 2009[7]. It is important step for investigation of innovative potential for national economy and SME particularly. The analysis of innovative performances is very important as a starting point for further investigation and more relevant for decision making process about policy and measures for innovative activities support.

Data pointed that Serbia is well bellow EU27 average. If EU 27 innovative index is 47.8 then Serbian Index is 22.7 only. To summarize, it is labeled as catch up country. First dimension enablers: Serbian research system has modest potential comparing to EU average and neighboring countries (Slovenia and Croatia). Human source is also limiting factor (with 19.2% highly educated and 85% with

secondary school in total young population). Second dimension – firm activities: Serbia is investing 0.5% GDP (public and private sources) in research (EU 2%). On the company level 28% of all Serbian SME and shops can be labeled as innovative [8]. There are 3.5% innovative SME with linkages and cooperation in research in total number of SME. Third dimension – outputs: The share of SME introducing processing/product innovations is 18.3% and 18.1% organizational/marketing innovations in total. Comparing to EU and matured transitory economies Serbia is less efficient in utilization of innovations. The share of employment in knowledge based activities is 3.9% of total. The share of medium and high tech product export is 27% in total and knowledge service export 34% in total. The share of sales of new to market and new to firm innovation is 10% in total turnover and lastly, the share of revenues from licenses and patents from abroad is 0.1% in GDP.

Serbia is realizing „Strategy for development of competitive and innovative small and medium scale companies 2008-2013“ from 2008. According to the Report on introduction European Charter for Western Balkan in 2008 Serbian system for encouraging innovation with SME sector is marked with 2.5[9]. Project of technical support for development of entrepreneurship and innovation is joint project of EU and Serbian Government. One of the main achievements of the Project is direct technical support for 150 SME aiming to introduce system for innovation management, which is basis for innovative product and process development and easier access of SME to foreign market. Subproject Support SME competitiveness threw innovation is realized threw several activities: 1) Interactive workshops in innovation management (covered 157 SME); 2) Intensive technical support to companies (covered 20 SME); 3) Training in innovation and 4) Innovation clinics. Serbian achievement in cluster and network development can be estimated as encouraging and according to the Report is marked with 4. Namely, 20 clusters were registered with governmental support for 14 of them.

*The second priority is support to dynamic and fast growing companies, especially the most dynamic, so - called gazelles.* A number of investigation proved that net increase in employment is result of development of dynamic companies [10]. Those companies are not concentrated in certain industry, but rather are dispersed within whole economy. They are research and development oriented, innovative and younger then average company. Those companies became also subject of interest and economic policy of EU and OECD. While big enterprises dominate, due to sources they are controlling, entrepreneurship, research and development and new working places are development priorities in which small and new firms play important role.

The analysis of Serbian gazelles in the period 2003-2007[11] covered 532 dynamic companies, of which 53 the most dynamic. The main characteristic of those companies, which employed more than 43 thousand workers, is vitality, as they survived and developed in spite of transition problems and increasing foreign competition. The share of dynamic companies in total number of companies in Serbia was 0.6%. Number of employees within those enterprises was dabbled from 2003 to 2007 (more than 22 thousand new working places). Rate of growth of their turnover in real terms was above average (117% in comparison to 54% respectively). So, they increase their share in total turnover from 3.2% to 4.5% at the same time. All business indices during the period were more than dabbled, while income increased more than three times.

Implementation of Serbian Strategy for development of competitive and innovative small and medium scale companies 2008-2013 should concentrate measures and activities to those specific companies with potential for fast growth and export expansion. Priorities for dynamic companies and gazelles support are: 1) *Legal framework reform*, with an aim to harmonize laws in line with EU, to minimize administrative procedures and requirements; 2) *Innovation support*, with an aim to define system of stimulative measures for research and development and innovative activities and their implementation within companies; 3) *Functional education*, with goal to increase overall level of knowledge of managers and employees improving bought formal and especially informal education system; 4) *Financing improvement*, with aim to disperse institutional framework for micro financing, investment funds and venture capital funds; 5) *Closing institutional infrastructure*, in order to develop further institutional network covering whole territory; 6) *Opening to World market*, with goal to improve competitive strength of dynamic companies and gazelles on the global market.

## 5. Conclusion

During late transition Serbia succeed to improve business climate and introduce great deal of measures aimed to support SME and entrepreneurship development. They became important economic agent and their share in GDP, employment and trade became significant. During economic crisis Serbian SME suffered like others, in spite of increasing financial help. For the first time after

decade number of new established firms slowed down considerably and, even, more shops were closed than founded and net effect for companies is near to zero in 2010. For overall economic recovery entrepreneurs and SME become very important factor. Considering their low efficiency and competitiveness abroad it is time to change SME development supportive policy into policy with aim to encourage innovative and fast growing SME, instead of aim to increase number of them only, which was important until now. Serbia made big step forward in SME development, but is still below other transitory economies, especially matured one. It recently started implementation of measures for development of competitive and innovative SME. Those pioneering efforts are in right direction, but it needs time, experts and sources to catch up other transitory economies.

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# Polycentric development in Latvia within the context of the Cohesion policy

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In the European Union there are several challenges in the field of territorial development - demographic changes, climate changes, city mobility, degraded territories, social inequality, and global competitiveness. The development policy for 2007-2013 in the European Union has been reasoned with the rules of sustainable development. Currently there are active discussions upon the direction how to develop the area of the European Union within the context of territorial cohesion until 2030. Latvia is also taking part in this process and works out the necessary central policy. The united central policy is based on several significant suggestions from all involved parties, which will define the development of all territory in the European Union and Latvia in the future. In order to develop cities the support of concrete financing is given. At the same time the development of other territories in the country (such as rural areas, seashore, and borderland) must be provided accordingly to the national regional development strategy. Latvia actively supports the idea of providing the support of the Cohesion policy for implementation of local development strategies and initiatives, as well as solves the issues of economic development. A new stage in the Latvian territorial development planning has started and it is closely connected to the policy formation on this particular issue.

## **Keywords:**

Cohesion policy, regional economy, polycentrism.

## **1. Introduction**

Topicality of research. In order to understand the processes within which the cohesion policy is implemented and evaluate the development tendencies of economic centers (towns) in Latvia in the context of sustainable polycentric planning a research shall be conducted on the political regulations of the European Union and Latvia. The aim of the article is to investigate the direction of Latvia in the context of the EU territorial cohesion. The tasks of the article are to get introduced with the characteristics of the Cohesion policy in the European Union, tendencies of urban development in Europe, perspective of urban development in Latvia in the context of polycentric development. The following research methods have been applied: monographic, comparative, logically constructive and scientific synthesis. The research has been supported by the European Social Fund within the project „Support for the Implementation of Doctoral Studies at University of Daugavpils” (Project No. 2009/0140/1DP/1.1.2.1.2/09/IPIA/VIAA/015).

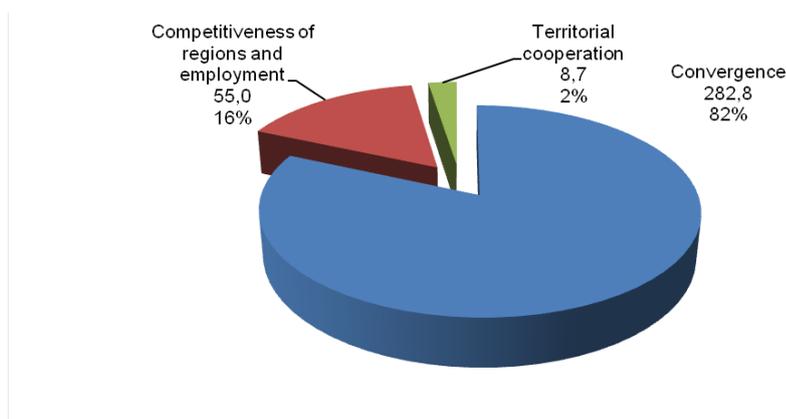
## **2. Characteristics of the Cohesion policy in the European Union**

The notion “Cohesion policy” states political regulations for solidarity on the European level expressed in projects, which throughout Europe are financed by two structural funds, e.g., European Regional Development Fund (ERDF) and European Social Fund (ESF), as well as Cohesion Fund (CF). The principle of economic and social cohesion included by the Member States in the Single European Act

(1986), Article 130a envisages “to reduce discrepancies between regions and underdeveloped regions” [1]. In 1999 there was adopted the European Spatial Development Perspective (ESDP), which is considered to be a significant document to implement the Cohesion policy in the European Union (EU). This document envisages standpoints for promotion of spatial development [2]. In May, 2007 there was adopted the EU Spatial Development Agenda, which envisages standpoints for promoting spatial development [3]. EU has put forward the following aims of the Cohesion policy for the planning period of 2007-2013:

- Convergence. This aim supports conditions and factors facilitating growth, which ensure real convergence in less developed Member States and regions. Within this aim there are supported regions, where gross domestic product (GDP) per capita is less than 75 % from the average indicator of the Community. Funding of ERDF, ESF, Cohesion Fund;
- Competitiveness of regions and employment. The aim is to strengthen the competitiveness and attraction of regions, which is implemented out of the convergence regions. Funding of ERDF, ESF;
- Territorial cooperation in Europe. Within this aim local and regional initiatives strengthen cross-border cooperation, interregional cooperation and exchange of experience. Funding of ERDF [4].

The Cohesion policy is the most financially intensive policy and in the planning period of 2007-2013 it comprises 35.7 % from the total EU budget. In order to implement the aims of the Cohesion policy mentioned above the EU budget has allocated 346.5 billion EUR, which are divided in the following way:

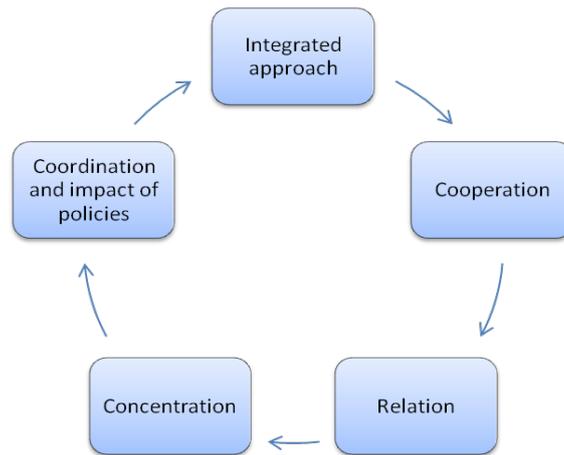


**Figure 1** Financial resources available for implementation of the aims of the Cohesion policy in the planning period 2007-2013. Allocation in percentage, billion EUR. Compiled by the author [4]

The Lisbon Treaty, which came into force on December 1, 2009, supplemented the economic and social cohesion by the territorial cohesion policy and introduced its official notion:

*“In order to promote overall harmonious development the European Union develops and implements activities strengthening economic, social and territorial cohesion. The Union strives to reduce development discrepancies among regions and handicap of the least developed regions. Among the regions concerned, particular attention shall be paid to rural areas, areas affected by industrial transition, and regions which suffer from severe and permanent natural or demographic handicaps such as the northernmost regions with very low population density and island, cross-border and mountain regions” [5].*

According to the Lisbon Treaty the Cohesion policy shall be implemented in the way to facilitate more balanced and sustainable development taking into consideration peculiarities of various territories as geographical and geopolitical challenges. In October, 2008 the EC published the Green Paper “Territorial Cohesion: Turning Territorial Diversity into Strength”, thus launching discussions of the Member States in this field [6]. In the course of discussions there were provided opinions and resolutions from various representatives of the Member States – regional and research institutions, associations, economic and social partners, European Parliament, as well as individuals. It must be noted that discussions did not lead to any agreement on a single definition of territorial cohesion; however, they agreed on the principles characterizing territorial cohesion. The aim of territorial cohesion is to promote harmonious and sustainable development of all territories basing on their characteristics and resources. Territorial cohesion includes five basic elements:



**Figure 2** Basic elements of territorial cohesion. Compiled by the author [6]

In June, 2010 there was adopted the EU strategy “Europe 2020” approving the significance of the territorial cohesion:

*.....It is also essential that the benefits of economic growth spread to all parts of the Union, including its outermost regions, thus strengthening territorial cohesion. [7].*

In the end of 2010 the EC published its Fifth Report on Economic, Social and Territorial Cohesion “Investing in the Future of Europe” including the standpoints within the Cohesion policy to promote territorial cohesion:

*Cohesion Policy is the EU’s main instrument for pursuing harmonious development across the Union. ....The Lisbon Treaty has added territorial cohesion to the goals of economic and social Cohesion. As a result, it is necessary to address this objective in the new programmes, with particular emphasis on the role of cities, functional geographies, areas facing specific geographical or demographic problems and macro-regional strategies [8].*

It is envisaged that in May, 2011 there will be adopted the reviewed EU Spatial Development Agenda including the new challenges in the spatial development. In June, 2011 there will be submitted proposals to the EC regarding the prospective EU multiannual budget after 2013, there will be determined the amount of funding to implement the Territorial cohesion policy in the future.

### 3. Urban development in Europe

On the European Union level territorial development has various challenges – demographic changes, climate changes, urban mobility, degraded territories, social inequality, global competitiveness. Cities play a vital role for the development of European regions. Currently, over 70% of Europeans live in urban areas. Most of the EU’s population just over 60% live in medium sized cities with more than 50 000 inhabitants. There are around 6 000 towns or cities with over 5 000 people and almost 1 000 cities with over 50 000 people in the EU, in which economic, social and cultural activity is concentrated. However, only 7 % of the EU-27 population live in metropolises of over five million [9]. European cities are the key to reaching the Lisbon goals, since they act as the motors for regional growth, innovation and employment creation [10].

The urban development policy for 2007-2013 on the EU scale is based on the provisions of sustainable development attributing polycentric direction. Currently, active discussions take place how to develop the EU territories in the context of territorial cohesion. In the solution of territorial issues within the framework of the Cohesion policy (CP) special attention shall be paid to urban development as cities can have a significant contribution to reach the aims of the EU 2020 strategy. The issues on environmental degradation and social exclusion have become topical. In this process it is essential to ensure involvement of local municipalities, and promote relation between urban and rural territories. It is envisaged that in the EU funds programming documents for the forthcoming planning period urban support measures shall be provided.

The Fifth Report on Economic, Social and Territorial Cohesion “Investing in the Future of Europe” emphasizes the role of cities and city environment in the development of territories, and determines perspectives for further development of cities:

Accordingly, an ambitious urban agenda should be developed where financial resources are identified more clearly to address urban issues and urban authorities would play a stronger role in designing and implementing urban development strategies. Urban action, the related resources and the cities concerned should be clearly identified in the programming documents [8].

In June, 2010 the EU Regional Committee in its meeting provided a statement considering that when making strategic choices for the forthcoming programming period (2014-2020) the EU should recognise the strategic importance of urban regeneration and ensure that the urban dimension is given more priority in all its policies, with a view to making cities laboratories again, this time with a much fuller agenda, to help the EU out of the economic and financial crisis [11]. Solution of the existing challenges in the EU cities and implementation of the “EU 2020” strategy, thus facilitating development of more reasonable, sustainable and socially inclusive cities, has become of the primary aims. In order to have complete understanding the integrated approach to cities, it is necessary to explore and work out a minimum set of common indicators, including indicators of cities sustainability.

#### 4. Urban development in Latvia in the context of polycentrism

Evaluating the current situation it can be noted that Latvia is a monocentric state having a dominant role of the center – Riga – in the total economic development. The capital of Latvia, Riga (and its surrounding territory) has 1.095 million or 48.73 % inhabitants of Latvia [12]. In other four regions of Latvia there are 1.15 million inhabitants; the potential of the network of 25 quite evenly located towns is not sufficiently used. Regional development is unbalanced, thus, it is necessary to implement a purposeful policy to facilitate polycentric development. Regional discrepancies are characterized by the differences of GDP:



**Figure 3** Differences of GDP in the statistical regions of Latvia in 2008, proportion in %. Compiled by the author [13]

In the planning period of 2007-2013 Latvia receives funding within the framework of the EU convergence and territorial cooperation. The main aim of Latvia in 2007-2013 is promoting harmonious economic growth and approaching the average EU level of welfare. The strategic aims of Latvia are as follows:

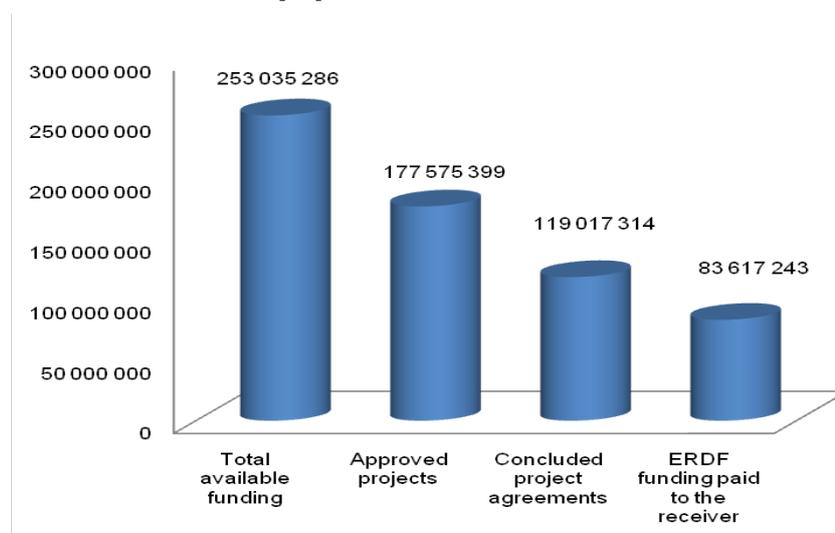
- to develop and use human resources effectively;
- to promote competitiveness and orientation towards knowledge-based economy;
- to improve public services and infrastructure as a precondition for balanced state and territorial development [14].

According to the EU Council resolution on the EU Multiannual Financial Framework 2007-2013, Latvia has received 4.53 billion EUR (EUR 4'530'447'634) to implement the aims of the cohesion policy by ES funding (ERDF, ESF and CF) having the following allocation:

**Table 1** Allocation of funding by funds and national co-funding in Latvia in 2007-2013, EUR [15]

	Funding of the European Community	Co-funding of Latvia	Total funding (European Community + Latvia)	% from SF and CF
<b>ERDF</b>	2 440 017 364	662 793 319	3 102 810 683	53.86%
<b>ESF</b>	550 653 717	97 174 186	647 827 903	12.15%
<b>CF</b>	1 539 776 553	381 540 358	1 921 316 911	33.99%
<b>TOTAL</b>	4 530 447 634	1 141 507 863	5 671 955 497	100.00

As one of the support instruments to promote polycentric development in the programming period 2007-2013 in Latvia there is introduced ERDF city environment priority "Polycentric development". Within the framework of this program the planned support activities are directed towards strengthening of cities' potential as a driving force of regions as well as forming functional relations with adjacent territories according to the integrated approach to urban development. The EU financial support is allocated to all large cities of Latvia, including to the capital city – Riga. The aim of the activity "Sustainable development of Riga City" program is to ensure revitalization of degraded territories of Riga City (functional activating) according to the integrated municipal development program, thus facilitating formation of the preconditions for socio-economic growth in the capital city of Latvia. In order to implement this aim there is allocated funding 11.72 million EUR, including ERDF – 9.99 million EUR [16]. Within the framework of the activity "Promotion of national and regional development centers growth for balanced state development" ERDF funding is allocated to 16 national and cities of regional and national importance in Latvia. The total funding is 297.69 million EUR, including ERDF – 253.03 million EUR [17].



**Figure 4** ERDF funding acquisition progress within the activity "Polycentric development" (EUR, 08.12.2010.) [18]

It must be noted that not only the programs mentioned above provide an irreplaceable contribution to facilitation of the polycentric development in Latvia, but also other EU co-financed programs for promotion of the capacity of human resources, stimulation of employment, strengthening of medicine, development of business, improvement of environment, enrichment of cultural environment, increasing efficiency of energy and support NGO.

Latvia is involved in a discussion on the EU territorial cohesion development and works out the necessary standpoints. The common stance is based on several essential proposals, which in the future will determine the territorial development in the EU and Latvia as well. In January, 2011 LR Cabinet of Ministers has adopted a document "National position of Latvia "On Territorial Cohesion """, which states what territorial cohesion principles shall be observed in the development and implementation of the EU policies in the future:

- Subsidiarity – greater trust of the state to the local municipality supporting the local development strategy and implementation of initiatives as well as greater responsibility of the local municipality providing that the available support is used in a more strategic and economical way.
- Coordination of policies – interaction of several branches/ fields and coordinated development in the respective territory.
- Territorial cooperation – more effective use of resources to reach common aims; supplementation of investments and positive impact in development in a larger territory [19].

The government of Latvia has expressed its opinion that the implementation of territorial cohesion shall be ensured on the national level letting the EU Member States and their regions determine and implement their regional development strategies suitable for the peculiarities and needs of specific EU Member State territories. Latvia does not support proposals to change the conditions for allocation of the EU funding in the forthcoming planning period by creating new EU scale support measures for specific territorial groups (for example, cities, remote territories, etc.) because in such case the diversity of European territories and different territorial development levels would not be respected. There are concerns that the territories of Latvia will not qualify for such support measures and will not have an opportunity to attract the EU funding – the territories of Latvia are not qualified as remote on the EU scale, the towns and cities in Latvia are smaller than the European ones.

Latvia joins the EC standpoint that cities shall contribute to reaching the aims of the US 2020 strategy in compliance with the national strategies. In the future the Cohesion policy shall respect the diversity of cities and different challenges they face. Within the framework of the city environment dimension not only problems of large European metropolises (social exclusion, environmental degradation) shall be solved as the EC offers it. In Latvia it is essential to strengthen cities as driving forces of the economic growth in regions primarily solving the issues related to workplaces and availability of services, including for the inhabitants of the surrounding rural territories. Latvia wants to continue the support measures for city environment indicated in the planning documents, at the same time support shall be also envisaged for the growth of other state territories (for example, rural, coastal, border areas) in compliance with the national regional development strategy. Latvia actively supports the idea to provide support within the Cohesion policy for the implementation of the local development strategy and initiatives; a relevant condition for further development is solving environmental and social issues as well as economic development issues. The territorial development of Latvia has reached a new stage closely related to the formation of the EU policy in this area.

## 5. Conclusions

- In the understanding of the European Union the notion “Cohesion policy” refers to political regulations to reduce discrepancies between regions and eliminate handicap of underdeveloped territories.
- Since 1986 the EU has consolidated its legislation envisaging standpoints to promote territorial development. These standpoints determine the aims of the Cohesion policy and provide funding to reach them.
- In 2010 the EC accepted several significant program documents determining the development of the EU in the period of time till 2020. According to the defined development tendencies the amount of funding to support territorial cohesion after 2013 will be marked out.
- In 2007-2013 urban development on the EU scale is implemented in compliance with the conditions of sustainable development applying polycentric orientation. This tendency is also preserved in the conception of the strategy “Europe 2020” emphasizing the significance of cities in the aspect of territorial cohesion.
- Polycentric development actions are included into the EU program documents which are binding to Latvia as well since its accession to the European Union. Latvia is a monocentric settlement with a dominant center Riga having a large proportion in the common economic system. At the same time Latvia has an extensive and quite evenly located network of cities and towns which potential is not sufficiently used. Regional development is unbalanced and local advantages are not used.
- Program documents indicate that polycentric development is put forward as a priority in Latvia because it creates preconditions for balanced state development by facilitating strengthening the potential of cities and towns as driving forces of regional development and forming a network of towns and cities. In order to promote polycentric development in the programming period of 2007-

2013 Latvia has introduced the priority of ERDF city environment "Polycentric development". Sufficient funding is allocated to the development of city environment.

- In 2010 Latvia was involved in the discussion on the development of the EU territorial cohesion and formulated its national position determining the principles to be implemented in the future, principles of allocating the EU funding, as well as manifesting support to strengthen cities in compliance with the national regional development strategies.

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# Techniques design modern elevator construction

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The paper discusses the issues of design and construction of modern elevator construction. The situation at the local market construction is much disarranged. There are no serious elevator manufacturers, the production is performed in small and scattered plants and it only partly meets local market requirements, while the export orientation is not even envisaged in the near future.

The paper presents guidelines for designer work in the field of elevator and offers some original solutions in the field of automated calculation of modern elevator installation equipment, kinematics analysis of car door mechanism and car frame construction. The aim of the research was initiate local production of modern elevator installations

## Keywords

Elevator, design, mechanism, construction, modern, kinematics.

## 1. Introduction

The elevator car is moved by a system of cables and pulleys, which link the car to a counterweight, the power usually being generated by electricity (earlier lifting systems had used a variety of methods, such as animal, steam, and water power). The invention of the elevator fostered the development of the skyscraper in modern cities. Following the invention of a safety device by Otis in 1852, the first (steam-powered) passenger elevator was introduced in New York City in 1857. Later improvements have included increased speeds, noise reduction, safety features (such as lighting and alarm systems), the automatic operation of groups of elevators, and two-deck cars (serving two levels simultaneously). Portions of the summary below have been contributed by Wikipedia. An elevator is a transport device used to move goods or people vertically. Elevators began as simple rope or chain hoists. An elevator is essentially a platform that is either pulled or pushed up by a mechanical means. A modern day elevator consists of a cab (also called a "cage" or "car") mounted on a platform within an enclosed space called a shaft, or in Commonwealth English called a "hoist way". In the past elevator drive mechanisms were powered by steam and water hydraulic pistons. In a "traction" elevator, cars are pulled up by means of rolling steel ropes over a deeply grooved pulley, commonly called a sheave in the industry. The friction between the ropes and the pulley furnishes the traction which gives this type of elevator its name. Hydraulic elevators use the principal of hydraulics to pressurize an above ground or in-ground piston to raise and lower the car. Hydraulic elevators are usually slower than traction elevators.

In 1853, Elisa Otis introduced the safety elevator, which prevented the fall of the cab if the cable broke. It consists of knurled roller(s) that lock the elevator to its guides should the elevator descend at an excessive speed, which is monitored by a governor device.

On March 23, 1857 the first Otis elevator was installed at 488 Broadway in New York City. The first elevator shaft preceded the first elevator by four years. An elevator shaft was included in the design for Cooper Union, because Cooper was utterly confident a safe passenger elevator would soon be invented; Later Otis designed a special elevator for the school.

Today the Otis Elevator Company, now a subsidiary of United Technologies Corporation, is the world's largest manufacturer of vertical transport systems, followed by Schindler, Thyssen-Krupp and Cone, in order. The first electric elevator was built by Werner von Siemens in 1880.

The development of elevators was led by the need for movement of large amounts of raw materials including coal and lumber from hillsides. In October 11, 1887 Alexander Miles, an African American

inventor, patented a method which permitted elevator doors to open and close safely. In 1929, Clarence Conrad Crispin, with Inclinator Company of America, created the first residential elevator.

## **2. Modern elevator construction**

Today, elevators are built under strict supervision of the Building Codes. Elevators are generally sold in prepackaged components which are inherently non-proprietary. In the case of renovations, the use of non-proprietary controls has become a large part of that business because it allows the owner to offer the maintenance contract to multiple bidders rather than accept a single manufacturer for the life of the elevator which can be more than 30 years. Non-proprietary systems generally have a higher up front cost, but may be offset by allowing the owner to control the long term costs over the life of the elevator. In some locations, the shaft and parts of the cab are made of transparent material for specialized "Scenic elevators." This allows riders to see outside the cab as they travel on the elevator. Today, all new elevators are computer-controlled and microprocessor based. This allows the elevator system to place cabs where they are most needed in the interest of smooth running, with behavior based on analysis of building use called "Traffic Studies." Traffic Studies are done by professional elevator consultants [2] who use specialized tools to determine the optimum size, speed and number of elevators for a building based on its peak use periods. Methods of access control include card readers, keys, and access codes entered into the control panel of the elevator. Elevators are usually installed in a building during construction.

## **3. Types of passenger elevators**

Passenger elevators may be specialized for the service they perform, including: Hospital emergency (Code blue), front and rear entrances, double ducker, and other uses. The concern for entrapping passengers requires all elevators to have communication connection to an outside 24 hour emergency service, automatic recall capability in a fire emergency, and special access for fire fighters' use in a fire. Numerous building codes require signs near the elevator to state "USE STAIRS IN CASE OF FIRE" [1].

### **3.1 Residential elevators**

This is a small enough for one person while some are large enough for more than a dozen. Wheelchair, or platform lifts, a specialized type of elevator designed to move a wheelchair 6 ft (2 m) or less, often can accommodate just one person in a wheelchair at a time with a maximum load of 750 lb (340 kg).

### **3.2 Freight elevator**

This is an elevator designed to carry goods, rather than passengers. Freight elevators or service elevators (goods or service lifts) may be exempt from some of the requirements for fire service. Freight elevators are generally required to display a written notice in the car that the use by passengers is prohibited, though certain freight elevators allow dual use through the use of an inconspicuous riser. Freight elevators are typically larger and capable of carrying heavier loads than a passenger elevator, generally from 2,300 to 4,500 kg. Although hydraulic freight elevators exist, electric elevators are more energy efficient for the work of freight lifting.

### **3.3 Vehicle elevators**

Are a car lift is installed where ramps are considered space-in conservative for smaller buildings (usually in apartment buildings where frequent access is not an issue). In spite of the sheer size of the car platform and it's perceived "passenger capacity", there are huge passenger and freight lifts that can accommodate more than the rated capacity of the car lift.

### 3.4 Aircraft elevators

This is on aircraft carriers; elevators carry airplanes and helicopters from the flight deck to the hangar deck and vice versa for operations or for repairs. These elevators are designed for much greater capacity than any other elevator ever built.

## 4. Analysis of kinematics parameters of door opening and closing mechanism

The importance of the analysis of mechanisms for automatic opening/closing of double car door lies in the possibility of consideration of changes of the expanding valises [3], such as displacement, speed and acceleration of the slide the movement of one door wing. The said analysis is indispensable for the reliability of operation of the mechanism, as well as of the possibility of achieving more favorable values by some modification of the configuration. Also, it is very important to define the value of inertia force acting on the slide, and through the slide on door wings. The value of the said inertia force is limited by national regions.

The researches [1, 4] analyzed the mechanisms made by local elevator manufacturers (L). Characteristic of mechanisms is that they are electro-mechanical mechanisms. Electric motor and mechanical part is system of pulley transmission and leverage. The mechanism practiced by (t) is shown in Figure 1 and its simplified kinematics diagram and the basis of which corresponding parameters were defined are shown in Figure 2.

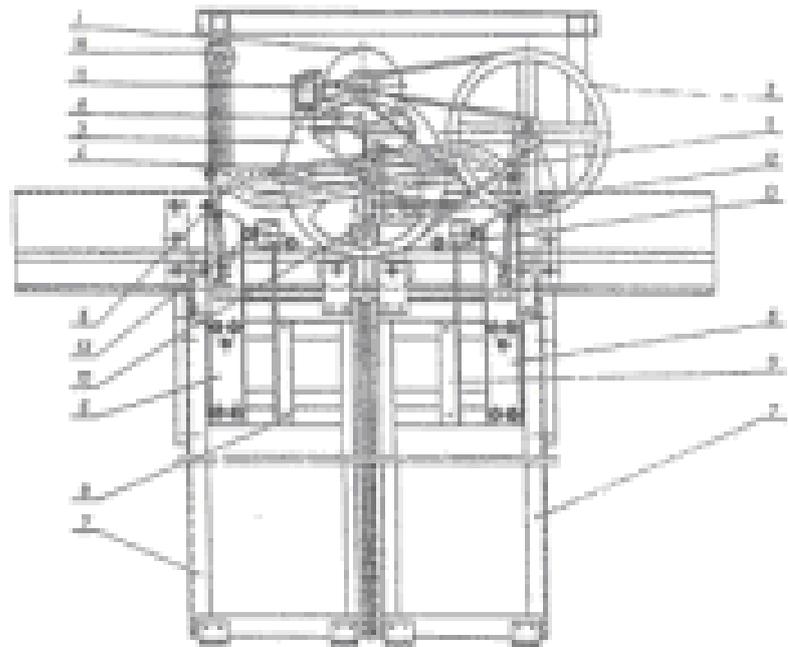


Figure 1 Door opening mechanism

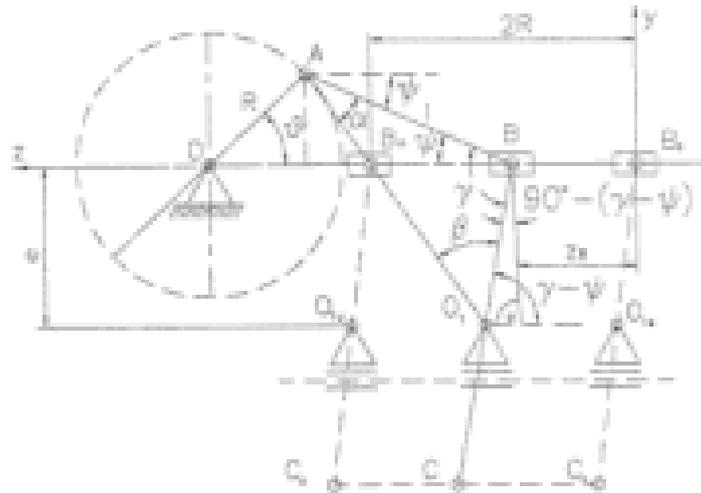


Figure 2 Kinematics diagram of mechanism

## 5. Standards of passenger elevators

The mechanical, electrical and operational design of elevators are dictated according to various standards (aqua elevator codes), which may typically be international, national, state, regional or city based. Where once many standards were prescriptive, specifying exact criteria which must be complied with, there has been a shift towards more performance-based standards where the onus falls on the designer to ensure that the elevator meets or exceeds the standard.

Some of the national elevator standards include:

Australia - AS1735 Canada - CAN/CSA B44 Europe - EN 81 series (EN 81-1, EN 81-2, EN 81-28, EN 81-70, EN 12015, EN 12016, EN 13015, etc.) USA - ASME A17

Because an elevator is part of a building, it must also comply with standards relating to earthquake resilience, fire standards, electrical wiring rules and so forth.

US and Canadian elevator standard specifics:

Passenger elevators are required to conform to the American Society of Mechanical Engineer's Standard A17.1 Safety Code for Elevators and Escalators in most US and Canadian jurisdictions (In Canada the document is the CAN/CSA B44 Safety Standard which was harmonized with the US version in the 2000 edition.) In addition passenger elevators may be required to conform to the requirements of A17.3 for existing elevators where referenced by the local jurisdiction. Passenger elevators must also conform to many ancillary building codes including the Local or State building code, National Fire Protection Association standards for Electrical, Fire Sprinklers and Fire Alarms, Plumbing codes, and HVAC codes. Residential elevators are required to conform to ASME A17.1.

### 5.1 Design of passenger elevators and car frame supporting structures

The calculus ores of the car frame supporting store applied by local lift manufacturers are riot in compliance with the 'valid calculations of steel supporting structures. Approximations of the actual behavior or of the lift car fr-arrxe structures were unacceptably, which resulted in very heavy supporting structures of the lift car arid of the car frame. In this design segment large improvements are back necessary arid feasible. During the research [1, 2] the methodology of calculation of supporting structures of lift cars and car frames was established, based on finite elements method and computer aided. It enables modeling arid calculation of complex structures arid problems [4]. The proposed manner of calculation provides for determinists of a realistic picture of stresses, determination of actual structure behavior, and reliable prognosis of the structure behavior during exploitations etc. The car supporting structure is modeled by beam-type arid plate- type finite elements.

## **5.2 Automation of passenger elevators and strength**

On the basis of theoretical postulations for the calculation of lifts and lift installation equipment, a software package was made during the research [2] with the principal intention of automation of the calculation and establishment of the data base on the corresponding lift elements and equipment.

Calculation of the lift drive comprises calculation and selection of the following components: rope, traction and idle sheaves, electric motor, worm transmission, coupling, brake, as well as calculation of the traction. Calculation of the lift stiffness comprises calculation of the traction sheave shaft in two versions, calculation of the idle sheave axle and calculation of the car guide.

## **6. Conclusions**

The paper presents research which should be carried out in the process of designing elevator installations. Elevator designers and constructors must have the specified knowledge, which must be continuously enhanced. To obtain a good quality product elevator sophisticated methods and techniques mentioned in this paper must be incorporated in the design and construction processes. On the basis of kinematics analysis of parameters of the mechanism for automatic elevator car door opening closing values of inertial forces acting upon elevator door wings can be accurately determined. At the same time these are the forces by which the car doors act upon potential obstacle, and the maximum values for these forces are limited by national regulations. In that way, by an inverse procedure, geometry and dimensions of elevator door opening mechanism elements can be defined. The proposed methodology of calculation of supporting structures of the elevator car and car frame provides for significant savings in material and energy, obtained on the account of reduced weights of the said structures.

The software package for the calculation of the elevator drive and strength presented in this paper provides for a considerable saving in time during the design process, and also creates well arranged data bases on all elements of elevator installations and their suppliers, which can be infinitely expanded and supplemented.

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# Regional Development under Consideration of Companies' Location Planning Decisions

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**Companies' decision for a location is one of the most long-term and cost-intensive investments. Companies have to consider many quantitative and qualitative indicators as well as chances and risks in the future assuring a sustainable successful business environment. Approved locations, such as existing cluster structures, attract further companies in a particularly way. Aspects like structural criteria, their innovation-friendly environment and interesting tax policies,[1] decide not just about long-term investments but also about the future chances of whole districts. Furthermore, global risks such as demographic development, energy policy and climate change (e.g. EU: Region 2020) complicate the future chances in some areas in the world. These processes establish also metropolises and global cities as well as region as new actors in an active role. Existing measuring instruments can describe and compare homogeneous areas such as global cities. They often don't consider the above mentioned future risks and finally fail in considering the heterogeneity of regions with rural parts.**

## Keywords

location planning decisions, location comparison, regional development, regional development indicators, case study

## 1. Introduction

The following article will describe the change in location planning decisions that brings regions in direct competition to metropolises and global cities. On the theoretical side, it will introduce how the change in global competition for locations takes place and which new criteria have to be considered. Along a case study that took place in a region in southern Germany, it will describe how a sustainable profile sharpening can be prepared.

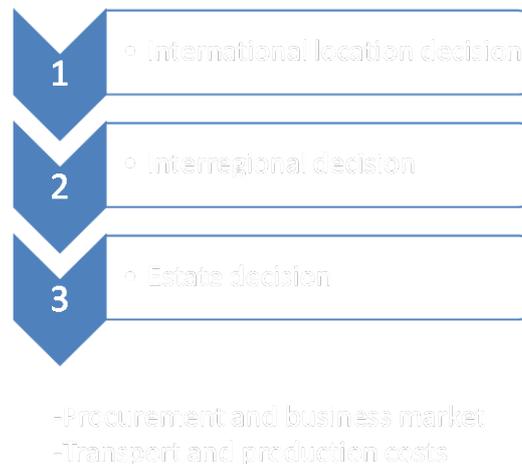
## 2. Changing Location Planning Decisions

Location planning can have its source in different scenarios, such as a new start-up company, outsourcing of a line of production as well as relocation processes.[2] [3] In any case, this is still one of the most important decisions because a reverse of location planning decisions belongs to the most cost intensive entrepreneurial decisions.

### 2.1 Changes in Location Planning Decisions

Entrepreneurial location planning process is changing. So far, it took place in three steps. First step is the decision for an economy itself, the international location choice.[4] This level follows factors of market, transport costs or production costs itself and dictates still determining factors such as economic laws, legal security and non-tariff barriers.[5] The second level of location planning contains the interregional decision that determines a geographical and economical region for production or distribution decisions.[6] In the last step the decision for an estate itself is made based on internal

entrepreneurial requirements.[3] According to the companies needs, an individual comparison between several possible locations is mostly made by a value benefit analysis or profitability analysis.[7] These instruments include hard and soft factors concerning all parts of entrepreneurship such as transport connection, labour market, lease costs, near business market or contractors.



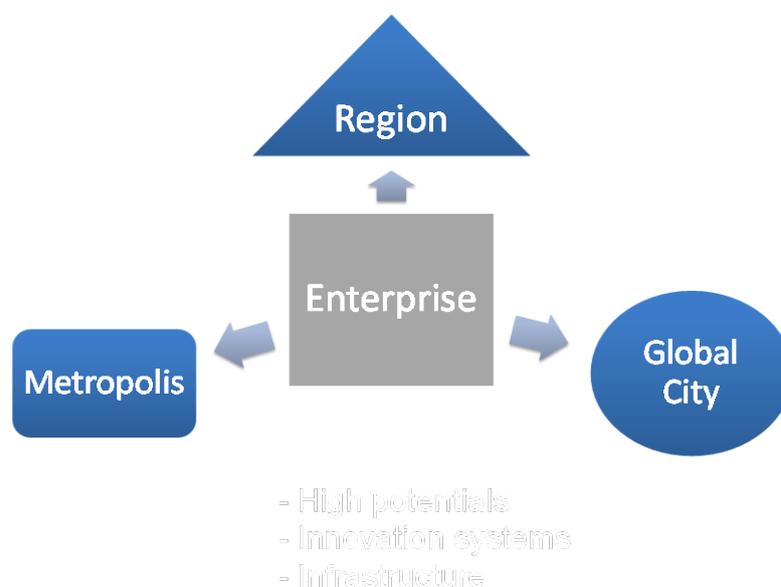
**Figure 1** Former Location Decision Model  
Source: own figure, cf. Schneider 2006

With continuously decreasing costs for transportation and communication – caused by effects of globalization – as well as declining non-tariff and tariff trade barriers (e.g. in economic unions such as EU, NAFTA or Mercosur), the entrepreneurial location planning becomes more precisely and furthermore more flexible concerning time, place and space.[8] Decision parameters, such as closeness to customers, raw material deposit become less important. The entrepreneurial location planning process has nowadays to include these continuously changing patterns: structural criteria, innovation-friendly environment, future development, future demographic development and risk management of the region.

## 2.2 New Actors in Location Planning Decisions

Leaving national level for location planning decisions, new actors in international competition appear. Already in literature discussed actors are the so called global cities. Saskia Sassen established the term and defines them as new places of concentration.[9] This includes agglomeration of production and management control as well as production factors such as knowledge and high potential resources. Siebel states that global cities reach a certain dimension with at least 6 Mio. citizens .[10] The global city furthermore contains social aspects such as education, health care, cultural offers as well as research centres with international awareness level.[11] Scharenberg subsumes this and declares the global city as the trial to locate the global economic system at a concrete place.[12]

In contrast to a global city a metropolis contains important economical headquarters but must not be a worldwide center of decision and trade market. It is not yet still clarified what is still a metropolis. Heineberg defines a metropolis as a political, economic, social and cultural centre with more than 1 mio. citizens and more than 2.000 citizens per km<sup>2</sup> with a mono-central structure.[13] Esser and Schamp define metropolises as a smaller level of global economic integration under the level of global cities.[14] Regions finally provide an even smaller value. They are not just a geographical, but also administrative and functional, even social construct with an economical structure with one or several centres and can also feature rural parts.[15] So, in difference to a metropolis regions can have polycentric structures and rural areas.



**Figure 2** New Location Decision Model (Source: own figure)

Accordingly, especially regions and metropolises face a difficult role in modern times. They crush harder in the international competition since the international location decision loses importance. Now, they have to appear as new actors in the global competition, although they cannot compete directly against more visible players. This sets them in duty to design and influence factors enhancing their attractiveness. The smaller the player is, the more it has to sharpen its profile and adapt its actions to its possibilities. Especially for smaller players this offers new perspectives, but also new risks at the same time such as being “taken over” by larger structural unities.

### **2.3 New Criteria Set for Comparing Locations**

This new set of actors in location planning decisions produces an extremely heterogeneous initial position for an analysis because both, urbanized and rural areas have to be considered the same way as well as several factors of infrastructural expansion stage, power concentration, international impact, awareness level but also furthermore in cultural visibility, innovation intensity and last but not least life quality factors for citizens. Yet, the existing measurement tools to compare global cities or metropolitan areas are not able to adapt to the special need of regions. As well, there exists a lack in regarding future orientated indicators like climate change demographic vulnerability, climatic change and energy supply as mentioned in the EU study Regions 2020.[16]

Furthermore, there is the question if citizens' perspective influences several economic indicators as well. In order to solve and combine this challenge, an enlarged indicator system concerning the special situation of regions as well as larger units is necessary. It should not only compare players but also give the opportunity to name chances and risks as well as recommendations for a sustainable development.

## **3. Case Study – Analysing and Comparing Regions**

### **3.1 Study Design**

A research project at the University of Ulm developed a triangulated scientific measuring for the region Donau-Iller in Southern Germany which frames ~1 Mio. citizens and a group of 52 regional political decision makers. Donau-Iller is a small region in Southern Germany, located between the attractive metropolises Munich and Stuttgart. With the city of Ulm it shows one regional centre, as well as several district centres like Memmingen, Biberach, Neu-Ulm and Günzburg. Especially the outside sections are rural areas with a lack of economic and infrastructural development and a low density of population. Beside future risks, the research design considers quantitative and qualitative indicators in

the topics economics, demographic development, infrastructure, research and development, education systems, healthcare as well as leisure offers. Already existing studies, local statistics and an online survey with local companies (n=273, in 2009) were combined to current state description. The data was also forecasted. Both, actual state and forecast were set into benchmark to the surrounding metropolis and highly developed regions in Germany and worldwide. Based on a gap analysis and a SWOT analysis, experts from all topics (3 focus groups, 35 expert interviews) and political decision makers evaluated this current status and the best practise proposals for further political decisions. This ensured that perspectives of several stakeholders are included. The triangulated method is capable to compare heterogeneous regions with other actors and gives an information basis to deduce recommendations. It is capable to describe regional competitiveness factors in a more detailed way. It was finally possible to consider specific structural conditions of regions such as a high concentration of world market leaders as well as existing cluster structures.

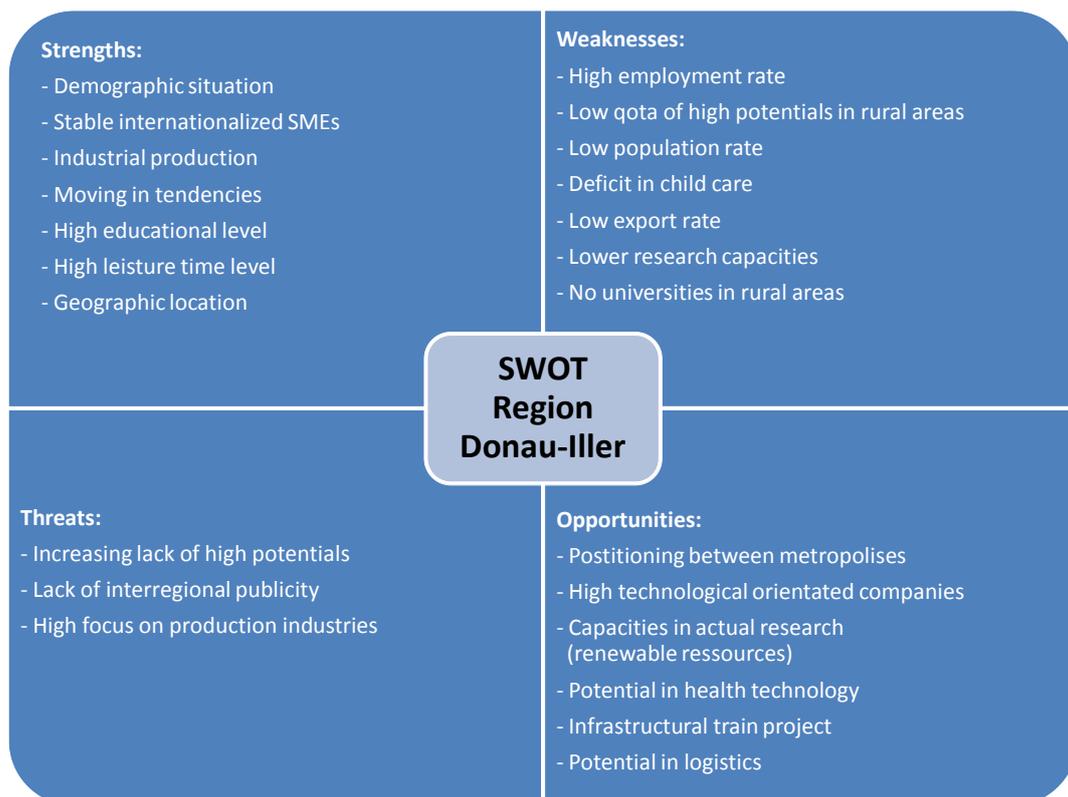
### 3.2 Quantitative and Qualitative Indicators for Regional Development

It showed up, that the different perspectives of stake holders in the regional context as well as many indicators itself are linked to each other. So, existing indicators have been completed with factors concerning entrepreneurial and civil need. Finally, the developed survey structure includes seven perspectives with up to 35 indicators each. Table 1 shows an excerpt of this indicator design.[17] Structural analysis of the interrelation of indicators leads to some very important functional connections that has to be regarded in coherence. Positive aspects for companies are e.g. a good educated employment market with a sufficient offer of high potentials. Therefore, a certain level of life quality for inhabitants is also important to attract and keep high potentials in this living area. This includes not only infrastructure such as retail industry but also matters of educational and health system as well as cultural and leisure time facilities.

For an innovative climate, cluster structures as well as research networks and existing branch structures are necessary. These pull new companies into a region and help existing branches staying competitive. On the other hand, a lack of infrastructure such as high speed internet connection, abroad highway access as well as missing railway connections and no fast access to international airports can reduce location's attractiveness. An insufficient education system can prevent high potentials from moving in, as well as a lack of leisure time activities. These factors work as barriers and prevent taking easily part in worldwide business processes.

**Table 1** Study fields and indicator examples (Source: compiled by authors)

<b>Topic</b>	<b>Main Indicators (excerpt)</b>	<b>Quantitative Dimensions (excerpt)</b>	<b>Qualitative Dimensions (excerpt)</b>
<b>Economy</b>	employment market	e.g. unemployment rate	e.g. education and expert level of vacant positions
	class of business portfolio	e.g. increasing branches	e.g. trends in future branches, analysis of cluster structures
	commuting tendencies	e.g. in- and out-commuting tendencies	e.g. analysis of living and workspace, infrastructural needs
	direct investments	e.g. number and height of investments	e.g. analysis of location planning decisions
<b>Research</b>	patents	e.g. numbers and topics	e.g. research fields
	research clusters	e.g. members, participants and quota of branch	e.g. descriptive research analysis of special research fields and excellence clusters
<b>Education system</b>	high potentials	e.g. numbers of specialists	e.g. professional level
	university students	e.g. numbers of study courses	e.g. analysis of needs coverage
	advanced trainings	e.g. numbers and topics of advanced trainings	e.g. further needs and analysis of provider structures
<b>Health system</b>	hospital medicine	e.g. number of beds, doctors, nurses, patients	e.g. analysis of cases, technical possibilities
	resident doctors	e.g. distance to general practitioner and specialists	e.g. development of health system, situation of country doctors
	nursing	e.g. numbers and location of residential and mobile nursing services	e.g. future needs and changes in therapy



and the summing up SWOT analysis, a theory driven 18 steps action plan for local policy level regarding a sustainable Regional Development was designed.

## 5. Conclusion

As recommended, the research project and case study showed that the entrepreneurial decision making process concerning locations has deeply changed. Political decision makers should recommend these structural criteria (e.g. regional risk management or innovation friendly environment) as more and more important. These qualitative indicators have to be considered within future political decision making processes. But even if this comes to reality, it might lead to a contradiction between future needs of a region and the personal future of actual politicians. The global competition of regions leads to a more deepened challenge of how to be attractive for further and future foreign direct investments. Competitiveness factors have to be differentiated and to be precisely approved by each of the regional actors. The challenge for all participants of location decisions is that the qualitative indicators become more reasonable on the one hand but on the other hand they are more difficult to be measured. The selective qualitative and quantitative criteria have to be constantly monitored in order to adapt strategic adjustments to inner or external changes.

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# Administrative procedures in public administration as an obstacle to the operating of SMEs: comparison of EU and selected SEE countries

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Companies act in an environment that is more or less favourable to them. The environment is significantly limited by the institutional framework that establishes the rules of the game and is controlled by public administration, which may be more or less effective, and more or less responsive to the needs of companies. However, companies differ not only by size and industry, but also regarding steps in their life cycle, their international focus, entrepreneur's ambition, etc. Since the essence of entrepreneurship is in obtaining and marshalling resources to exploit business opportunity, unimpeded access to resources is of crucial importance to entrepreneurial activity. However, it is not just about getting financial resources, but also about all other factors of entrepreneurial ecosystem - from hiring and firing people to obtain various licenses, state regulatory statistical and tax reporting, tax burdens and different procedures that must be carried out by entrepreneurs so that their core business, namely the production of goods and services, can take place smoothly.

In the empirical part of the paper, we analyse selected indicators for responsiveness of public administration in selected SEE countries (Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro and FYR Macedonia) compared to the average European Union (EU). Using the EU's measurements and assessments of different areas of the business environment we analysed same topics as analysed in Small Business Act and Report of European SMEs. The data were obtained directly from the database WB Doing Business Book. Indicators are divided into three periods of the company lifecycle: (1) starting a business, (2) business operation, and (3) closing a business.

## Keywords

Administrative procedures, public administration responsiveness, SEE countries, SMEs, entrepreneurship

## 1. Introduction

Institutional environment determines the conditions in which companies must operate from their establishment until their closing. In this paper, we discuss selected aspects of this environment determined by public-administrative procedures faced by entrepreneurs throughout the company's lifecycle. Modern and responsive public administration has positively impacted the exploration of business opportunities, acting as a supportive environment. In contrast, obsolete and unresponsive public administration further complicates entrepreneurs' life and negatively impacts new business creations as well as companies' successful operation. In general, economic policy makers have two main ways of promoting entrepreneurship [1]. First, their actions may be in the direction of low regulation, or second in the direction of high support. The low regulation can direct economic policies

in two areas. The first one is to enable starting the businesses in the most simple, inexpensive and fast way. The second area is to minimize the number and scope of regulations for companies that already operate. Entrepreneurship policy with the high level of support is actually on the shoulders of taxpayers, covering the provision of many support services. These support services may be different advice, information provision, education, financial incentives, subsidies and similar. The less regulation direction is characteristic for USA, while the supportive policy is more typical for European countries.

The paper provides the overview of the institutional framework for entrepreneurship and presents the results of the empirical analysis of indicators to measure administrative processes and public administration responsiveness in selected SEE countries and EU average. The paper will conclude with some insights that should be considered at the further development of public administration.

## 2. Institutional framework and entrepreneurship

Entrepreneurship is a scarce resource. Therefore it is of particular importance how it is utilized. Generally, the entrepreneurship as a characteristic of the human spirit is not in certain countries or regions greater, but it is about the "channel of entrepreneurial spirit" [2], where some countries are more successful than others. Major role is played by the institutional system and the rules of the economic system. It is always possible for economic policy to support the creation and operation of companies, but it has to take into account that the effectiveness of support depends on the companies' life-cycle. It must be understood that companies have different needs and are differently affected by external factors, depending on the stage of their life-cycle. The establishment and operation of a company needs particular capital, therefore there have to be considered the influence of income limit [3], because it can have a negative impact. Additionally, transaction costs (e.g. costs of searching and acquiring information, costs of negotiation and decision making, costs of motivation and execution of agreements, costs of control and performance evaluation, and compliance costs of business activities) can be very important factor for operating of companies.

The policy affects the level of business in a society in two ways [4]. The first one is in shaping the quality and quantity of inputs for the entrepreneurial process, and the second one is in shaping the institutional framework that provides the "rules of the game". However, the key question is always, to whom different incentives are aimed at. It is important not only to influence the amount of companies, but primarily their quality. Influence on the institutional framework takes place over the entire set of laws, rules of a competitive market, government intervention, the legal system, tax rules and others. Those are the factors, which [5, 6] direct individuals to decide to engage in (or discourage) the different types of entrepreneurship: a productive, unproductive or destructive. Creative people will get involved in productive entrepreneurship in countries which ensure property rights, fair and balanced legal system [4], and appropriate implementation of contracts. By contrast, in countries with incomplete and inadequate institutions more individuals will engage in unproductive or destructive entrepreneurship. The more the institutional structure is unregulated and the public administration is slow and unresponsive, the greater are chances that companies are directed towards maintaining the status quo instead of innovation, growth, and internationalization.

However, unresponsive public administration brings an additional risk. Entrepreneurial process is largely based on the principle of "attempt - error" [7, 8, 4], it is nevertheless a constant recombination of resources. Therefore, resources have to be free for entrepreneurial activity and should not be burdened with numerous administrative obstacles and processes, which have negative impact on entrepreneurs' core mission, namely the manufacturing and providing products and services that customers are willing to purchase. Therefore, the effectiveness of the entrepreneurial process depends not only on successful products and services, but also on how quickly it is possible to identify failures and to eliminate inefficient combination of resources and based on this enable their more successful combination. The more the economic system is bureaucratic and politicized, the less effective it is. In the strong economy there will always be a huge dynamic of new companies and their failures.

A national policy influence the development of the economy by three aspects [9]: first, by the legislation system which establishes a regulatory mechanism; second, by the development process at national level through various short and long term economic policy measures; and third, by encouraging entrepreneurship in the public sector. However, companies have their life-cycle from inception to closure. Therefore, they need support from public administration to lessen administrative obstacle to encourage entrepreneurship. In continuation is provided empirical analysis of selected indicators of administrative procedures in public administration.

### 3. Empirical analysis of administrative procedures in public administration

According to the goals of the European Union to become the most competitive economy, the European Commission implemented several initiatives to fulfil that aim. Measurement and evaluation of initiatives' effects are mostly made on the annual level by different systems of indicators. The area of establishment and operation of companies that refer to administrative procedures in public administration are estimated by several indicators, using database of *World Bank Doing Business*. To measure and evaluate impeding administrative procedures in public administration faced by companies in different stages of their life-cycle we used the database *Doing Business 2011* [10] for selected SEE countries (Slovenia, Croatia, Bosnia and Herzegovina, Serbia, Montenegro and FYR Macedonia). The life-cycle of companies was divided in three steps, namely (1) starting a company, (2) operating of a company, and (3) closing a company. In this paper we analyse the first two steps of life-cycle.

**Table 1** Overview of indicators, measuring administrative procedures in public administration of companies

Starting a company	Operating of a company		
	Trading across borders	Registering property	Enforcing contracts
<ul style="list-style-type: none"> <li>• Procedures</li> <li>• Time</li> <li>• Cost</li> <li>• Minimum capital</li> </ul>	<ul style="list-style-type: none"> <li>• Documents to export</li> <li>• Time to export</li> <li>• Documents to import</li> <li>• Time to import</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures</li> <li>• Time</li> <li>• Cost</li> </ul>	<ul style="list-style-type: none"> <li>• Procedures</li> <li>• Time</li> <li>• Cost</li> </ul>

#### 3.1 Analysis of administrative procedures in public administration at starting a company

Starting a company and its operation requires the entrepreneur's constant dealing with public-administrative procedures and costs. Already the establishment of a company is associated with them and continues throughout its life-cycle. Administrative procedures at starting a company are measured by number of procedures, time, costs and minimum capital required. Definitions of these indicators are as follows [11]:

- *Number of procedures, needed to establish a company* is defined as any interaction of the company founders with external parties (for example, government agencies, lawyers, auditors or notaries). Interactions between company founders or company officers and employees are not counted as procedures. Procedures that must be completed in the same building but in different offices are counted as separate procedures. If founders have to visit the same office several times for different sequential procedures, each is counted separately.
- *Time* is measured in calendar days. The measure captures the median duration that incorporation lawyers indicate is necessary to complete a procedure with minimum follow-up with government agencies and no extra payments. It is assumed that the minimum time required for each procedure is 1 day. Although procedures may take place simultaneously, they cannot start on the same day (that is, simultaneous procedures start on consecutive days). A procedure is considered completed once the company has received the final document.
- *Cost* is measured as a percentage of the economy's income per capita. It includes all official fees and fees for legal or professional services if such services are required by law. Fees for purchasing and legalizing company books are included if these transactions are required by law. The company law, the commercial code and specific regulations and fee schedules are used as sources for calculating costs.
- The *paid-in minimum capital requirement* reflects the amount that the entrepreneur needs to deposit in a bank or with a notary before registration and up to 3 months following incorporation and is recorded as a percentage of the economy's income per capita. The amount is typically specified in the commercial code or the company law.

The Table 2 represents the results of above mentioned indicators by selected SEE countries and EU average for year 2011.

**Table 2** Administrative demands in public administration at starting a company by country [10]

Country	Procedures (number)	Time (days)	Cost (% of income per capita)	Min, capital (% of income per capita)
Bosnia and Herzegovina	12	55	17,7	30,5
Croatia	6	7	8,6	13,7
Macedonia FYR	3	3	2,5	0
Montenegro	7	10	1,9	0
Serbia	7	13	7,9	6
Slovenia	2	6	0	45
EU average	6	15	6	18

Among investigated countries, the most procedures to establish a company are required in Bosnia and Herzegovina (BIH) and the least in Slovenia and FYR Macedonia, which are also under the EU average. However, the time, needed to establish a business is also the highest in BIH while are all other countries under the EU average. Costs of starting a company are also the highest in BIH, while in Slovenia there are no additional costs of establishing a company. The last indicator is the required minimum capital which is the highest in Slovenia, while in FYR Macedonia and Montenegro it is not needed. In previous years almost all countries (except BIH) opened one-stop shop systems and eliminated several procedures for establishing companies. Additionally, Serbia is among countries that made the most to ease the process of establishing a company in last years. Consequently, number of registered companies significantly increased. It shows that each of indicators is an important part of number of establishing companies in an economy. However, starting a company is unique event while operating of a company takes over time and is from this point of view more important.

### **3.2 Analysis of administrative procedures in public administration at operating of companies**

In the second phase of life-cycle (operating) companies are confronted with even more administrative procedures and expenses than in the first phase. In following chapters are analysed three groups of indicators, measuring administrative procedures, namely (1) trading across borders, (2) registering property, and (3) enforcing contracts.

#### **3.2.1 Analysis of administrative procedures at international trading**

International cooperation is important prerequisite for companies' growth especially in smaller economies. It depends on national conditions enabling trading across borders. Barriers to international trading regarding administrative procedures can be measured by several indicators, among which we selected the following four [12]:

- *Documents for export or import:* All documents required per shipment to export and import the goods are recorded. It is assumed that the contract has already been agreed upon and signed by both parties. Documents required for clearance by government ministries, customs authorities, port and container terminal authorities, health and technical control agencies and banks are taken into account.
- *Time to export or import:* The time for exporting and importing is recorded in calendar days. The time calculation for a procedure starts from the moment it is initiated and runs until it is completed. If a procedure can be accelerated for an additional cost and is available to all trading companies, the fastest legal procedure is chosen.

Table 3 represents the results of above mentioned indicators by selected SEE countries and EU average.

**Table 3** Administrative demands in public administration at starting a company by country [10]

Country	Documents to export (number)	Time to export (days)	Documents to import (number)	Time to import (days)
Bosnia and Herzegovina	5	16	16	7
Croatia	7	20	8	16
Macedonia FYR	6	12	6	11
Montenegro	6	14	6	14
Serbia	6	12	6	14
Slovenia	6	19	8	17
EU average	5	12	5	12

The results show that in each country, including EU average, there is needed more or equal number of documents to import than to export. However, it cannot be stated for time to import and export. In general, time to import and export is higher in Croatia and Slovenia than in other countries. The time to import is very high in Bosnia and Herzegovina although they made a reform already in 2008 to simplify the international trade. Additionally, Montenegro and FYR Macedonia successfully implemented measures to simplify procedures and shorten time, while other countries have not implemented special successful measures in this area.

### 3.2.2 Analysis of administrative procedures at registering property

Registering property includes all steps, time and cost involved in registering property. It is measured by three indicators [13]:

- *A procedure* is defined as any interaction of the buyer or the seller, their agents (if an agent is legally or in practice required) or the property with external parties, including government agencies, inspectors, notaries and lawyers. Interactions between company officers and employees are not considered. All procedures that are legally or in practice required for registering property are recorded, even if they may be avoided in exceptional cases. It is assumed that the buyer follows the fastest legal option available and used by the majority of property owners.
- *Time* is recorded in calendar days. The measure captures the median duration that property lawyers, notaries or registry officials indicate is necessary to complete a procedure. It is assumed that the minimum time required for each procedure is 1 day.
- *Cost* is recorded as a percentage of the property value, assumed to be equivalent to 50 times income per capita. Only official costs required by law are recorded, including fees, transfer taxes, stamp duties and any other payment to the property registry, notaries, public agencies or lawyers.

Table 4 provides results of administrative procedures and costs associated with registering property in selected SEE countries and EU average.

**Table 4** Administrative procedures and costs at registering property by country [10]

Country	Procedures (number)	Time (days)	Cost (% of property value)
Bosnia and Herzegovina	7	33	5,3
Croatia	5	104	5
Macedonia FYR	5	58	3,2
Montenegro	7	71	3,3
Serbia	6	91	2,7
Slovenia	6	113	2,1
EU average	5	35	5

The results show that costs and number of procedures is in all countries comparable, while there are major differences in time, which is an important issue in registering property. The worst situation is in Slovenia (113 days) and in Croatia (104 days). However, all other countries except BIH (33 days) are over the EU average (35 days). Although all countries implemented measures to shorten and reduce administrative procedures on this issue, including implementation of electronic systems, it is still not optimal and needs further improvements, especially of reducing time.

### 3.2.3 Analysis of administrative procedures to enforce contracts

Administrative procedures and costs indicators of enforcing contracts measure the efficiency of the judicial system in resolving a commercial dispute. Administrative procedures in enforcing contracts are measured by following indicators, which definitions are [14]:

- *A procedure* is defined as any interaction, required by law or commonly used in practice, between the parties or between them and the judge or court officer. This includes steps to file and serve the case, steps for trial and judgment and steps necessary to enforce the judgment.
- *Time* is recorded in calendar days, counted from the moment the plaintiff decides to file the lawsuit in court until payment. This includes both the days when actions take place and the waiting periods between. The average duration of different stages of dispute resolution is recorded: the completion of service of process (time to file and serve the case), the issuance of judgment (time for the trial and obtaining the judgment) and the moment of payment (time for enforcement of judgment).
- *Cost* is recorded as a percentage of the claim, assumed to be equivalent to 200% of income per capita. No bribes are recorded. Three types of costs are recorded: court costs, enforcement costs and average attorney fees.

Results of above mentioned indicators for selected SEE countries and EU average are provided in Table 5.

**Table 5** Administrative procedures and costs at enforcing contracts by country [10]

Country	Procedures (number)	Time (days)	Cost (% of claim)
Bosnia and Herzegovina	37	595	40,4
Croatia	38	561	13,8
Macedonia FYR	37	370	33,1
Montenegro	49	545	25,7
Serbia	36	635	28,9
Slovenia	32	1290	12,7
EU average	32	549	21

Similarly to the issue “registering property” also the enforcing contract issue differ in time while in number of procedures and costs all countries are comparable. However, at regarding only a time the most effective is FYR Macedonia (370 days) what is also below EU average (549 days). All other countries are above EU average, leading by Slovenia where there are needed 1290 days to enforcing a contract. Additionally, only FYR Macedonia is recorded as a country which implemented some measures to improve this area of public administration in last three years, among which was also a good practice “sustained multitasking” [15]. This area of companies’ operation is important because it can have a major impact on entrepreneurship dynamic, because unsolved commercial disputes can prevent further successful operation of a company.

## 4. Conclusions

The paper provides an insight into the administrative procedures in public administration for companies during their life-cycle. Provided results of empirical analysis among selected SEE countries compared to EU average.

First were analysed administrative demands at establishing a company. Almost all countries implemented majority of initiatives and conditions for establishing a company were mainly improved.

However, establishing a company is an one-time act. Much more important are administrative procedures and costs for operating companies because they affect business on a daily basis. Nevertheless, study of administrative procedures and costs shows, that analysed countries did not make as much efforts in improving conditions for operating companies as for starting a company. First analysed domain was international trading where almost all countries could improve conditions to lessen the number of procedures and to shorten the time to import or export goods. Fostering international operations of companies positively impacts their growth therefore in the future all countries should implement additional measures to improve conditions for international trade. At other two domains, registering property and enforcing contracts, the main challenge to improve is the time. Almost all countries should shorten the time, needed to register property and to enforce a contract, while other two indicators, namely procedures and costs are less critical issues. It can be concluded that analysed countries still have to improve conditions regarding administrative procedures and lessen costs. However, national economies have to find appropriate level of administrative procedures and costs to foster entrepreneurial activity and at the same time to retain suitable minimum level of administrative procedures to ensure institutional protection and overview.

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# Analysis of Potential Improvements in the Process of Evaluation of Scientific and Research Results in Serbia

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**Business process modelling represents trend in modern business, as it helps to overcome complexity, misunderstandings in conducted activities and communication at all levels. Certain systems have been implemented in Serbia that allow centralized storage of scientific biography of researchers or their papers, however they do not support automated scoring of results nor they deal with the evaluation of research results. The problems were multiplied with emergence of new researchers and with constant flow of new research.**

**With the goal of improving the existing systems and the introduction of automation in certain steps of scoring and evaluation of research results, we analyzed every aspect of the process and the current situation in Serbia which lead us to the “AS-IS” model. Modelling of “AS-IS” model represents the first step of business process analysis. This model helped us to identify key business processes, and to identify places where improvements and certain automation must be made.**

**In order to initiate the process of improvement, we developed several alternative “TO-BE” models. Each model illustrates different viewpoints on improvements of the process of evaluation of scientific research results.**

**Presented paper describes each model with its merits and shortcomings identified through the thorough analysis. The aim of this paper is to perceive all proposals to determine whether one of the suggested alternatives is the best solution. If not, to extract all good recommendation and to consolidate them into a new TO-BE model. The emphasis is put on the proposed improvements and automation of certain steps of evaluation process of scientific research results in the Republic of Serbia.**

## **Keywords:**

Education, Process modelling, Scientific research result, Scientific worker

## **1. Introduction**

Business process modeling (BPM) is the best way to understand and analyze processes since they can encounter many difficulties. Modeling helps to combat complexity, lack of understanding and communication problems, both between people and systems. BPM tools provide visibility into the exact functioning of internal processes and services so they can be standardized, understood and better managed. The purpose of BPM is to develop applications that solve business problems. The first step in the creation of a BPM-based application is the development of business process models. These models will be used to illustrate how the work is performed today, what opportunities for improvement exist, and how the work should be improved and automated.

The modeling of a business process starts when a process analyst captures (models) the "AS-IS" process which reflects the current way of doing business. After the business process diagram is complete, it will be used to analyze that process, and make improvements. "Once it is established how the business is currently done, business analyst should strive to find other opportunities of carrying out the business processes and then to compare them. This intermediate stage is characterized by development of potential diagram called COULD process diagrams. Finally, the selection of a new process is done through analysis of proposed COULD diagrams, moving towards the final TO BE process diagram. Of course, it is much harder to carry out an analysis of the current process because it does not have to be logical or make sense, than to create a new process that will be mostly logical." Therefore, the goal is to develop several alternatives of the future business process model, and then to analyze them with the aspiration to determine an optimum TO BE process model that will facilitate company with more efficient way of doing business and will include some automation steps.

Although education is not a business process in the classical sense, in modern terms it is organized in the form of a process. In that process, education and research are intrinsically attached to and dependent one on another. In order to estimate the contribution of scientific research to the improvement of education process, it is necessary to evaluate the results of scientific research and bind them to the authors, i.e. researchers and scientists. By doing this, the contribution of scientific research results of individual authors to the development of certain scientific and research fields can be estimated, and thus their contribution to improvement of the education process as a whole. Evaluation of scientific and research results is especially challenging, because it depends on the type of the result and the specific scientific area of the result.

Regarding the evaluation of scientific and research results in Serbia some problems must be emphasized, such as disagreements regarding the criteria of evaluation; evaluation process is not fully standardized at the state level and it is not a regular and compulsory activity, it is only performed when the need arises; lack of unified database of evaluated results and their authors that would enable easy access to data on existing scientific and research results and their values to all interested parties.

Need for improvement of the process of evaluating scientific and research results was the motivation for this research. First undertaken step was development of an AS-IS model of the process that will help to fully understand and define the current state of the process. The basis for improvement and partial automation of the evaluation process, and therefore the fertile ground for improvement of the education process as a whole, is presented in [2] where authors revealed in detail AS-IS model of the process with all its shortcomings and initial ideas for improvements. This paper will reflect the most important issues of each proposed alternative of scientific and research results evaluation process.

## 2. Overview of problem domain and current work

The idea of unique bibliographical database exists for several years, but the implementation was not conducted as expected. There was a few separate opinions on how the implementation of this database should be conducted, which further brought up several systems depicting each of the opinions. These systems gave a fertile ground for future development of the unified database. Furthermore, it was noticed that fulfilment of this idea would be increased through the conjoin between the existing systems. A few systems that could represent the initiation of this idea are Kobson, DOI, Scriptor, Svibo, SCIndex.

Kobson, as a portal, is used for online search of articles from a wide range of journals. The access for searching is unlimited, once you have been registered (by identifying the user over the academic network identification or simply by filling the registration form as academic stuff) as a Kobson user. It gives a browsing options over a wide range of the world's most prestigious databases, such as EBSCO, Springer, IEEE, etc. Furthermore, it gives an opportunity for visitors to check the domestic journal archive and access a full text articles. The advantage of the Kobson lies in the possibility to access a wide range of articles, but, on the other hand, it doesn't have an integral database for all those articles that are published in domestic journals.

Digital Object Identifier (DOI) represents alpha-numeric array which uniquely identifies doi pointed digital copy placed at the server. The main task of this service, which is under a jurisdiction of National library of Serbia, is to assign DOI numbers to the articles which are published in domestic journals. This service provides a complete review of articles published in domestic journals and instant access to the full paper of listed references if the user is subscribed to the journal where the referenced article is published. DOI provides the information about the paper used in references, but it cannot give an information about scientific worker to whom reference belongs.

Programming language Svedi is built for gathering and revising article's citation informations. Svedi does the revision of article's references through the strict comparison of references provided in the article and the original one. This helps maintaining and upgrading the national citation index. Another tool which parses bibliographic information is a Scriptor tool. It prepares bibliographic information to prevent wrong transfer of data to the citation database.

SCIndex, Serbian national citation index, was designed as a mean of evaluating scientific work and communication through provision of reliable information about scientific work. SCI index perfectly measures citation index of each article, but it doesn't have a citation list for every author.

While observing current situation in Serbia, it can be noticed that certain functionalities of developed systems can be used in order to carry out the idea of unique bibliographical database development. Besides the existing functionalities, bibliographic and scienometric analysis are extremely important. As stated in reference [2] "often criticized certain deficiencies of the most prominent international citation databases (SCI and SSCI) can be overcome by expressing individual author's citation and on the basis of coauthors' contributions, i.e. in fractional form as recommended in scientometric literature." To sum up, the purpose of this integral bibliographic database would be to give a complete inspection in scientific accomplishments of all scientists.

After detail analysis, it can be concluded that in order to overcome listed deficiencies and promote the process of scientific and research results evaluation, it is necessary to automate the process of evaluation of scientific and research results as much as possible. The first step would be design and implementation of unique national bibliographic database, which would give the scientists an opportunity to register and enter all of their scientific research results, which would further facilitate the scientific worker's personal and research accomplishments data record (KNR) generation and maintenance. In addition, the database should own information of all known journals, publications and projects, providing a possibility to enter new ones, too. In order to keep accurate journal classification according to M categorization, the Ministry of Science should appoint a Committee, which would be responsible for monitoring of journal categorization, as much as reviewing of existing types of scientific research results categorization. Furthermore, the Committee would associate paper categories with a value points, ensuring the valuation of scientific research result is done automatically according to the verified and applied categorization. The database administrator, elected by the Committee, would do the maintenance of the database according to the given instructions.

### 3. Model description

The process modeling implies that the functions of the overall system should be divided into abstract parts in order to reflect basic functions that should be met. Later on, the abstracted parts are drilled down and divided into smaller parts known as tasks. Each of the tasks should have input and a valuable output, so the process could be called successful. The actors would ensure that the tasks, as part of a process, are appropriately done.

#### 3.1 The first alternative

At the beginning of modeling the process of evaluation of scientific and research results, it is assumed that it should deal with the majority of the drawbacks described above. In order to accomplish the appointed requirements, the following basic sub-processes were identified: sub-process of *Entering the scientific work data into the database*, which will be conducted with the permission of Committee and executed by the database administrator; the sub-process of *Insertion of scientific worker's research result into the database*, whose activities would be conducted by a scientific worker and the sub-process of *Verification of scientific research results* conducted by the verification body. The Ministry of Science and Technological Development of Republic of Serbia will appoint a database administrator, verification body and Committee responsible for running predefined tasks.

The first sub-process concerns database development, which represents the creation of categories and clusters of scientific research results. That way, the database would have the scientific work, and therefore scientific research result unequivocally sorted. Furthermore, when the categories and clusters inside those categories are made, it is only necessary to enter information about certain scientific work (journal/conference/project). In some cases (after the database has been created), it is only necessary to update the information about existing scientific work, like changing the area where it is assigned or adding the citation data if it is journal information. When all the necessary information is updated/inserted, the scientific research can be indexed and assigned appropriate points. The next sub-process is the recording of the scientific research result of a particular scientific worker. This part

of the process represents a standalone sub-process which can be run independently of the database recording flow. Therefore, this sub-process would start when a scientific worker has a scientific research result to record. In order to succeed in this task, the scientific worker has to be a registered user of the portal which provides the service for collecting and evaluating scientific work. If the user doesn't have an account, he/she is offered to create one, using the registration sub-process. This sub-process considers entering/changing the personal data about the scientific worker and the selection of scientific area, in which the user is conducting scientific research. That way, by selecting the scientific area, the user would be evaluated and assigned points only for those scientific research results that are of importance to him/her, while the other scientific research results will represent only the references.

After the registration process, the user needs to login and enter another sub-process which will lead the user to enter the information about scientific research result. First of all, a person, sub-process participant, is being offered a list of all available scientific works, which are entered earlier (during the database creation and maintenance). The participant might notice that the particular scientific conference/journal/project is not in the list. In that case the participant can, with an appropriate proof of scientific journal/conference/project presence, send a request to the database administrator so the missing scientific work can be added. The administrator will check the existence of required scientific work, consult the Committee and add it to the list with appropriate categorization; otherwise, the request will be rejected. The evidence of scientific work existence should be the document that uniquely proves its existence. For instance, the proof of journal existence would be its front page and ISBN. If the person finds the wanted scientific journal/conference/project in the list, by simply selecting it, the scientific work is assigned a category and cluster of the selected item. Furthermore, the particular scientific work is automatically evidenced in KNR of the logged-in user as a scientific research result. All scientific work that is entered by the logged-in user is marked as non-usable until it is verified by the verification body. This controlling mechanism is made in order to prevent misuse of scientific references. It is planned that the verification is done periodically - once per month.

The last, but not the least important sub-process is part of the scientific research result verification sub-process, and is under jurisdiction of the verification body. While, the sub-process of verification is conducted, the scientific worker is required to wait for a period of time, until his/her scientific research results are being verified. This sub-process includes the task of technical correction check and can have two scenarios. The first one would be when the technical data is fine, in which case the scientific research result would be entered into the database along with the assigned points, predefined for it. The second one would be if the scientific research result is not being entered as a part of an appropriate scientific journal/conference/project, the verification body would find the appropriate scientific work, do the technical data correction and assign it to the appropriate journal/conference/project. Finally, the scientific research result will be entered in the unique database of scientific works, the points will be assigned to the scientific worker and the mark of unsafe reference will be removed.

This model deals with drawbacks of the existing systems - automation enrolment and design of a unique database, but still it doesn't cover some of the possible reasonable solutions. The possibility of reviewing the verified scientific research result by a scientific worker could be one of them. That way the process could deal with the situation of disagreement of scientific workers and verification body; providing the participant (scientific worker) an opportunity to submit a complaint about inappropriate classification.

### **3.2 The second alternative**

In second proposed TO-BE model, following sub-processes were identified: Analysis of journals, Journal categorization, Insertion of new scientific and research results into database, Consideration of complaints/requests, Verification of scientific and research results, and Notification about the changes. Activities of the first sub-process – *Analysis of the journals* are conducted by the verification Committee and research institutions. Verification Committee examines to which degree journal, that is not registered in the database, satisfies predefined criteria that must be fulfilled for the journal to be indexed and inserted in the bibliographic database. If all necessary criteria are met, verification body performs its categorization, otherwise the institution is informed about the criteria that must be met for journal to be listed in bibliographic database.

Activities of the sub-process of *Categorization of journals* are conducted by the verification Committee and database administrator. When a need for categorization of journals occurs administrator delivers citation information to verification Committee for consideration. On these bases verification Committee can define M coefficient, scientific fields journal belongs to, and associate it with an adequate value

points. Such information is forwarded to administrator for database update. Described activities are repeated in case someone has objection regarding categorization or if journal is not registered in the database.

Activities of the sub-process *Insertion of new scientific and research results into database* are conducted by scientific workers and verification body. Scientific worker must be registered on a system to be able to add his/her work to the database. Therefore, the first activity is status check. If a new user should appear he/she must create account. After login activity, a user can access journals only from his/her scientific and research field, since that is the only relevant field for assessing the work. The following activity is status check of scientific and research work, which means the separation of the unpublished (e.g. participation in projects) and published scientific work, because there is a distinction in their evaluation. Unpublished scientific work is directly inserted into the database. Otherwise, the user is obliged to select from available journals in the database the one where the work is published. At this point two problems can occur: the journal is not registered in the database, and wrong journal categorization. Both problems should trigger automatic notification of the verification Committee for inclusion of the journal in the database or its' update. If problems should not occur, an automatic categorization of work is performed.

Activities of the sub-process *Consideration of complaints/requests* are conducted by verification Committee and scientific worker. When scientific worker faces with above mentioned problems, complaint (about an inadequate categorization) or request (for journal to be listed in database) is sent to verification Committee. Therefore, the first activity of this sub-process is consideration of complaints or requests. If stated arguments are acceptable journal status must be established: is it a new or already registered journal? In case of a new journal a journal analysis must be performed, while registered journal has to be re-categorized. In case complaints/requests are refused, automatic notification is sent to the scientific worker when the user must reenter scientific work and adapt the existing categorization.

Activities of the sub-process *Verification of scientific and research results* are conducted by verification Committee and database administrator. After scientific worker inserts new scientific and research results into the database, information about this activity is sent to verification body. Verification Committee is obliged to check technical correctness of each inserted paper, before its final insertion into KNR table of the database. If the paper is technically correct it is automatically inserted into KNR table, otherwise verification Committee updates it and sends notification to the user about changes.

Activities of the sub-process *Notification about the changes* are conducted by verification Committee and scientific worker. When verification Committee makes certain adjustments to paper inserted into database, regarding categorization or technical issues, a notification about changes must be sent to the owner of the paper. Scientific worker can object to these adjustments, when verification Committee analyzes it. If there is an agreement, scientific worker sends confirmation to verification Committee so the paper can be inserted into KNR table.

### **3.3 The third alternative**

The third proposed TO-BE model is based on two major assumptions. The first is the existence of one unique bibliographic database of scientific and research results and scientific workers i.e. the authors, with built-in mechanisms for automated categorization and for automated assignment of value points to the scientific and research results that are being entered. The model does not deal with the process of creation or with regular updates of the database – those tasks are performed outside of this model. The second assumption is the existence of Committees for verification of scientific and research results for every research field, appointed by the Ministry of Science and Technological Development, responsible for confirmation of existence and for verification of categorization and evaluation of entered scientific and research results, as well as for cooperation with the DB administrator in the process of DB update by entering new types of scientific and research results and changes in the categorization and evaluation criteria.

Owner of the process is the person in the Ministry of Science appointed to monitor the evaluation of scientific and research results in Serbia. The process is initiated when an author wants to enter a new result into the database. First step of the process is a sub-process *Logging to the DB*, one of two sub-processes incorporated into the process. In this sub-process the authors who already have an account at the DB just sign in to the DB. New authors must first create an account by entering the general information about themselves (name, title and position, name of the institution, ...), then they must choose the research field in which he/she was elected (which affects the classification and evaluation of the authors' scientific and research results) and define a unique user name and password. When

the new account is created, it is stored to the DB and the new author can then sign in to the DB, and with that ends this sub-process.

The next step is the second sub-process *Entry of the scientific and research results into the DB*. The author selects, from the list offered in the DB, the publication in which the result has been published, or a conference at which it has been presented, or the type of the result, or the project that he has participated in and is related to the result. If there is a problem, such as the required publication/conference/ type of the result/project is not in the list, or if it is not properly categorized or evaluated, a complaint is sent to the Committee for verification for the given research field, stating the problem that occurred at the entry. If the Committee accepts the complaint, in cooperation with the DB administrator they enter the correction into the DB. In this activity Committee uses the *Regulation of the evaluation of scientific and research results* and additional documents for the evaluation of scientific research, issued by the Ministry of Science, related to the correction of evaluation criteria based on scientific and research results citation. If the complaint is not accepted, a notification of rejection is sent to the author. In both cases the sub-process continues by returning to the first activity of the sub-process i.e. the selection of the publication, type of the result or the project. If there is no problem with the first activity, the result is automatically entered into a temporary table in the DB and with this ends the sub-process. The output of the sub-process is the temporary entry of the result into the DB.

Further activities are to determine whether the entered result is participation in the project or some other type of result. When it is participation in the project, the activity of categorization is skipped, whereas for any other type of result next activity is the automatic categorization. Based on the selected publication/conference/type of the result and on the categorization rules (the Regulation of the evaluation of scientific and research results) already entered into the DB, mechanisms for automated categorization automatically assigns the appropriate category to the result. After this follows the verification of the entry of the result into the DB: Committee for verification of scientific and research results for the given research field verifies that, in the activity of entering, the result has been connected with the appropriate publication/conference/type of the result/project and that the other entered information is correct, for which the author must provide evidence of the existence of the result. If the entry is correct, next activity is the automatic evaluation, and if the entry is not valid, the Committee re-connects incorrectly entered result with the publication/conference/type of the result/project and re-categorizes it. Any other error is also corrected and the correction is entered into the DB. If there is an error in the categorization of publication/conference/type of the result caused by the DB administrator (whether the entered categorization is not good or it has not been updated), the Committee sends to the administrator a requests to correct the categorization entered in the DB. The output of this activity is the corrected temporary entry of the result. Then the Committee notifies the author of the corrections made to the entry of the result, to which the author may object to. If the author objects to these changes, he/she sends the objection to the Committee and the process continues with the return to the activity of verification. If there are no objections, the process continues with the activity of the automated evaluation, as it does in the case when the entry is correct.

In the activity of the automatic evaluation of the result the mechanism automatically assigns the value to the result in the form of points, awarded based on the categorization and on evaluation rules that have already been entered into the DB. The output of this activity is the evaluated result, which is then finally entered into the DB. Based upon the entered results, a KNR of the author i.e. scientific worker can be generated, and that is the final activity and output of the entire TO-BE model of the Process of evaluation of scientific research results in Serbia.

## 4. Conclusion

The business process modeling is an ever evolving discipline. One of the definitions of process modeling points out that none of the business process is perfect and therefore, needs constant improvement in order to satisfy its main postulate – ever evolving structure. Considering all of the above statements, it is realized that, in order to accomplish the requirements that are given, it is necessary to be ready for the constant auditing and modification of all of the alternatives.

After detailed analysis of three solutions of TO-BE models given in this paper, it is discovered that there are certain deficiencies in each of them. On the other hand, every model has revealed advantages that could, with minor modifications, be considered as perfect solutions to these particular requirements. Furthermore, some of the advantages revealed in one of the alternatives have been identified as deficiencies in other alternative(s). The conclusion is that the perfect solution for modeling process of evaluation of scientific research results in Serbia would be joining together the advantages of all of the given alternatives and creating a new TO-BE model.

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# Open Innovation for the Bottom of the Pyramid

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Open innovation is a relatively newly emerged idea. So far, this idea is used in developed countries and focusing on high income customers. In contrast, around two-thirds of the world populations live in developing countries and their income is very low but the cumulative market of this low income stratum is about \$5 trillion. The aim of this paper is to explore the potential of open innovation idea at the bottom of the pyramid. Economies of developing countries are growing rapidly and people living there are becoming more inclined to use high technology in their everyday life. Moreover, they have increasing access to information and communication technologies. No one can be considered as isolated. Everyone is a part of global village. But we need to tap the low income stratum for sustainable development.

## Keywords

Bottom of the Pyramid, Developing countries, Open innovation

## 1. Introduction

World's market can be divided into three major strata: high income, middle income and low income. More than four billion people live in the low income stratum and Prahalad [1] called this stratum as the bottom of the pyramid (BoP). The aim of this paper is to demonstrate the importance and benefits of open innovation for the bottom of the pyramid. In general, multinational companies make initiatives to innovate products, services, and processes focusing high income customers and these customers are largely located in developed countries. High income customers are small in number and market of high income customers is considered as exceedingly competitive comparing middle class and low income markets.

Schumpeter claimed innovation as a sole domain of the entrepreneurs [2]. In productivity innovation, it is necessary to consider external valuable work and talent [3] and firms are increasingly using open source models to collect external ideas for innovation [4] [5], for instance, by means of websites on which customers, suppliers and other external parties can submit ideas for innovations. Open innovation is a new paradigm which considers that both external and internal ideas are necessary for a company to grow. A firm can combine internal and external values for innovation. According to Chesbrough [4], some ideas can go into market through external channels, while others can come from outside in. He also posits that not all talents work for a single company. So it is important to generate ideas from external talents too.

Open innovation is relatively a very recently emerged idea. For many valuable reasons, this idea is getting momentum. However, utilization of this idea is mostly used in developed countries or focusing high income customers. So far, there is almost no use of open innovation for the bottom of the pyramid. To the best of my knowledge, no literature is available on open innovation for the bottom of the pyramid. Thus, this paper is an endeavour to shade light on open innovation for the bottom of the pyramid.

## 2. Open Innovation for the Bottom of the Pyramid

Open innovation idea is providing an interesting approach to govern the global R&D needs [6]. The increasing development of technologies, scientific initiatives, global market are offering new phenomenon of collaboration [7]. Multinationals are facing the need to adapt their products and services to the large untapped customers at the bottom of pyramid and extensive local knowledge is

necessary to meet that demand [6]. How innovation ideas disseminate is changing all over the world [8]. Developing countries are growingly formulating policies to support innovation [9] and many talents are dormant there too [10].

The share of research and development (R&D) of developing countries is growing rapidly. As shown in the table 1. World's R&D share had increased from around 10% in 1990 to 21% in 2000. In 2007, the developing countries had captured about one-fourth of total world's R&D share. Similarly, in developing countries, the R&D expense in percentage of GDP is also growing. Even though, the R&D share in developing countries is increasing, utilizing open innovation idea has not been considered adequately for innovation.

**Table 1** World's R&D Share of Developing Countries

<b>Developing Countries</b>	<b>End of 1960s</b>	<b>1990</b>	<b>2000</b>	<b>2007</b>
<b>Share in Global R&amp;D in Percentage</b>	2.0	10.2	21.0	24.0
<b>R&amp;D as percent of GDP</b>	NA	0.7	0.9	2.3
<b>Coverage</b>	Excluding centrally planned economies	Including centrally planned economies and newly industrialized countries (NIC)		

Source: [11], [12]

Despite the importance of the open innovation in low income stratum, there are no remarkable initiatives to use it. However, a classic example of open innovation is the innovation of BOGO solar light which is increasingly becoming popular in developing countries where more than 2 billion people live without access to dependable electricity and forced to use traditional lighting like kerosene lamp, candles, flashlights etc. [13]. To develop BOGO targeting developing countries, Mark Bent, CEO (Sunlight Solar) had to get help from InnoCentive, the premier open innovation platform of the world. The challenge of BOGO light posted in Innocentive platform and solved to serve the customers in the developing countries. It had brought successful innovation and BOGO is increasingly using it in developing countries where there is no adequate electricity (for more information see [www.bogolight.com](http://www.bogolight.com)). A water purifying bottle that uses ultraviolet light to sterilize drinking water is developed through open innovation platform and it will help people of developing countries who have no access to pure drinking water [14]. Even though, open innovation is considered as a glaring importance, it is still not used for the bottom of the pyramid. Thus, real product, price, value etc. remained unexplored as companies are developing product in developed country without involving properly the target users. Customers remained unaware of product as they rarely informed of any product during development process. Additionally, through participating in open innovation process, potential customers become aware of a product and also tell others about the product. Consequently, it results product marketing without expenses. More involvement of customers with product development brings more persuade to use the products. So, establishing open innovation platform for the bottom of the pyramid may help to capitalize from huge number of customers' voices.

### 3. Interactions with Customers for Innovation

There is an increasing number of researches on how interaction in virtual communities trigger creative activities with cost minimization [15];[16];[17]. Still, innovating with customers' involvement is a relatively recently emerged phenomenon in the academic discipline [18]; [19]; [20]; [5]; [21]. Rapid technological change and squeezing of product lifecycles, made innovation and technology as key sources of competitive advantage [10]. Although there are enormous innovations but relatively few business models capture value from an innovation [4]. Frigo and Ramaswamy [22] believe that risk of innovation stems from inability to change or to create offering or to meet customers' needs better compare to competitors. Additionally, complex challenge involved with open innovation is how to assess cost/benefit impact of factors like projected value, timescales, risk, licensing costs, opportunity cost, and technology integration [23]. Questions for these innovations concerns the cost of individual contributors of submitted ideas as well as means of measuring innovation value and how to integrate all the parties for an idea generation aiming to get better ROI (cost/benefit) are unanswered in open innovation literature. Identifying, assessing, refining and developing an idea into a business concept are crucial and management weakness is more at the initial stage of an innovation process. According to Bessant and Tidd [24], it requires managing creativity to transforms idea into innovation. Despite these glitches, interacting communication is becoming omnipresent [8] and companies are vying to capitalize from it. Though the virtual communities have got immense proliferation, the success factors are limitedly known [25]. Deregulation and emergence of new technologies are enabling companies to move towards increased globalization. Yet, open innovation for the bottom of the pyramid is not considered much by the researchers whereas it is extremely important.

### 4. Shifting of Innovation towards the Bottom of the Pyramid

Share of developing countries in research and development (R&D) is growing more than ever before. In contrary, open innovation idea is getting popular at a very slower pace. Recent research revealed that individual creativity often matters far less for innovation than connection and networks [26]. Good ideas may reveal from farthest places of an organization [27]. Value is constantly shifting and making difficult to predict due to naturally emergent interactions among consumers and producers [28]. The easy access to internet tools and services for information sharing, interaction and communication have brought sweeping change of the end-users' roles from passive consumers to active co-creators [29]. Creating an experience environment, where customers engage in active dialogue and co-create their personal experiences consequence might be same but customers may construct very different experiences [30].

**Table 2** Income Group and Population in the World

<b>Income Group</b>	<b>Income per annum</b>	<b>Population in Million</b>
<b>High Income</b>	<b>More than \$ 15 000</b>	<b>800</b>
<b>Middle Class</b>	<b>From \$ 1500 to 15 000</b>	<b>1 500</b>
<b>Low Income</b>	<b>Less than \$ 1500</b>	<b>4 000</b>

Source: [31]

Larger number of people lives at the bottom of the pyramid. As depicted in the table 2, around four billion people live at the lowest stratum and their income per annum is less than \$ 1500. These 4 billion people need products that are different and customized for them. Products which are produced targeting to high income cannot satisfy with slight modifications. Rather, we need unique products for these people who are living in the low income stratum.

Limited theoretical attention is given in studies of firms' evolution towards innovation product development [17];[5] despite firms' collaboration with outsiders generates higher percentage of sales from their new products [32]; [33]. Literally, no attention is given in the context of developing countries.

## 5. The Digital Divide and Open Innovation

The digital divide is the term used to understand the differential access to ICTs based on gender, race, income and location etc. [33];[34]. It has an important relation with open innovation. Narrowing the digital divide gives more opportunity to avail ICTs and it ultimately results more scope for open innovation at bottom of the pyramid. Although, despite devotion of tremendous resources to bridge the gap of digital divides, the result is inconclusive [36]. It is widely recognized that the access to information and communication technologies (ICTs) may result high living standard and improved social welfare [35]). Obviously, the internet penetration is very low in developing countries like India (7%), Sri Lanka (8.3 %), Pakistan (10.4 %), and Bangladesh (0.4%). Even then, there is a huge pool of enthusiast contributors from the bottom of the pyramid to participate in open innovation platforms; little consideration is taken to engage them. Participation of the people who are living at the bottom of the pyramid may bring innovative products for low income people that may be open a new additional market for the multinationals. The regulators need to focus on making networks widely accessible especially targeting the bottom of the pyramid [37].

## 6. The Digital Divide and Open Innovation

The infrastructure favourable for open innovation is developing rapidly in developing countries. Mobile phone business is largely in developing countries because of high population density and its usefulness. Astoundingly, in India, the figure of subscribers is around 700 Million by July, 2010 and it is one of the most profitable businesses in India. Moreover, number of mobile phone subscribers is 100 million in Pakistan, 15 million in Sri Lanka and 70 million in Bangladesh. These figures tell the importance of mobile phone in developing countries. However, telecommunication field comprised of mobile phone, internet, broadband, digital subscribers links, wireless, VOIP etc. are flourishing tremendously and reducing the challenges for open innovation remarkably at the bottom of the pyramid.

Growing internet especially wireless advantages with mobiles and laptops are changing the scenario of the world swiftly. Moreover, demand of desktop computers in offices and homes are influencing work environment to shift towards utilizing ICT services. Amenities of social networking platforms like Facebook, Twitter, and Skype etc. are attracting people and users' numbers are growing unimaginably. More importantly, governments of developing countries are becoming friendly in helping to innovation activities specially that have potential to improve peoples' living standards. Advanced communication technology is increasingly giving opportunity to people to communicate everyday with modern knowledge. Thus, environment for open innovation is becoming more favourable continuously. Media, in most developing countries, are experiencing freedom and enriching communication and knowledge arena. Local institutes are partnering with advanced universities of the world; western educated people are coming back to home as reverse brain drain [10]. MNCs are using local talents and places to capture customers more profitability. Non government organizations (NGOs) are playing key roles for the development of the society in developing countries. Much of the foreign aids are reaching to poor people through NGOs and these NGOs are helping to provide better products and services to the low-income people.

No business models come without challenges. Open innovation in developing countries is not a different. Companies in developing economies have shortage of advantages which are available in developed countries but it does not rule out the prospective of open innovation locating in developed counties absolutely. Even though, innovation management in the developing countries is assumed to be problematic characterized by poor business model, political instability and these problems tends to restrict the development of innovation environment.

## 7. The Digital Divide and Open

Open innovation idea is becoming an integral part of research and development in every multinationals. The focus remains mostly towards the high income customers and in developed countries. The influence of technology is increasing in developing countries through penetration of mobile phone, accessibility to internet and customer awareness. Customers are more careful and sensitive than ever before. There is a huge market at the bottom of the pyramid with low purchasing power. Products that can satisfy the need for the bottom of the pyramid have profitable business and sustainable development.

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# The Role of Supply Chain Management in Fostering Regional Development Throughout Southeastern Europe

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During the last decade, the European Union (EU) has undertaken many initiatives in order to foster economic development and to further support cross-border trading cooperation throughout Southeastern Europe (SEE). Despite its key strategic geographical location, that includes potential vital trading routes between Northwestern European and Asian markets, the region has failed thus far to tie itself effectively to global supply chain networks. Corporations operating throughout SEE report several impediments concerning free-trade facilitation, including a strict regulatory environment, ineffective policies, limited coordination, weak strategic planning, poor logistical infrastructure and financial support, inefficient customs and trade regulations, and corruption. On this basis, best practices, including innovations in Logistics and Supply Chain Management, could mitigate obstacles and risks, enhance competitiveness and improve the performance of ventures operating in the area. Leveraging disruptive reforms can assist enterprises operating in the region to develop appropriate trade competences, to secure sustainable development and to be better positioned in the global business landscape. Under this context, and motivated by the desire to support regional development, the purpose of this paper is twofold: (i) to identify and classify the bottlenecks regarding free-trade facilitation, logistics and supply chain management practices in the region, and (ii) to propose a rather generic strategic methodological framework that could assist governmental authorities, regulators and managers to design and adopt effective policies towards logistics and supply chain management.

## Keywords

Free-trade facilitation, Policies, Southeastern Europe, Strategic framework, Supply chain management

## 1. Introduction

During the last decade, a significant number of initiatives has been introduced in order to promote free trade facilitation in Southeastern Europe (SEE). To that effect, a Memorandum of Understanding (MoU) towards the establishment of a Free Trade Zone was signed in 2001 among seven SEE countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, FYR Macedonia, Romania and FR Yugoslavia [1, 2]. In the following years, a network of subsequent intra-SEE Free Trade Agreements (FTAs) was developed to improve the trade related regulatory environment, while several organizations were instituted towards this goal (e.g. the SEETO, an organization dedicated to the development of the multimodal network Southeastern Europe Core Regional Transport Network) [2, 3].

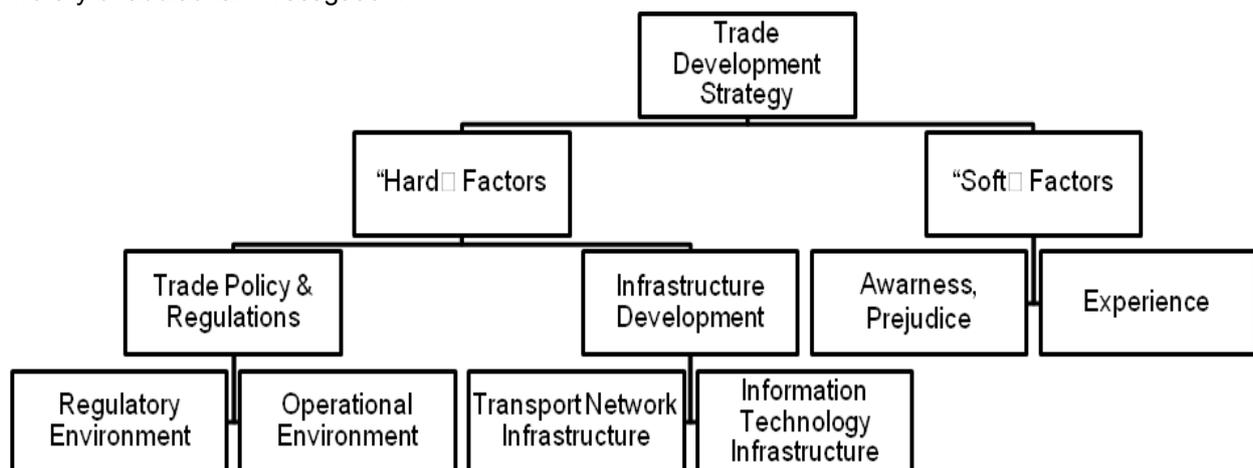
However, the vision of achieving trade integration and liberalisation in SEE, and creating a wider trade partnership in the crossroads between Southwestern Europe and Asia has not yet been fulfilled. Today, this necessity is more pronounced than ever as the SEE region strives to respond to the global economic crisis [4]. Several factors and issues constitute bottlenecks towards the development of global supply chain businesses and trade openness in the region, while additionally preventing domestic enterprises from realizing substantial growth [5, 6]. The portfolio of suggested policies aims

towards the direction of comprehensive and efficient supply chain management that at a second stage will assure the economic viability of domestic enterprises [6].

In this manuscript we aim to investigate the role of supply chain management in the SEE region and to review the relevant growth opportunities in order to foster regional development. The objectives of this research are: (i) to identify the bottlenecks regarding trade liberalization, logistics and supply chain management practices in the region, and (ii) to propose a rather generic strategic methodological framework that could assist governmental authorities, regulators and managers to design and adopt best policies towards logistics and supply chain management. The rest of the paper is organized as follows. In Section 2, we present a brief review of the major challenges regarding Trade Development Strategy in the region. In Section 3, we proceed to policy recommendations that could foster Free Trade in SEE. We sum up in the last Section with conclusions.

## 2. Trade Development Challenges

The various facets of trade liberalization are affected by a wide array of diverse and versatile factors that can be partitioned in two classes (see Figure 1). The first class captures quantitative and more formal issues such as trade regulations and physical network infrastructure; they are hereby termed as “hard” factors. The second class includes a set of intangible factors which are qualitative and rather informal in nature such as inertia, perception, prejudices and experience. The factors that are classified into this latter category are termed as “soft” factors in this paper. It is now evident that these factors, which capture the culture and tradition, the intuition, the uncertainty and the subjectivity of stakeholders can have a detrimental effect during the decision-making process and they are therefore worthy of additional investigation.



**Figure 1** Main components of the required trade development strategy in SEE countries

A careful scrutiny of the national “Logistics Performance Index” (LPI) can yield a first, generic view about the problematic areas concerning supply chain operations in SEE. The LPI is a comprehensive quantitative index developed by the World Bank which quantifies the performance of national logistics systems for more than 150 countries [7, 8]. One of its goals is to assist countries to identify the challenges and opportunities they face regarding the efficiency and responsiveness of their national logistics system [7, 8]. It is interesting to observe the dynamic evolution of the LPI for the SEE countries between 2007 and 2010. The data in Table 1 demonstrate that the overall logistics performance of the countries of the region has declined dramatically from 2007 to 2010.

**Table 1** Comparison of the LPI index, 2007 and 2010 [7, 8].

Country	Rank 2010	LPI 2010	Rank 2007	LPI 2007	Customs 2010	Infrastructure 2010	Timeliness 2010
Albania	119	2.46	139	2.08	2.07	2.14	3.01
Bosnia and Herzegovina	87	2.66	88	2.46	2.33	2.22	3.18
Bulgaria	63	2.83	55	2.87	2.50	2.30	3.18
Croatia	74	2.77	63	2.71	2.62	2.36	3.22

Country	Rank 2010	LPI 2010	Rank 2007	LPI 2007	Customs 2010	Infrastructure 2010	Timeliness 2010
Greece	54	2.96	29	3.36	2.48	2.94	3.49
Macedonia, FYR	73	2.77	90	2.43	2.55	2.55	3.10
Montenegro <sup>1</sup>	121	2.43	115	2.28	2.17	2.45	2.65
Romania	59	2.84	51	2.91	2.36	2.25	3.45
Serbia <sup>1</sup>	83	2.69	115	2.28	2.19	2.30	2.80
Turkey	39	3.22	34	3.15	2.82	3.08	3.94
SEE Average		2.76		2.69	2.41	2.46	3.20

<sup>1</sup>Serbia and Montenegro was a unified country that was separated in 2006.

A national logistics and supply chain strategy needs to be comprehensive tackling holistically the modules of Figure 1. Below, we provide a comprehensive analysis of the main trade development challenges in the SEE region.

## 2.1 Trade Policy & Regulations

Trade liberalization is a diverse and challenging subject for both businesses and governments. It involves a broad range of diverse issues (e.g. political, administrative, financial etc.), all of which must be taken into consideration when a country aims to develop a national trade strategy.

To begin with, the greatest threat in developing a harmonized trade strategy in the region is the existence of large deviations among the individual SEE countries. Mainly, the independent character of national consultation institutions, trade regimes and border agencies imposes unnecessary burdens for trade and logistics in SEE [9]. More explicitly, innumerable trade regulations and complicated trade procedures are ensued by added transport and trade costs for local producers, consumers and traders in the region. In addition to the lack of conformity, there has been also observed a lack of public-private consultation on trade issues. This results in a chasm between the interest of business and the other societal stakeholders affecting negatively FDI flows [9]. Furthermore, only few years ago certain SEE countries have adopted the institutional and legislative implementations of world approved trade provisions (e.g. Bosnia and Herzegovina, Montenegro and Serbia approved the provisions of the WTO only in 2006). Additionally, the relation with the European Union is hindered due to the unilaterally implementation of the EU Stabilisation and Association Process (e.g. Serbia). Implementation of EU-harmonized technical standards has become increasingly important in the region, especially for Bulgaria, Croatia, and Romania after their EU accession. The 2004 Regular Report of the EU concludes that the alignment with the EU *acquis* (i.e. "the accumulated legislation, legal acts, and court decisions which constitute the body of European Union law") in these countries is incomplete [10]. Furthermore, the deficiency of a harmonized certification system between the SEE and the EU stems from the lack of the will to establish a common institutional setting in the region. This is more evident in the sanitary and phytosanitary area (i.e. perishable goods and drugs) that comprise the major exports of the region. The lack of streamlined legislative frameworks towards health and safety inspections hampers the trade capacity of local businesses, repels foreign investments and diminishes the entrepreneurial potential in the region.

In addition, SEE countries have not developed yet an evaluation system that could provide valuable feedback while quantifying the outcomes of the applied trade policy at a given period of time [3, 11]. Governments and trade committees have been proven unable to co-ordinate and proceed to streamlined actions due to limited technical know-how. The situation has been exacerbated by the instability of the political situation in the region [9]. In brief, it is well documented that reforms of customs and border-crossing rules are limited by a range of impediments including limited coordination and cooperation, customs corruption, ineffective border clearance, old customs and border facilities, misinterpretations of the legal regulations, obsolete technology in customs, lack of trained cross-border officials and the overall complexity of procedures. It is important to point out that the nature and the extent of the problems that each SEE country faces is different [12].

## 2.2 Infrastructure Development

Inadequate infrastructure is a constant, prominent obstacle as documented annually by the Southeastern Europe Core Regional Transport Network Development Plan [3]. In addition to the limited number of official border-crossing points, there are many unofficial border crossings with no rules governing trade transactions, a plethora of phenomena of corruption and with no consequent economic benefits for the countries [9]. Thereof, the infrastructure can be regarded from two perspectives: *multimodal (road, rail, sea, river, air) physical network infrastructure* and *information technology (IT) infrastructure*.

Despite the efforts and the huge investments regarding the development of the *physical infrastructure network*, there are major challenges. Through the years, a lack of any systemic maintenance resulted in the declining of the road condition without realizing its full potential. According to data available, there are still 1.122km of bottleneck length in SEE [3]. The condition of the *core rail network* is even worse than that of the road network, considering that maintenance and investment are below requirements [3]. The major bottleneck criterion that hinders rail freight is the limited capacity of the rail network, which is below the standards set by the UIC CODE 406 (i.e. capacity is evaluated by means of capacity utilisation) [3]. The situation is better when it comes to *seaport infrastructure*. Today, excluding Greece and Turkey, there are only ten seaports in the rest of the SEE with overall modest condition, capacity and turnover. Modernization is exerted by the necessity to correspond to the significant incoming Asian trade flows. Asia has emerged as the major supplier of freight for Europe and transport routes pass through the Mediterranean. Rijeka, only in 2009, received 11.24 million tons of freight [3]. Furthermore, all *airports*, except Pristina and Sarajevo, recorded a major decrease in passenger traffic in 2009 because of the economic crisis. As for the cargo transport, airports in the region do not utilize appropriate capacities and terminals, and thus the freight transport is limited only to the airports of Zagreb and Belgrade [3].

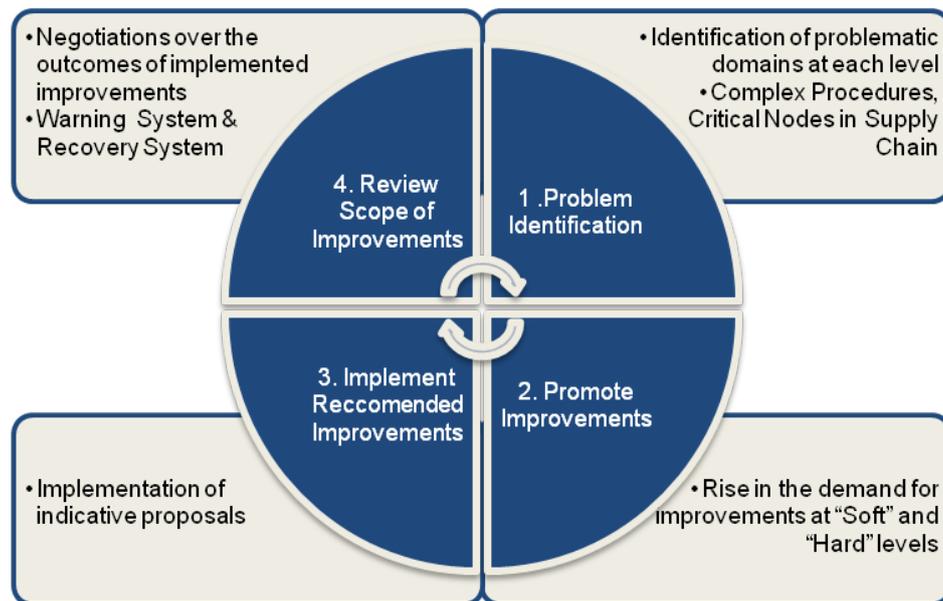
Lastly, it is imperative to distinguish between IT infrastructure at the enterprise and at the e-customs level. SMEs that are operating in the region, which comprise the backbone of the regional national economies, clearly recognize the true potential of policy reforms regarding the IT sector [1]. At a greater extent, they can provide valuable insights about the relevant weaknesses and pave the path to policy-makers to proceed to appropriate reforms to enhance competitiveness in the region [1]. The most significant IT problem is the lack of integration between the *information systems* utilized by companies, suppliers and customers that hinders entrepreneurial activity in the region, undermines growth and diminishes innovation indexes [1]. Additionally, a shortage of highly qualified and skilled personnel to operate such systems is observed, resulting in inadequate vendor support and in hidden costs. The same problems appear to the *e-customs* systems thus resulting in time delays, increased variability and costs, and overall low efficiency at border clearance. A significant shortcoming at the *e-customs* domain is the lack of a 'Single Window' environment in SEE. Single Window refers to an integrated information and communication technology system where traders submit only once information regarding their trade practices. The information is then directed automatically to governmental controlling authorities reducing significantly non-tariff barriers and enabling trade facilitation for the benefit of the trade community [13]. Today, only Albania and FYR Macedonia have made some progress towards this direction [14].

Nevertheless, the most important factors in the assessment procedure of the trade liberalization that seem to be the greatest threat in the overall trade reform effort is the lack of political will, absence of common policies and the resistance of the officials towards change which is diffused at all aspects of the Southeastern European countries [6].

## 3. Recommendations

It is widely admitted that to promote trade liberalization and better cross-border management in SEE, generic recommendations do not appear to be effective [15]. The core of the problems has to be identified at a national level [16]. It is important to further scrutinize specific problematic areas and propose localized recommendations according to the requirements of each individual SEE country (see Figure 2). Given the emerging window of opportunity to establish a new, complete, and sustainable Free Trade Zone in SEE, it is crucial to adopt disruptive innovations for the design and the implementation of a liberal trade regime in order to create distinct competitive advantages compared to other alternative supply chain routes in the global scheme [17, 18]. However, before investing substantially, it is recommended to evaluate the behaviour of the envisioned, integrated supply chains

in SEE through simulations in order to capture the impact of any unpredicted variability [19, 20]. Below, we provide specific recommendations regarding the “hard” and “soft” factors.



**Figure 2** Steps of the Trade Development Strategy that need to be utilized by each SEE country

### 3.1 Regulatory Environment

The strategic recommendations provided below revolve around the four main modules of harmonisation, standardisation, simplification and modernisation.

*“Soft” Term Interventions:*

- Develop an environment of close intra-regional cooperation, mutual understanding and genuine dialogue between all the stakeholders in the region, create a common vision and work towards that goal.
- Develop local knowledge capacity and human capabilities. To this direction, the enhancement of the institutional role of the Chambers and the promotion of joint training programs of trade officials must not be neglected. The academia can have a detrimental role in this effort.

*“Hard” Term Interventions:*

- Establish a common regulatory framework, technical standards (e.g. labelling) and licensing concerning the goods and services traded among the SEE countries [6]. This will lead traders to avoid the duplication of controls and compliance procedures. Considering also the European vision of many SEE countries, it is crucial to align SEE trade regulations with the ones of the EU in order to realize greater trade potential. At a second stage, this harmonization with international laws and standards must lead to the standardization of the necessary trade documents and data sets that will result in increased accuracy and competitiveness, fewer errors, less confusion and reduced costs.
- Apply transparent and operable rules and procedures to avoid phenomena of misinterpreting policies and regulations, and their subsequent costs. It has been observed that non-transparent procedures result in high levels of corruption among the border agencies. Another side-effect of clear regulations will be the enhancement of the national markets. It is perceived that trade is the “fist in the world innovation” that increases the pool of technology and services for the local innovation process [5].
- Establish a regional, independent, common market inspection body that will certify the domestic manufacturers about the compliance of their manufactured or traded products and services. The latter will be extremely useful for the inspections, especially for perishable items such as foods and drugs. The standardization of the import/export requirements and procedures will, at a second stage, be open to every exporter/importer in the region and there will be eliminated any problems regarding the import/export regulations and trade agreements which are altered frequently and are

difficult for organizations to follow. The proposed system resembles the FAST program between Canadian and USA borders which has already demonstrated positive results for major trade firms [21].

- Minimize trade costs and homogenise tax regulations to enhance the trade perspective of companies.
- Develop national logistics action plans and set up national logistics observatories that, in cooperation with EU authorities, will periodically assess the national logistics performance of each SEE country and will monitor the impact of trade actions and reforms.

Finally, Grainger provides a comprehensive, descriptive model concerning the reform procedures in the wider regulatory environment and he proposes a set of eighteen reform actions that should be adopted by governments and business stakeholders [22]. To be effective, however, the proposed actions need to be combined with disruptive, innovative approaches in an organic manner and must be evolved and evaluated at each phase of the implementation process [23]. Applying reforms in the supply chain sector will also enhance domestic entrepreneurship and will impel the interest of foreign direct investments (FDIs). Literature confirms that trade openness is positively related with FDI and that it assists firms in increasing their market share [24, 25]. The main reasons include the diffusion of technology and knowledge base that can foster innovation, entrepreneurial activities and competitiveness of local companies.

### **3.2 Infrastructure Development**

At the intermodal infrastructure network, initiatives should be considered in order to:

- Develop inter-modality connections and capacities with the aim to improve efficiency and security.
- Integrate the road, rail, air, river and sea networks with the multimodal nodes (cities of Thessaloniki, Burgas, Varna, Constanza) to realize the potential of new, emerging markets [26]. It is worth to point out the role and the harnessing potential of the pan-European transport Corridors IV, V and X. In addition, the perspective of the Danube River cannot be neglected.
- Apply "smart", innovative solutions in the physical network design so as to minimize travel distances, travel time unpredictability and increase security.
- Create direct routes between the regional economic centres to support bilateral and regional trade as long as investments [6].
- Establish halfway terminals and warehouse facilities to increase the storage capacity that will service the growing needs of demanding supply chain operations.

Moreover, at the IT sector leapfrog advances should be adopted to enable trade liberalisation and facilitation so as to establish a true, operational, and integrated e-customs system [27]. The careful actions towards this goal aim to:

- Provide economic incentives in order to assist domestic enterprises in the adoption and implementation of sophisticated information technology systems [1]. Except for that, local governments should promote the relative legislative measures to enable the free flow of information.
- Develop national strategic reference frameworks to financially support the companies operating in the region so as to adopt high-tech systems and foster their trade efficiency and capacity.
- Educate the borders' administrative staff about the new IT systems and the vision and the long-term goals of the Free Trade Zone initiative.
- Invite experienced instructors and experts from the European Commission, and build upon existing paradigms so as to enable knowledge transfer regarding practical issues that may inhibit the normal process of the Free Trade Zone implementation. The bottom line of the efforts should be to build upon the increased regional cooperation both at a national and at an enterprise level.
- Capitalize on the experience of existing electronic customs projects (e.g. the Electronic Customs Decision of EU, the FAST program), and request the appropriate assistance and knowledge transfer.
- Apply a common regulatory framework to achieve the implementation of a centralized clearance concept [28]. This will pave the path to establish a Single Window environment in the region in order to ensure efficient trading and governmental controls of trade flows. This will result in more transparent trade operations, improved governance, better efficiency, increased effectiveness and

fewer opportunities for corruption. Nevertheless, a major prerequisite for the implementation of a Single Window initiative in the region is the simplification of documentation and regulations.

## 4. Conclusions

The problems associated with trade performance in Southeastern Europe demand immediately comprehensive remedial policies. Reforms are imperative at both “hard” and “soft” levels so as to harmonize operations and accomplish similar trade development degree at each individual SEE country. The latter will help the integration with the global value chains and will open new market opportunities. Towards this direction, the fast development of supply chain management strategy cannot be achieved in a haphazard way with huge investments with vague outcomes. Careful scrutiny and due diligence are required to achieve the same level of development at each SEE country in order to attract FDIs that will transform the region in a major trade node between Western Europe and Asian markets [1, 21].

Reforms should be made firstly at the regulatory environment with the main aim the implementation of common policy frameworks at each SEE country. Except for the alignment with global trade standards and procedures, trade liberalizations and the successive foreign direct investments will enhance the diffusion of innovation and foster the competitiveness of SMEs. In addition, expanding the capacity of physical network infrastructure is vital. The utilization of intelligent information systems will enable Single Window operations with the corresponding advantages for the governments, trading parties and consumers.

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# The link between Intellectual Capital, Strategy and Entrepreneurship

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**Recently the role of intellectual is becoming very important inside small and medium enterprises; the main reason is because of their influence in formulation and implementation of strategies in these enterprises. This research will try to examine the links between intellectual capital of entrepreneurs, strategies and entrepreneurship they use to discover business opportunities. This research will try to find the link according to the already made research around the world and also there will be an empirical research that will be made in a forty five enterprises in different cities in Republic of Macedonia. The aim of the research is to emphasize the role of intellectual capital in formulation and implementation of strategies through theoretical and practical research that will explain in a better way the link or the relationship between intellectual capital, strategy and entrepreneurship. This will help entrepreneur to better understand and use intellectual capital in strategy formulation of enterprises by investing in intellectual capital in order to formulate and better implement the strategies in enterprises. Through better use and investing in intellectual capital entrepreneurs and their workers will be able to discover opportunities for new business and enhance their competitive advantage in a market.**

## **Keywords**

Entrepreneurship, Opportunity Discovery, Intellectual Capital, Strategy formulation, Strategy implementation

## **1. Introduction**

Globalization and increase in competition has led to the era where the knowledge along with tangible assets has been used as production factor in which the knowledge is the building block of intellectual capital.[1,p29-42].

Businesses who have understood the importance of learning have shifted their strategic efforts from managing financial assets - often confidential - to managing intangible asset of intellectual capital. [2,p202-214]. Intellectual capital, in an increased uncertainty, information needs and managing with change has been seen as vital instrument [3, p151-171];[4,p159-176]; [23,p142-160]; Indeed, today, competitive advantage, material and financial resources of enterprises, rather depend on how they conduct their intellectual capital [7,p267-284]. The future of a business move is to create values of working people, business strategy, structure, systems and processes, established by the enterprise and customer community are only possible with effective management of intellectual capital [5,p366-374]. Future of big businesses very much depend on CEOs (chief executive) as well as the DR capacity for managing intellectual capital effectively and appropriate selection of Chief Knowledge Officer-company information manager. However, the intellectual capital of enterprises is to analyze, measure, develop, use, and studies relating to the effective management of and increased research [8,p489-509]. In this study, primarily we analyse management of intellectual capital components and general information is given, followed by large-scale industrial enterprises in Macedonia who use intellectual capital management practices aiming to determine the results of the research carried out within the framework of evaluation.

## 2. Definition and components of intellectual capital

Sustainable competitive advantage and intellectual capital plays an important role in creating a superior financial performance that is accepted in all circles and research [9, p1161-1181]; [11.p348-360] J.K. Galbraith in 1969 used the concept of intellectual capital, in the present-day organizational sense which later T. Stewart (1991) defined as "operation that provides a competitive advantage in the market, the sum of all things known to employees as described. Stewart (1997)[12] published his book in the intellectual capital "Welfare use of intellectual material to create wealth, knowledge, information, intellectual property, and a combination of experience". Brooking [16], defined intellectual capital, "to sustain the business activities of all intangible assets" known as the first professional manager of intellectual capital [13, p366-373] and [14, p439-448] have used intellectual capital as "value of information can be converted to".

According to the traditional accounting sense, intellectual capital and goodwill (goodwill) corresponds to the concept of representing the difference between book value of the enterprise market with recognized market value [18];[10,p63-76] , intellectual capital, talent and commitment of employees to identify the product, owned the business and assets of the organization see it as a meta-capability. Intellectual capital is defined as to create value for the future, gained through experience and learning can be used to achieve the strategic objectives of all kinds of intangible assets (Intangible assets),[24, p 1114-1128].The intellectual capital, products and services throughout the enterprise market thinks of as a physical output. All of these definitions can be defined as taking into account the intellectual capital, which directly affect the success of current and future business that provides competitive advantage, create added value, knowledge of the essence, to the whole business of intangible assets owned by organization.[6]. As you can see the intellectual capital, the hidden assets of a company's balance sheet is a collection of unseen and the most important source of competition; [23,p142-160];[15,p51-59]. On the other hand, the classification of intellectual capital components in an effort to use different names with which the authors are committing the same subject [18];[16];[10,p63-76]. In this study, within the framework of the review of the literature, the intellectual capital generally recognized that the components will be discussed under three main headings:

- Human Capital: Employees have the knowledge, skills, abilities and the sum of experiences. For example, the Employee education level, satisfaction, attitudes, values, organizational commitment, motivation, intelligence, creativity, teamwork, problem solving and communication skills, self-confidence, desire to share knowledge, entrepreneurship and leadership skills, innovation and so on. [21,p 251-268].
- Structural (organizational) Capital: Business and truly enterprise owned by the business and employees work in providing products and services are produced and distributed a set of assets [19, p77-78]. The organization's strategy, culture, mission, management philosophy, processes, information technology / systems, patents, copyrights, trademark / secrets, logos, databases, R & D, innovation, such as[27,p27-41].
- Relational (stakeholder based) Capital: business, create added value for all parties (customers, partners, investors, suppliers, distributors, and government) and covers the relationships. For example, customer relations, customer loyalty / satisfaction, business recognized, distribution channels, brand equity, alliances [22, p10-19]), licensing agreements and so on.

The components of this dynamic, complex, fuzzy and original feature and with each other in mutual relationship, as they are reviewed and managed in a comprehensive study.

## 3. Intellectual capital management

Information, documents and audio format or as a message described. The difference of information from the data, relationships, is organized for the purpose. Information, in a manner that creates business value that can be organized, into group, modelling and passed over data is defined as the action. Knowledge management and intellectual capital management concepts are closely related to each other [29, p93-110].

Knowledge management of the business in the hands of information and raw data transformed into human capital and relational capital comprises activities. However, intellectual capital management information management of the more far-reaching [13, p366-373].

Intellectual capital management, organizational value for the discovery of the creative elements and from increasing the market value into a conversion, to measure the value of intellectual capital management of the development process [21, p61-77]; [10, p72-73].

Intellectual capital management business is an important managerial responsibility and intellectual capital, performance can be measured. For this, a systematic approach to be developed. In this regard, various models have been developed [28, p160-173]. Some of them, Skandia's manual, Dow Chemical's value platform, intangible assets monitor, balanced scorecard, intellectual capital index [26, p413-426], American Education and Development Association Stylesheets [25, p414-432]. These models are examined, some elements of each model are highlighted, and they focus on. Most two models mentioned in the management of intellectual capital are examined briefly below [20, p206-240].

#### 4. Role of intellectual capital in strategy

Many researchers have tried to understand why some enterprises are profitable. Porter [30] considered that industry profitability arise from the interaction of five competitive forces that he proposes and that profitability of the industry depends on impact of these five forces. But why do companies within the same industry differ in the profit earned? This question influenced many researchers to try to answer this question. Some studies suggest that profitability between companies inside the same industry vary three to five times more than profitability between different industries [31]. Excellent response to this issue we can find in the research made by Teece, who considers that the answer to this very complex question lies in the following three aspects [31 p5-7]:

- **The paradigm of a competitive force** – according to this aspect the main credit in enterprise profitability comes from intellectual capital. This capital has a tremendous impact when enterprises think on organizations strategy. This is especially evident in organizations that rely on intellectual capital such as universities, hospitals and so on. The main reason why some companies are more profitable than others is that they prevent other companies from coping of their strategies that result from using of intellectual capital.
- **The paradigm of resource-based approach** - the profitability of an enterprise comes from their resources portfolio (known as strategic assets). The term resource refers to the untouchable i.e. intellectual capital and touchable resources. Untouchable resources incorporate knowledge, competence, intellectual agility, the ability to establish links and attitude of employees. Very important characteristic of the untouchables resources compared with touchable resources is that they are not owned by the company but by the very individuals who possess these values.
- **Evolutionary paradigm** - is based on the Charles Darwin theory, according to whom strategies through time emerge and only those organisms (strategies) that exist in their environment will reproduce and multiply. This approach is explained in evolution of strategies.

If we analyzing these proposed aspects it can be noted that the first two aspects actually point to the importance of intellectual capital. The importance of individual skills is reflected in their power that these resources possess and which is related in a increasing of the companies' value. In order to use this value or its materialization it is required an appropriate strategy that will transform individual capabilities in to value. This is the very goal of competitive strategy which tries through creating of additional value to achieve competitive advantage.

According to Goèran Roos [31, p1] formulation of the strategy is an activity which stems from the creativity of the human brain and there is no written formula that will give the correct answer. This definition refers to individual skills (intellectual capital) that a person or persons have when they decide on choosing the right strategies. This line of thinking in which we accept creativity or that that strategy depends on personal abilities it is related with entrepreneurs or entrepreneurship.

When we are talking about intellectual capital primarily we think about its impact on formulating and improving of strategies. As a very important factor that affects intellectual capital is knowledge, i.e. knowledge based approach. Knowledge based approach conceptualize company as an independent regulatory system that optimize the interactions of individuals and groups in creating and implementing knowledge in formulating the strategies of the companies [32, p179]. The importance of knowledge for enterprises was launched in early 1990 with the appearance of many studies that focused on the knowledge which contribute to the emergence of a new approach based on knowledge. This approach includes analysis of resources, capabilities of the company and organizational knowledge [33, p133]. Authors David M. Brock and Eyal Yaniv, believed that knowledge is an important resource for the organization, but they also emphasized that enterprises know very little how this knowledge can be used by businesses in achieving competitive advantage, mainly for its movement through the organizational hierarchy. This knowledge can come from the experience and knowledge that their employees have (internally) or by consumers, competition, or literature (external). It happened with the

company Sharp, when they used their knowledge for production of flat-display which allowed them to be leaders in market worth seven billion dollars [34].

When we talk about the role of knowledge in strategies we mean for the knowledge that both enterprise managers and employees have. Employees knowledge very usually can be a limited factor in formulating the enterprise strategies, this for a reason that some employees may not understand them. This is one of the biggest problems that manager's face, and that is the risk that employees won't understand the enterprise strategies. Studies have shown that from the total number of employees in enterprises only 5% to 8% of them understand enterprise strategy [35, p2]. Most of the knowledge remains tactical which means it is harder for others to access or to imitate. Knowledge operates in a very mysterious way, for example knowledge used in Toyota when they produce cars refers to a very strong social and specialized organizational relationship that evolved through decades [32, p179].

Experience is a crucial component of knowledge. Experience refers to the individual or collective past that is being built through the process of repetition, trial and error, feelings, observation, analysis, implementation of practices, etc.[36, p403]. Experience is associated with so-called replication strategy used in hotels, fast foods, home visits etc. These are some classical examples of the transfer of knowledge and the possibility of accumulating knowledge [37]. Knowledge and experience of people can be key factors that influence the success of the strategy. Possession of a unique competent people in enterprises as a top surgeon in the hospital or outstanding professor/researcher for the university does not mean automatically possession of competitive advantage. These people very easily can leave the enterprise or retire and that's why enterprise should take their knowledge and experience and allocate through organization in order to achieve sustainable competitive advantage [38].

The achievement of many goals of the enterprises depends primarily on their employee's i.e. human resources available to the enterprises. Human resources are very important strategic resource for the enterprises. Companies should compete in attracting and retaining best employees in their ranks. These employees in continuance can be excellent basis for achieving competitive advantage over the competition. Although the use of different techniques and technologies can contribute in achieving

a significant competitive advantage, however from employees depends the ability of utilization in achieving competitive advantage. Sometimes the impact of one employee can be so large that in case of his dismissal he can take with himself many consumers. This is why enterprise need to have continuous training and rewarding of enterprise employees. The main task of enterprises would be to use the maximum from their employees [39].

Many theoretical and practical studies have found that people are very valuable and important resource for success of a business and that they can be an important source of competitive advantage for enterprises [40, p1901]. This and other authors actually found that companies that apply the human resource management practices are internally more consistent and more compatible with the enterprise strategy and show far better results than other enterprise who do not pay attention to this aspect. Research in this area suggests to a new area called the Strategic Management of Human Resources (SMCHR). Strategic Management of Human Resources indicates use and connecting human resources management with enterprise strategy, business strategy and strategies at all levels of the enterprise and use of their potential in achieving the objectives of these strategies. Strategic Human resource management should not be understood only as a use of management of human resources in achieving the strategies. The Strategic Human resource management includes knowledge, skills and attitudes in organization and that some individuals are better than others in managing [41p.192].

Human resources are mostly highlighted as unique, valuable, difficult to imitate and difficult to substitute which is great base for achieving sustainable competitive advantage. They can serve as a core competence. Companies' core competence of a company depends on several factors such as [42, p172]:

**Knowledge** - information on market intelligence on competition, technological expertise and understanding of political and economic surrounding.

**Abilities** - refers to the potential of enterprises to perform an activity or task.

**Attitudes** - refers to positions within the organization. Athlete without winning mentality cannot win. The position of the company may be oriented towards innovation, being aggressive or competitive oriented improving the quality and so on. A recent survey found that many managers believe that human resources are critical to the future success of their business, but also they believe that management of these resources or any poorly or not there [43, p172].

## 5. Conclusion

Except theoretical research that has been made as part of this researches a practical research have been made in 45 enterprises in Republic of Macedonia. The data from this research have been proceeded using SPSS and STATA as statistical software programs in order to get to needed information.

- Empirical research has confirmed the overwhelming influence of experience and knowledge in enterprise strategies and that there is a connection between strategy and knowledge. Using cross tabulation results showed that there is a connection between level of education and the choice of the original strategy. Thus managers who have completed university, masters and doctoral studies used primarily original strategies or strategies that are very different from competitors, as opposed to managers with lower levels of education. Also the results showed that there is a connection between having a formal strategy and level of education of managers. In 100% of the companies whose managers have completed master's and doctoral studies have noted the use of formal written strategy, as opposed to those companies whose managers have completed secondary education, where only 10% of them use formal written strategy. That it makes successful managers who have completed secondary and primary education is the great experience that these managers have in the business where they are as well as their experience in management positions. Thus only 4% of all managers have explored less than 2 years experience of managerial position, and this 4% were all managers who have higher levels of education. The analysis showed also that managers who have greater experience in management positions believe that the experience has more influence in formulating the strategy in relation to those managers who have less experience.
- The ability for strategic thinking of managers who carry strategic decisions is very important. So for all managers in the analyzed companies it has been noted relatively good capability for strategic thinking that is associated with the possibility of starting a new business that is observed in 75% of cases, 58% were able to revive a business from the crisis and 56% of these managers were at lower management levels. Almost all managers noted that they were in at least two of the above three situations. Given that most of the analyzed companies have been successful in recent years than it we can conclude the impact of managers' ability for strategic thinking on the success of the enterprise.
- The ability of employees to carry out the strategy and the enterprise ability to harness the intellectual capital using empirical research it can be concluded that they have great influence in formulating the strategy of companies. Thus only 6.5% of managers considered that the education of their employees have little influence in formulating their strategies and that only 2% of managers considered that the quality of intellectual capital that they have don't have influence in the formulation of strategy. In relation to the level of education of top managers it may be noted that only 2% of them have completed doctoral studies, 7% are with completed masters' studies, 50% have completed university study, and 11% have completed higher school while the rest have completed secondary and primary education.
- During this research we found that unlike the relatively low level of education of managers, most of them have great experience in the business in which they are located. Similar is the situation regarding the experience of managerial position where 60% of these managers have more than 9 years of experience, and that only 4% have one to two years experience in managerial positions. Thus analysis also showed that managers who have greater experience in management positions believe that the experience has more influence in formulating the strategy in relation to those managers who have less experience.

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# Competitiveness of Serbian Economy in the Region and it's Prosperity

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Up to date experiences have shown that, subsequent to the democratic changes, the Serbian economy has survived the increase in social gross products within the period 2006 - 2007. It is clear that this is a consequence of the period of the highest inflow of foreign investments in Serbia. Taking into consideration that, the world economic crises has reached the largest multinational companies, it has reflected to the domestic economy. The extent of foreign investment has been decreased which lead to the decline of basic macro economical indicators in our country, as well as to the decline in economic growth. The future of Serbian economy and a revival of the economic activity may stimulate direct foreign investments through miscellaneous forms and modes of cooperation.

Serbia is a country which has a very favourable geographic position, skilled and relatively cheap work force and is rich in natural resources. Its future economic development will be based on agribusiness and metal-processing industries. Nowadays healthy food is the world's imperative and this should be the main economic activity of our country in the future.

## Keywords

agribusiness, investments, economy, resources

## 1. Introduction

The previous year 2009, in economic terms, was the most challenging period for the Republic of Serbia, ever since the democratic changes which occurred in 2000. The global crisis has negatively reflected itself to the Serbian economy, among all other economies of the countries in the region, practically all the European economies and a vast majority of the economies worldwide.

The economic growth ceased in 2008 and economic entities operated with the loss of 37 billion RSD. During 2009, the economic crisis initiated a significant decrease of business activities for more than 16%, to the lower demand on the market, reduction of industrial production, lowered income of foreign investments and a deceleration of loan activities. Besides, an illiquidity increase and a previous massive indebtedness of the economy together with more severe conditions for subsequent debts amplified the sensitivity of our economy to all of arising challenges which originate from the surrounding.

Even though, in the course of the year 2010, the slump in economic activity has been stopped and a growing trend of industrial production and economic export has been maintained, generally speaking, a noteworthy recovery is not yet perceptible. Furthermore, risks of the further weakening of the national currency, a decline of demand, illiquidity growth and expensive financing sources are still present, together with a risk of business operation ambience which generates high costs. Likewise, unemployment risks and growth of social tensions are still present as a consequence of existence of a vast number of illiquid and insolvent companies. The economy is facing an enormous count of menaces. It is obvious that there is no significant recovery of economy without the increase of production and export, while, on the other hand, without the eventual recovery of the economy and its structural adjustment, there will be no way out of the crisis. The ongoing year is extremely challenging for the Serbian economy and generation of a favorable investment ambience is of an essential

relevance for engaging direct foreign investments which represent a main generator of stability and economy growth.

## 2. Current state of affairs in Serbia

The global recession has amplified, in the course of 2009, the macro economical vulnerability of all transition economies which were faced to the negative growth rate. Serbia, as a transitional country, has faced the consequences of the global recession, yet, compared to other surrounding countries, it had a milder decline of social gross products in 2009 mainly due to the package of incentive economic regulations. The economic activity in 2009 has been drastically decreased due to the abundant decrease of domestic and export demands, decline of loan activities and companies' liquidity.

Social gross products records the decline of -3% and the highest negative effects of the crisis reflected on the industry (decline of -12,1%), especially the processing industry (decline of -15,8%), where the growth was entirely nullified within the period of 2001-2008, thereafter, the trade (decline of -12,3%), and civil engineering (decline of -25,1%)[1]. The largest proportion of the social gross decline is possessed by the sectors of traffic and merchandise storage and the sector of real estates, leases and business activities. The physical scope of the industrial production in 2009 records a descent of 12,1% in comparison to the previous year.

The decrease in production has been affected by the immense decline of a loan activity and aggregate demand, increase of economy liquidity and additional burden of debtors with the depreciation of RSD. The decline of domestic demand as a consequence of a decrease of individual consumption and a decline of manufacturing activity has lead to a decrease of foreign trade activity, primarily import which has affected the decrease of Serbian deficit in 2009 (1,7 billion euros) for 4,2 billion euros comparing to the year 2008 (5,9 billion euros), which represents the sole positive point. The inflation rate within the year 2009 amounted to 10,4 %, RSD has depreciated in regards to euro for 8,2% .

General decline of economic activity within 2009 has lead to the deceleration of incomes` growth, decline of employment and increase of unemployment. The average net income in Serbia within the course of 2009 amounted to 338 euros, the total number of employees has decreased for 5,5 % compared to the year 2008 and the unemployment rate up surged for 2,6 % compared to the year 2008. In the course of 2009, the wages were realistically lower for 0,1% (while the nominal value records an increase of 8,5%)[2].

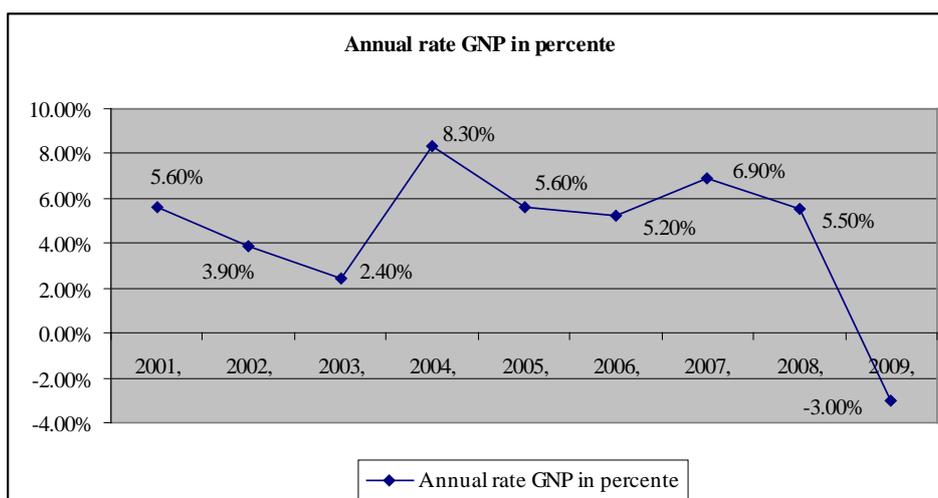
The Republic of Serbia has attracted 25% less direct foreign investments in the course of 2009 than during the previous year.

**Table 1** Movement GNP i millions USA and GNP per capita in periods of 2001-2009.

Years	GNP in millions USA	GNP per capita
2001	11484.7	1530.6
2002	15102.6	2012.7
2003	19550.8	2613.5
2004	23649.9	3168.9
2005	25334.4	3391.4
2006	29221.1	3942.6
2007	39385.4	5335.6
2008	48856.6	6647
2009	43697.1	5957.4

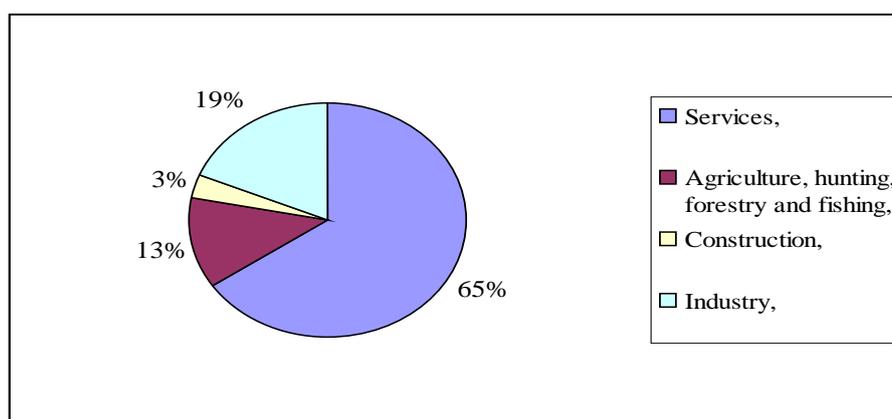
Source: Statistical office of the Republic of Serbia, 2010.

**Figure 1** Real annual rate of change in GDP in the period 2001-2009 (in percent)



Source: Statistical office of the Republic of Serbia, 2010.

**Figure 2** Structure of gross value added in 2009



Source: Statistical office of the Republic of Serbia, 2010

The very state of affairs has reflected on companies business performance in Serbia, which were already burdened with old difficulties, such as illiquidity, high indebtedness and accumulated deficit from the previous period, therefore, they had to face themselves with a problem referring financing current business operations, what, under the conditions of decreased inflow of direct foreign investments, has caused the increase of their illiquidity and decrease of extent of their business activity. The companies, along with the decreased range of economic activities, operated in the course 2009 with a deficit which has been doubled in comparison to the previous year and amounted to 95.732 million RSD.

The Government of the Republic of Serbia and miscellaneous competent institutions (The National Bank of Serbia above all) has promptly and rather thoroughly reacted to the outbreak of the crisis.

Priority proceedings were directed to the preservation of macro economical and financial stability. In this sense, the arrangement with MMF must be singled out (the total value of 2,87 billion euros out of which, Serbia has withdrawn 2 loan tranches in the amount of 1,13 billion euros, mainly intended for reinforcement of foreign currency reserves), and the so called Vienna initiative, which has assured the substantial foundation for amortization of the impact on banking and financial system of the country.

The decline of economic activities has reflected itself on the decrease in budget income inflow which has solely deepened the gap between the fiscal incomes and expenditures.

Budget deficit has been partly covered with means obtained on the basis of sources allocation with MMF and partly by emission of treasury notes- state bonds. Likewise, the Government has enforced the Decision that the solution to the problem with the budget deficit ought to be sought among the

expenditures- by means of cost reduction, which made it possible to avoid the VAT rate escalation and, this action should maintain Serbia on the list of potential destinations for foreign investors.

The Government key actions within the year 2009 referred to the so called Stimulation package intended for the economy, in the value of 180 billion RSD, which has been under application since May 2009. Within the aforementioned package, a special position is occupied by liquidity loans, intended for reinforcement of companies, together with the investment loans.

These actions have been primarily directed to overcoming the crisis` consequences and, it is apparent they gave a positive result in mitigation of the consequences since the beginning of recovery of the economy become evident as the year 2009 expired.

Gradual growth of the economy activity which commenced at the end of 2009, has continued within the year 2010. Macro economical data for the first half of the year 2010 draw attention to a gradual recovery of the economic activity which has mainly been based on the external demand recovery, the positive trend of growing export has been recorded within the first half of 2010.[3] Serbian export amounted to 4 billion euros, which shows the increase of 19,6% compared to the same period of 2009. World trade deficit was 9,7% less than during the same period of the previous year, since the import value was 5,1% less and it amounted to 7 billion euros.

However, export increase in the first half of the year 2010, unfortunately, was not the anticipated consequence of the production increase due to the industry`s slow recovery from 12,1% descent from the previous year which was finally brought to a closure in September 2009, but it is in stagnation ever since. Analysts of economy movements point out that the immense import growth for the first six months of this year was realized on the account of an increase in placement of black and colored metallurgy and, agricultural products, as well. Since the products in question make a significant portion of Serbian export structure, the tendency of a positive increase of export may continue within the forthcoming period, imposes itself. Likewise, the following fact ought to be kept in mind: the descent of RSD value compared to euro has significantly stimulated the export and helped it grow with greater velocity than the import.

Therefore, it is clear that the end of the crisis is not yet in sight and that the year ahead of us will, by no means, be easy, despite the encouraging forecast of positive economy growth in 2010.

### 3. Movement of direct foreign investments worldwide and Serbia

The economic crisis has reflected on the decrease of direct foreign investments worldwide and in Serbia as well. Net inflow of direct foreign investments in Serbia during 2009 was 1,8 billion dollars (1,4 billion euros) which is, compared to the year 2008, 853 million dollars (452 billion euros) less.

**Table 2** FDI, net in millions EUR

Year	2001	2002	2003	2004	2005	2006	2007	2008	2009
Value	184	500	1194	774	1250	3323	1821	1824	1372

*Source: National Bank of Serbia*

The total net direct foreign investments in Serbia, in the course of the period 2001-2009 amounted to 15,6 billion dollars (12,3 billion euros) whereas, the highest income of 43 billion dollars (3,3 billion euros) was realized in 2006. Within the aforementioned year, Serbia achieved the highest rate of direct foreign investments from 2000 onwards, which draws attention to the enormous significance of direct foreign investments for the economic activity of the country. The most important investors in Serbia in the course of 2009 were as follows: [1]

- Russian Federation; due to the purchase of the majority of shares of Serbian Oil Industry (535 million dollars)
- Austria (322 million dollars)
- The Netherlands (242 million dollars)
- Italy (239 million dollars )

The first quarter of 2009, 46,8% of the total annual inflow of direct foreign investments was realized and, the greatest part refers to the privatization of the Serbian Oil Industry. In the course of the second and third quarter, the continuous slump of direct foreign investments occurred. The greatest part of foreign net investments was directed to the processing industry (532,9 billion euros), real estate operations (239,8 million euros), sale (222,2 million euros), traffic (118,5 million euros). The remaining

part of the investments amounted to 2,9 million euros, whereas the significant part of assets inflow stood for the means of MMF based on the Stand by Agreement.

Alongside with the global recession, foreign investors' interests for investing in Serbia economy decreased. Supporting the previous facts goes the data on unsuccessful Government's attempt to privatize some of the largest companies in the country: RTB Bor, JAT airways, JAT technique.

Investments participation in BDP in the course of 2009 amounted to 18,2% (in 2008 - 23%) which was insufficient for the noteworthy growth of industrial production and competitiveness increase. Available domestic means cannot cover domestic investment needs, due to which, the direct foreign investments are crucial economy development.

Direct foreign investments have an immense significance for economic growth and expansion of developing and countries in transition. Recent experiences indicate that foreign investments played an important role in structural changes of production, export and business method in the user –countries of these sources. Serbia, as a country under transition, defines foreign investments as a noteworthy source of economic development, modernization, production employment and income escalation. The ingress of foreign investments would result in up-to-date knowledge, experiences and technology.

Likewise, direct foreign investments possess a vast political and economic importance since they signalize that the country in question offers miscellaneous performances and economic future and that the investment can turn out to be profitable. In the course of previous years, Serbia showed an immense progress referring political and economic reforms. Substantial law reforms which are under process have for their aim to harmonize our legal system with the legal heritage of the European Union and, they have been frequently complimented by the leading international institutions.

Although, Serbia has vastly evolved referring management of structural reforms, the world economic crisis in 2009 has set back the dynamics of reforms' conductions and additionally deteriorates the low level of the economic competitiveness. The World Bank Business Report 2010 (Doing Business 2010) points out that Serbia occupy 88. position on the list of 183 countries referring business conditions. The report indicates that the structural reforms under process, directed at the economic growth by means of investment surroundings' improvement were not powerful enough within the course of 2009 as to absorb negative consequences of the world crisis transitional process, therefore, a noteworthy improvement of business surroundings never occurred. A comparative analysis of the dynamics and tempo of business surrounding improvement to the neighboring countries points out a slowdown of economical reforms in Serbia. Serbia has achieved the most important improvement of ranking in the field of companies' foundation where the escalation for 35 positions was perceived.

Within the field of loans obtaining, Serbia is best ranked and occupies the fourth position, which presents the improvement for 8 positions. From the standpoint of political and economic investing risks, the loan risks of the country is BB-, which indicates the unfavorable investment surrounding.

Serbia pays a special attention to incitement of investing in the development of the private sector. Law regulations stimulate private investments and guarantee the transparency protection, non-discrimination and ownership rights protection International companies in Serbia are guaranteed the same legal treatment like domestic companies. Likewise, they are allowed to invest in whichever industry they choose, moreover, to freely transfer all financial and other actives, including profits and dividends. The factor which significantly contributes to the more favorable investment climate is a stimulating tax surrounding. The company income tax rate amounts to 10% and it is among the lowest in the region. The foreign trade regime is stimulating the export increase. Potential investors were sent a positive signal by signing the CEFTA agreement signed by the Republic of Serbia on December 19, 2006, and the EFTA agreement signed on December 17, 2009. Direct foreign investments are generators of production and export increase and, they spur the competitiveness of export-oriented company by means of knowledge and technology transfer.

## 4. Conclusion

It is evident that the crisis has not yet elapsed and that the year 2010 will, by no means, be easy, The existent economy structure, low investments consumption, current level of technological development and knowledge, adverse financing sources, and substandard overall business performances of the economy result in minimal potential for economy development. The crisis can be overcome by means of defining a new offensive and sustainable strategy of economical growth. Long term stability can be enabled solely by means of considerably larger and continuous inflow of foreign currency originating from export which implies the necessity for modification of economic structure towards the export-oriented. Also, a special attention ought to be paid to the incitement of foreign investments, since, only the investments rise and a continuous inflow of investment capital can lead to the positive change in

economic structure and construction of competitive economy, which exports goods and services of a high additional value. It leads to economical stability. That represents the challenge ahead of the forthcoming decade of Serbian development.

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# The Most Common Obstacles in Granting Patents for Macedonian Inventors in International Applications

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The paper gives a brief introduction to the definition of patent and necessary features of invention (invention) that should be possessed in order to be protected by patent. The benefits inventors and holders of the right (the owners) to acquire the international filing of patent applications pursuant to the Treaty on Cooperation in the field of patents (RST) and the procedure of the European Patent Convention, EPC are listed. The essence of the paper addresses the question emerges as the biggest obstacle observed in international examination reports from international examiners in respect of patent applications submitted by the Macedonian inventors and that is lack of novelty and inventive step. The knowledge is gained from the experience of agency "BERIN" and based on the Representation of over thirty patent application from Macedonian inventors before the World Intellectual Property Organization (Geneva) and the European Patent Organisation (Munich). The notable obstacles in international reports on patentability of inventions are: the industrial applicability is present, but not a novelty, especially the innovative step, which indicates a weak knowledge of the inventors in Macedonia with the modern trends of research techniques and lack of available patent information. This paper also gives suggestions and guidance for inventors to remove deficiencies and highlights the methods for recognition of innovative steps in their inventions.

## 1. What is a patent?

"Patent represents one of the industrial property rights which protects the invention"[1]. "Invention is the solution of technical problem relating to a product, method or composition of matter itself, which is the result of a particular procedure,"[2] This is the general legal definition defining invention in almost all national Laws on Industrial Property. There is a so called, engineering definition of a patent, which unites the definition of invention and it reads as follows:

"Patent represents an exclusive right that is assigned to the patent holder who created the invention which provides a new way to do something or a way that offers new so far unknown solution of a technical problem."

Concerning the exclusive rights, they relate to rights to:

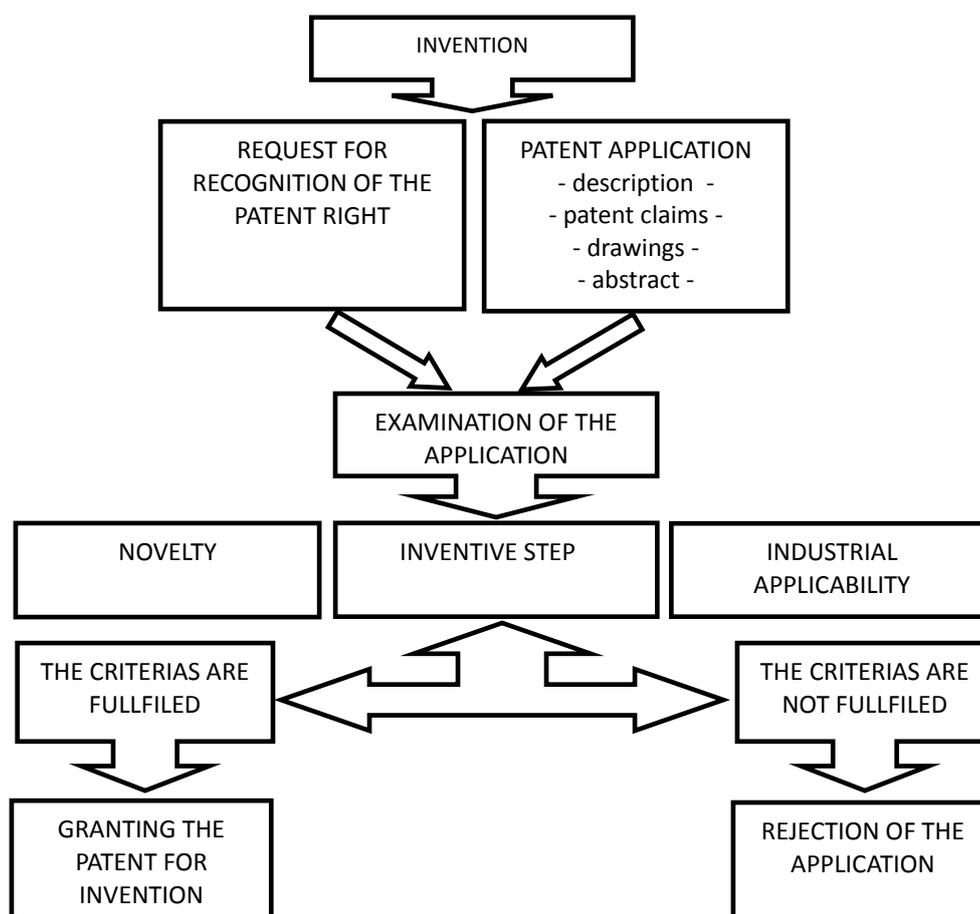
- use the protected invention in the manufacture,
- releasing in market of the products produced in accordance with the invention, and
- prohibits third parties to use the protected invention in the manufacture and market without permission.

Taking into account the above mentioned rights and interests, therefore the interest of a new technical solution to obtain a patent and to gain the possibility of unlimited exploitation of the invention within 20 years, as well as the fact that this exclusive right guarantees "monopoly" on the market, it could be concluded that the owner of the right posses huge advantage over the competition. However, the Macedonian inventors prefer to transfer their patent rights to other for adequate cash compensation. In an internal questionnaire by the Agency for Intellectual Property BERIN, about 30 Macedonian inventors, holders of the patent, were asked about their future plans concerning acquired patent rights. Only 90% of them responded that they will sell the patent right for the invention in order to gain financial benefit[3]. Only 10% were willing to invest in their own business and to exploit the invention

on the market. It is obvious that the entrepreneurial spirit is the weak side of the inventors from the Republic of Macedonia, although they have in their hands a powerful tool for personal and economic development.

## 2. Patentability requirements (The three patent commandments)

Once it became clear what patent is and what rights arise, further we are referring to the features that should have the invention to gain the patent right. Figure 1 shows a common rough structure of the procedure for patent granting.



**Figure1** Common rough structure of the procedure for patent granting

- It is clear from the figure 1 that besides completing the request for recognition of the patent right before the State Office of Industrial Property, it is also necessary to file patent application that contains:
  - Description of the invention that should be clear and precise for the skilled examiner to determine the applicability of the invention,
  - One or more patent claims, defining the scope of protection, the claims be clear and fully contained in the description of the invention,
  - Summary of the essence of the invention (abstract), and
  - Drawings.
- Further, the request is being considered as the patent application is being examined. Generally, the patent will be granted if the examiners (employees in the Office of Industrial Property), that are skilled persons in a particular area of technology for which the invention relates, determined that the invention meets the three patentability requirements:
  - Novelty,
  - Inventive step,
  - Industrial applicability.

The NOVELTY means that the claimed invention is new. But what does in reality mean that something is new? In everyday life the concept of novelty is taken for granted. " New clothes, new house, new love, and everyone thinks it is relatively easy to decide by himself "what is, and, what is not new". But, can be so easy determine whether the claimed invention meets the first patentability requirement? Within the The State Office of Industrial Property (SIPO) considering the Law on Industrial Property, examiners will evaluate and accept the invention as new if it is not disclosed in the prior state of the art.

The state of the art means everything that is available in the front of the world public by describing the invention of the written or oral route, using or in any other manner before the date of filing of the patent application in a way that skilled in the relevant field allows to apply. On that basis, the local examiners from the Macedonian Institute should decide whether an invention is new. Typically, they will search the contents of national patent applications with the exception of the abandoned, foreign patent applications (European and international) that are valid or for which protection is validated in the country.

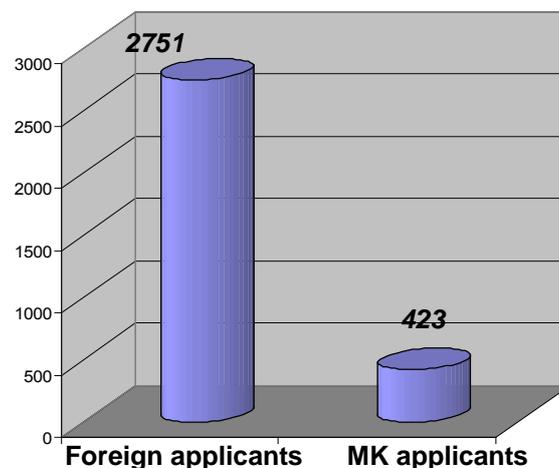
The invention meets the requirement for INVENTIVE STEP if for an expert in the field, the subject of the invention is not obvious from the state of the art. This is a general definition, that will be further explained in details.

INDUSTRIAL APPLICABILITY is the third patentability requirement, which is considered to be fulfilled when the invention is produced or used in any branch of industry. Somewhere, this requirement is considered only as an additional, and it rarely happens not to be fulfilled. It is also the simplest way to determine since it is the most tangible category, and least suspicious to be understood from the examiner. Inventions are material creations that have adequate technical construction or composition, and anyway the idea of creating the invention is to be used in the industry and as such must be produced there.

It is important to note that the Macedonian examiners from the SIPO shall examine only the first and third patentability requirements and if they are met the patent right will be granted but with a limited duration of 10 years. Certainly there is option for prolonged duration of patent right for an additional 10 years, but if on the prescribed time the applicant submits a positive report from the total (substantive examination) of the patent application prepared by the authorized institutions for international examination.

### 3. International protection of the inventions

Macedonian inventors and applicants of the patent applications can (and most often) confer their patent rights in the Republic of Macedonia. The available statistics show that, within the last 7 years, a total number of 423 patent applications were filed before the State Office of Industrial Property by the domestic applicants (inventors). In the same period, the total number of patent applications filed by foreign applicants was 2751. Hence, the share of number of patent applications filed by domestic inventors in the total number of patent applications filed in Macedonia is only 8.6% (Figure 2) [4].

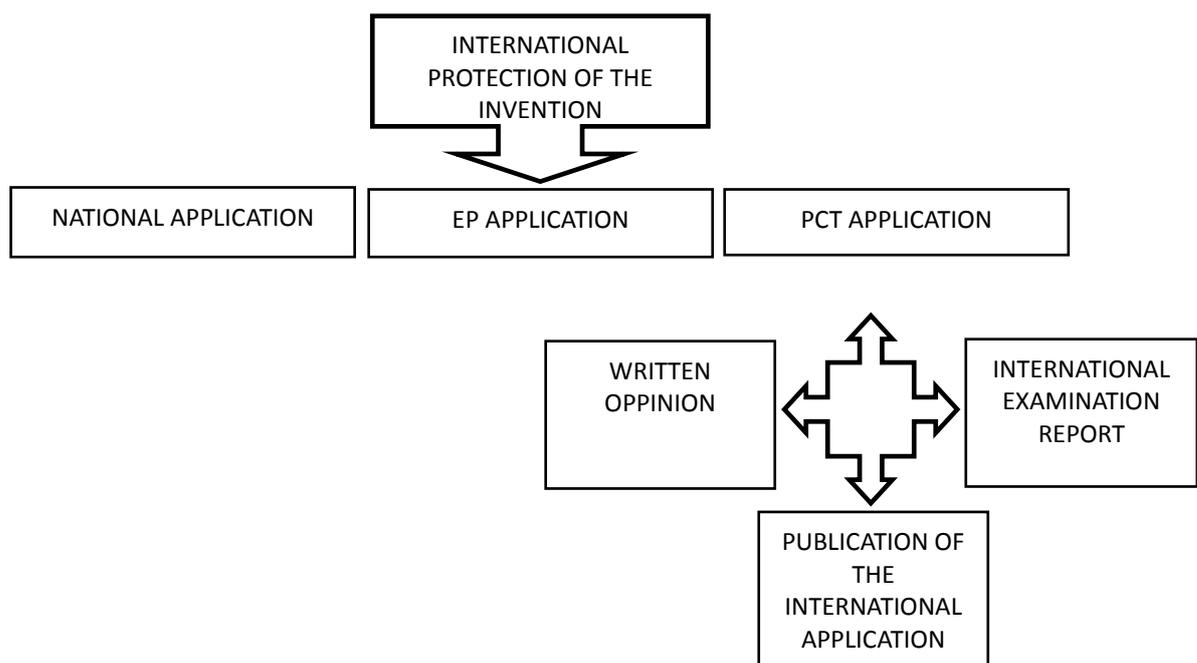


**Figure 2.** Share of patent applications filed by domestic and foreign applicants before SOIP in the period 2002 - 2009

- Benefits of the patent right can also be conferred in foreign countries, wherein patent applications can be filed before the Patent Offices in each country separately or before patent offices of the regional patent organizations. It should be noted that there is no world institution or body that examines patent applications or can grant patents solutions for the right of a patent that will be valid in all countries in the world. Although, this is something that every applicant (inventor) wishes, in economic terms, the reduction of the costs, at this moment that remains only a “sweaty dream”. Therefore, until realization of this dream, the only remaining option for the domestic applicants is international protection, according to: National laws and procedures, wherein the obtained patent rights are valid only in territory of the state where the patent application is filed,
- European patent procedure before the European Patent Organisation (EPO) [5] located in Munich
- Patent Cooperation Treaty (PCT). The procedure is being carrying out before the World International Property Organization (WIPO) based in Geneva. Macedonia is a full member of PCT Union since 10.08.1995. From that date, the domestic inventors could file their international applications through the National IPPO or directly in the Secretariat of this organization.

The first option for obtaining the patent right is mandatory filing of patent application in each country separately, wherein significant costs appear, which increase with each submitted application. The protection of inventions before EPO is a possible option for domestic applicants, but considering the high initial costs for filing the European application, unfortunately, till now, there is no single patent application filed before European Patent Organization by Macedonian private or legal person.

It seems that the filing of patent application under PCT is most popular option for Macedonian inventors. The benefit of the international application is one that provides a unified procedure of filing an international application for protection of invention in any Member State of WIPO (up to now a total of 142 countries). Since acquiring independence of the country, the total number of 60 PCT applications was filed in WIPO by domestic applicants.



**Figure 3** Essential phase of International Protection of Invention

#### 4. PCT procedure

The procedure for filing a patent application under the PCT can be seen in the Figure 3 and it consists two phases:

- International Phase, and
- National Phase.

The International phase begins with the filing of an international patent application directly to WIPO or

SOIP which has the role of receiving office for these applications. Later, in a time period of 9 months after filing the international application the applicant receives the „search report“ performed by an International Searching Authority (ISA), accompanied by a written opinion regarding the three patentability criteria of the invention, being the subject of the application. 18 months after the filing date or the priority date, the international application is published in the gazetta of the International Bureau together with the already performed International Search Report. Since the invention is now disclosed it becomes part of an international patent data base and thus part of the state of the art.

International phase ends 31 months after filing the international patent application as the "National / Regional" phase beginning. This phase is actually a continuation of the international phase, as now the patent application enters in national and regional phase with filing of request in each contracting state. Once again, the PCT application itself does not mean requesting a grant of patent right, and it will not become such unless it enters national or regional stage.

The following are the benefits that can be acquired for domestic applicants (inventors), for the patent right under this procedure:

- Postponing of national or regional phase for a period of 31 months from the priority, that saves considerable amount of money for respective official fees and translation costs for entering in national phase in each country.
- The "Search report" from the "International examination“, the applicant will acquire information concerning the current state of the art and information about any similar inventions patented in the contracting states. Based on this relevant information, the applicant can decide whether it would be worthwhile to seek national protection of the invention in the national stage, and if required, in which countries, which will save on unnecessary costs in those countries where the report showed the existence of similar inventions.
- Many national patent authorities will rely on the international search report instead of starting from scratch to search the prior art themselves, and the applicant may be able to save in search fees as procedure for the recognition of the right to patent these countries is very simplified. As previously noted, International patent application under the PCT procedure is the most popular and most useful way for international protection of invention among Macedonian applicants (inventors). The essence of this paper is to present the biggest obstacles, which are outlined in reports from international research in relation to applications submitted by the Macedonian inventors. Such obstacles certainly limit further protection of the invention, and bring disappointment among inventors.

## **5. Weaknesses in the Search reports form the International Examinations present in the patent applications from the Macedonian applicants (inventors)**

International search reports and the "written opinion" concerning three patentability criterias are performed by the European search authorities based in the EPO branch Office in The Hague. Although the application is submitted in Geneva, further it is distributed in The Hague where the search shall be made and the report and opinion shall be formed. These results, are sent to the applicant.

The „search report“ from the „international examination“ is usually written in two to four pages. The report lists the classification of the subjected invention as well as the class for which the search is performed. The most important part of the report are the cited documents that are considered relevant to the subjected invention. The relevance of the cited document is marked with a category. There are 9 categories beginning with the lowest "A" – referring to documents where the general state of the art is not relevant to the invention up to the highest "&" - that shows invention from the same patent family (same invention but from other inventor).

Table 1 provides a detailed view of the number of appearances in the categories of relevance in 44 international search reports of patent applications filed by the Macedonian applicants (inventors). Only three categories are considered relevant

- Category "A" - referring to the documents, wherein the general state of the art is not relevant to the subjected invention,
- Category "X" - referring to the documents of particular documents which indicate that subjected invention can not be regarded as new and does not involve inventive step,
- Category "Y" - referring to the documents of particular relevance that indicate that subjected invention can not be regarded as new and does not involve inventive step, according to the cited

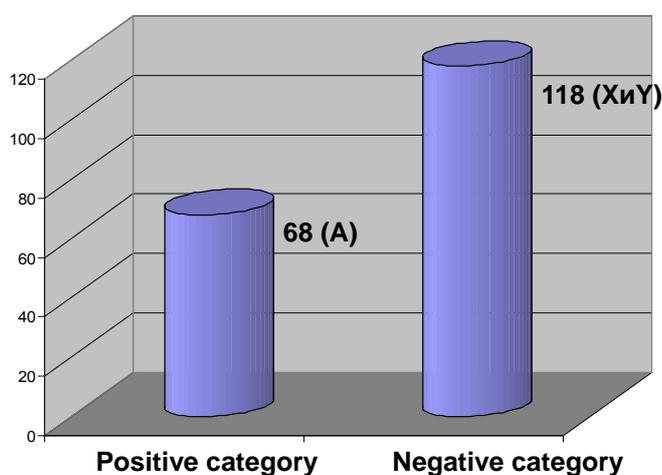
documents, and the opinion of the skilled person for a given technical problem is that the solution from the invention is already known. The remaining categories were not anticipated since their appearance was "one" or "zero".

**Table 1** Number of the appearances in the categories of relevance in international search reports of patent applications filed by the Macedonian applicants (inventors)

Categories	A	X	Y
Number of appereances	68	92	26

It is evident from the Table 1, that category "A" which is considered as positive, indicating that the invention has novelty and inventive step, appears only in 68 cases.

Category "X", which is considered negative and indicates that there is no novelty or inventive step occurs 92 times while the most negative and non desirable category "Y" indicated that there is no novelty, inventive step or even technical problem which resolves domain is already disclosed appears even 26 times.



**Figure 4.** Total ratio between apperaences of positive and negative categories in the „search reports“ from the „international examinations relating the Macedonian inventors

Percentage ratio between positive and negative categories in international reports is 1:2,2. Respectively, one appeared to be positive category is being followed by more than two negative categories. Overall, in examined 44 patent applications only 34% of them or 12 could be considered to have meet the patentability criterias and as such are eligible to be granted the patent, while in the 76% or in 32 international patent applications the „search report“ is **negative** and does not meet the patentability criteria so consequently the patent would not be granted for the invention.

As a conclusion, the fact that the invention subjected to the examination is determined not to be new can be established by its negative categorization in the “International Search Report”. In a word, negative categories in the „search report“ lead to a negative written opinion concerning the first patentability criteria.

The same goes for the inventive step. It was pointed out that the invention would have inventive step if it is not part from the state of the art. The examiner who gives this opinion, at first identifies the most relevant state of the art from the „search report“. If the report is negative, ie prevailing categories X and Y, then definitely what follows is a negative opinion concerning inventive step.

## 6. Conclusion

Given the fact that nothing is perfect, we believe that there is no ideal “International search report”, wherein the invention for which protection is sought will be entirely new and absolutely unknown to the state of the art. There is always a probability that an inventor, for example, in Japan or in Chile, came to the same or similar idea with those one of the Macedonian inventor, as well as the innovation resulted from this invention (patented or published much earlier) or being worked on or thinking about it simultaneously, is already being processed and implemented in the praxes. There are examples in

the world technical history when two scientists came to the same discovery, scientific formula or method at the same time, though never meet or know each another. The point is that, the possibility that sometimes the idea of making a discovery which is equivalent to that of the Macedonian inventor as the invention was patented long ago, should never be neglected..

To summarize, the above negative results regarding novelty and inventive step in patent applications by Macedonian inventors (applicants) are considered to be due to:

- insufficient research of available patent information, and, or
- lack of awareness and poor knowledge of domestic patent applications of applicants with the modern trends of technique.

The following are the recommendations for getting an international report with a better quality, that will lead to a positive opinion on these two criteria:

1. Immediately, after the birth of the idea and before the start of realization to create an invention, it is necessary to search available patent information, which will gain insight into the state of the art in the field of the invention. There are numerous sources that offer online information for searching existing patents and patent applications. Or, by simple entry of a term characteristic for the invention, the internet browser will certainly list the relevant information that will provide to the inventor insight into the state of the art.
2. It is always better and most recommended to consult patent agents who are skilled experts in this area and can instruct and advise inventors about the state of the art of patents in the particular area of interest. The experience of the agent will provide more skilled preparation of patent documentation and representation before national and international institutions.
3. Change the attitude that "nobody else but me is able to create an invention same as mine". Changing this attitude will save money and hassle before being aware that sometimes the idea as a basis for creating the invention is not new. Following this recommendations the applicants (inventors) will have enough relevant information for the guidelines of creation their invention and for making a quality patent application, which will lead to a positive report from the International examination, and also simplifying the procedure for grant of patent in the countries of interest.

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# Performance Appraisal of ERP implementation in South-East European SMEs

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The purpose of this paper is to investigate whether and in which ways South East European (SEE) small to medium-sized enterprises (SME's) are benefiting from the enterprise resource planning (ERP) implementation. The study is based on a survey research and aims to help SME's in this region to take appropriate decisions about ERP implementation. The research is exploratory in its nature. Namely, a survey methodology is used which is cross-checked with personal interviews conducted with the main personnel in the SME's and the ERP vendors. A structured questionnaire was developed to collect the data. The survey of 63 SME's in SEE reveals that most of them have implemented ERP to integrate the existing information system and found ERP implementation beneficial in inventory reduction, customer service improvement and improved communication. Also top management support and user involvement, as well as participation, are found to be the major contributors for the ERP success. A research limitation of this study is that of the scope since it could not get more responses for the period planned, the results are quite encouraging with very good response rate from the SME's, even though the industry-institute is not so strong in collaboration and information sharing for research developments. Other SMEs that are planning to implement ERP in the near future will highly benefit from the performance appraisal of ERP in SEE - SME'S.

## Keywords

Enterprise Resource Planning, Implementation, Performance, Small-to-Medium Enterprises, South East Europe

## 1. Introduction

In the opening up of the economy business era, liberalization, privatization and deregulation have thrown many challenges to SME's in the fast developing economies like SEE region. Compressed product development life cycles, cut throat global competition, rapid change of customers preferences and volatile financial markets have increased the pressure on SME's to figure out effective and competitive advantages to survive and succeed. ERP is often considered as one of alternative solutions for their survival [4].

Until the beginning of – 1990s, SME's in SEE region had operated under much-protected economic regime characterized by limited competition and highly regulated business environment. This business environment had resulted in limited focus regarding the process efficiencies, centralized control structure, highly formalized business settings and lack of professional business practices. However, following the economic liberalization and opening the economy to foreign multi-national companies, SEE SME's have adopted modern business practices and strategies, which can provide a turnaround edge to competition.

ERP system integrates many functional spheres in an organization; it acts as a link through the entire supply chain, aimed at adapting best industry practices in order to provide the right product at the right

place at the right time at the lowest cost. ERP in this case has the ability, once implemented, to integrate all major activities across the organizational departments using an integrated software solution. In fact this can greatly assist the enterprise to carry out its operations in more effective and efficient manner and allow the workforce to interact and collaborate in an environment where information is enabled.

Using ERP, manufacturing firms are linking up with their suppliers and customers located anywhere in the world. Employees are sharing information with each other on time. ERP can accelerate responses to customers' orders and queries, reduced inventory, shorten production cycle time, improvement quality, enforced efficiency of delivery of products and services and strengthen inner coordination [9]. However, after emphasizing on the large-scale firms, the ERP suppliers are now aiming on SME's. Recently many international firms have restricted their operations to partnering only those mid-sized enterprises that are using compatible ERP system. Thus, it becomes important for many mid-sized enterprises to adjust their business models and adopt ERP software that is compatible with the large companies with which they deal. Though ERP is needed in all firms, its implementation is not successful all the time. There are many failure companies that have the resources needed to perform a careful planning and implementation. A mischief that has gained acceptance recently is that ERP's are meant for large organizations. This statement is partially true. The ERP's marketed are expensive and smaller firms cannot afford those [10]. Taking into account the uncertainties in the business environment, most ERP vendors are moving their attention towards SME's by offering cheaper and straightforward solutions that requests this market segment such as ERP system which compact package, flexible pricing policy, new methodologies for implementation and specialized functionalities. The successful evaluation and implementation of ERP in SME's is an important study to know the present status of ERP implementation in SME's and how they are performing. An extended body of literature exists on the ERP selection, its implementation and critical success factors (CSF's) mostly dealing with large-scale companies. As ERP implementation started in 90's, most studies on ERP are found after 90's in the developed European countries and US industries. In contrast very little effort has been made in the fast-developing countries in SEE region. The critical analysis of which will become a guideline for the SME's to extract more benefits from their ERP system and other SME's those who plan to implement ERP in the future. Authors in this study have evaluated and presented the appraisal of SME's who have implemented ERP based on the survey conducted and in-depth interviews with ERP vendors as well as key personnel in the user enterprises.

## 2. Review of Literature

Nowadays many companies have embraced new tools for planning and resource management software systems in order to integrate their processes enhance data integrity to manage better resources. These package systems are broadly classified as ERP systems [1], [3].

Before emergence of the ERP, industries have enjoyed benefits of material resource planning (MRP) in inventory turnover, delivery performance and other benefits, but there are mixed reports when it comes to ERP implementation. Hence, 80 percent of the large industries that implemented ERP, around one-third of such systems failed [2]. In addition a 65 percent of executives strongly believe that ERP systems could be harmful, this perception being buttressed by specific instances of how pitiable implemented ERP systems have contributed to the bankruptcy of many firms [5]. On the other hand there is evidence that indicating the various tangible and intangible benefits of ERP's.

Indeed ERP systems reduce costs by improving efficiency through computerization and augment decision making by offering on time information to the whole enterprise. The result of implementing ERP does not, however always prove successful. In spite numerous problems, small-and-medium sized firms are now also starting to embrace ERP but because of the complexity of system implementation, the efforts may be expensive. Thus, top managers are likely to require an appraisal of the success of the resulting system [7].

Different results lead researchers to evaluate the appraisal of ERP implementation. There are many methodologies developed by the researchers. Some researchers have identified that the balanced scorecard approach may be an appropriate technique for evaluating the performance of ERP system [6], [10]. In addition, Teltumbade [8] noted that appraisal methodologies relying on financial cost benefits utterly fail to apply. There must be a mechanism in order to determine whether ERP is needed and once implemented, whether it is successful [12]. Basically user satisfaction is one principal mechanism for determining system success. Besides, productivity measurement of information technology (IT) investment is very difficult since it incorporates various factors [9].

According to Singh et al. [11], SME's are facing many pressures and constraints due to globalization of markets to sustain their competitiveness. Very few SME's carried out performance appraisal though it is vital and very few recent studies have focused on ERP also. Ngai et al [13] in their study investigated the CSFs in the implementation of ERP across ten different countries/regions. In their 18 CSFs "top management support" and "training and education" were the most frequently cited critical factors to successful implementation of ERP system. Another study conducted by Malhotra and Temponi [14] identified that the best practices of the critical decisions while implementing ERP as project team structure including implementation strategy and database conversion strategy. Nevertheless, comparison of local or global suppliers is critical as well. The more localized ERP system developed by local suppliers is more sensitive to the link between attitude in the direction of change and perceived usefulness. Another issue that must be stated is the organization's preparedness and the emergence of implementation problems.

The empirical analysis on the appraisal of the ERP is rarely found in the literature. Therefore authors in this work aimed to put the empirical results of the survey of SEE region.

### 3. Motivation, research objectives and methodology

In a wide spectrum SME's play an important role in both developed and developing countries. SME's in SEE are no exception because they occupy prominent position planned development economy. Over the years, most ERP suppliers have modified their products so they can suit SME's working environment and affordable prices for them. Authors have attempted to conduct a survey-based research to get insights of performance appraisal of ERP implemented SME's, a progress driver of SEE economy.

The research objectives are:

- to investigate the extent to which SME's are familiar with the ERP concept;
- to analyze the penetration of the ERP in SME's;
- to explore the implementation of the ERP implemented SME's;
- to appraise the performance of ERP implemented SME's ; and
- to investigate the enablers and inhibitors for the success and failures of ERP implementation.

As the research is exploratory in nature, a survey methodology was used and emphasize of the study was cross-sectional with personal interviews of the key persons in SME's. The main issue was to interact with the ERP implemented SME's and to collect the quantitative and qualitative data through structured questionnaire. Out of 170 ERP implemented SME's; the questionnaire was sent to 135 firms. Therefore, only 63 SME's responded with complete filled in the questionnaire, this is shown on the table below.

**Table 1** SEE countries - research participants

Country	Frequencies	Percent
Albania	12	18.8
Bulgaria	10	15.6
Greece	11	20.3
Montenegro	8	17.2
Serbia	9	14.1
<b>Total</b>	<b>63</b>	<b>100</b>

### 4. Results and discussion

According to the findings ERP penetration is very less in SME's and is increasing with very slow pace. Some of the issues regarding ERP implementation in SME's for the SEE region are given below.

#### 4.1 Information of ERP system

The responses concerning the “information about ERP system” revealed that ERP is evolved from basic idea of MRP and manufacturing resource planning. Since most of the firms are not using the production planning, maintenance and most quality management modules that are critical functions in manufacturing. The main purpose that ERP became popular is that of the common modules in the industrial sector that include inventory management, procurement and financial management modules. The ERP implementation in SME’s in SEE region are 90 percent late. Therefore, the respondents have not filled the cost of the ERP which they have implemented. Following up with the respondents, it was found out that either firms want to keep it secret or are unaware about the cost. The cost dealings are done mostly with the top management. Nonetheless, in most firms a team of four-five personnel was formed before implementing the ERP taking two-three key employees, one from each department and IT manager as a team leader.

#### 4.2 Motivation to implement ERP system

These days there are different advanced manufacturing technologies adopted by different enterprises so they can improve the productivity of their organizations. ERP implementation is one of the tools, but the reasons to implement it are different in all companies. The information collated in this study show that 60 percent of the enterprises have implemented ERP “to integrate the existing information system”. In contrast, the reason was the opposite from the employees who wanted to continue with existing system. The second priority was given for replacing “weak existing information system” that gained 40 percent from the responses. In general assumption of the SME’s that ERP is not for them and it is affordable only to the big enterprises, consequently some sort of information systems which were developed by local firms were bought by them. Hence, either MS access format or excel format was their back end. The third priority “replacement of legacy system” scored 34 percent, where as “complementing legacy system” comes as the final priority with 72 percent of the responses.

#### 4.3 ERP benefits

To appraise the performance of the SME’s after implementing; its benefits must be measured. As mentioned earlier that one third of the ERP implementation failed in large firms or expected goals are not achieved. The objective of this part of the survey was to find out whether SME’s are benefited by the ERP implementation and in what aspect benefits are more compared to others. The respondents were asked to indicate their responses on 11 different tangible benefits and 8 intangible benefits. These benefits are present to act as catalysts of ERP success. The summery and analysis of the responses are given below.

**Table 2** ERP tangible benefits

Nr.	Tangible benefits	Most beneficial		More beneficial		Beneficial		No benefit	
		F	%	F	%	F	%	F	%
1	Reduced planning cycle time	41	64.1	19	29.7	3	4.7	0	0
2	Reduced manufacturing cycle time	3	4.7	11	17.2	40	62.5	9	14.1
3	Improved customer service	39	60.9	18	28.1	6	9.4	0	0
4	Decreased lead time	42	65.6	16	25.0	5	7.8	0	0
5	Reduced cost	17	26.6	38	59.4	8	12.5	0	0
6	Reduced inventory	46	71.9	11	17.2	6	9.4	0	0
7	Reduced error in ordering	20	31.3	39	60.9	4	6.3	0	0
8	Increased throughput	36	56.3	24	37.5	3	4.7	0	0
9	Increase in sales volume	7	10.9	17	26.6	33	51.6	6	9.4

Nr.	Tangible benefits	Most beneficial		More beneficial		Beneficial		No benefit	
		F	%	F	%	F	%	F	%
10	Improved competitive position	35	54.7	24	37.5	3	4.7	1	1.6
11	Improved communication	39	60.9	21	32.8	3	4.7	0	0

It is clear from the table 2 that “reduced inventory“ is found out to be as most beneficial factor of the ERP with 46 enterprises responding as most beneficial. The “decreased lead time”, reduced planning cycle”, “improved customer service “and “improved communication” are the next priority with the most firms. The “increased throughput”, “improved competitive position” and “reduced error in ordering” are considered also the areas where firms found benefit to certain extent.

The respondents were also asked to quantify the benefits from comparing the performance with the previous record, but such contemporary records could not be available with them. Nevertheless, this issue was discussed in group meeting with key employees as well as with the ERP vendor’s representatives. The reduction in cost can be combined effect of reducing the manpower cost, decreased lead time, reduction in inventory and so forth. Basically man power is not reduced but keeping the same manpower, the turnover of the firm is increased which results in saving the manpower cost. By computing the proportional increase in manpower cost with the increase in turnover, one can find out the reduction in cost due to ERP. On the other hand, except the tangible benefits there are many intangible benefits as well, that can be seen in table 3.

**Table 3** ERP intangible benefits

Nr.	Intangible benefits	Most beneficial		More beneficial		Beneficial		No benefit	
		F	%	F	%	F	%	F	%
1	Better coordination in between managers	35	52.2	26	38.8	1	1.5	0	0
2	Improved forecasting	24	35.8	36	53.7	3	4.5	0	0
3	Reduced inventory delay	45	67.2	15	22.4	2	3.0	1	1.5
4	Improved decision making	49	73.1	10	14.9	4	6.0	0	0
5	Streamline the business processes	44	65.7	16	23.9	3	4.5	0	0
6	Improved competitive position	58	86.6	3	4.5	0	0	2	3.0
7	Improved communication	54	77.6	9	13.4	1	1.5	1	1.5

It can be seen from the table 3 that “improved competitive position” is the most rated intangible benefit and this is due to the advantage that mostly tasks are fulfilled more accurately from the system. Also “improved communication” gained solid rating from the responded because it is easier when integrated communication is applied. To wrap up, those inhibitors that gained low scores are the main facilitators for failure of the ERP system.

### 3.4 Return on Investment

In the context of possibility to provide for and achieve a meaningful return on investment (ROI) for ERP projects, various aspects measured are summarized in this paragraph. About 40 percent of firms fairly agreed that there were more intangible benefits from ERP; while, very few firm (5 percent) fairly agreed that there were more “tangible benefits” from ERP. However, on the issue “ERP ROI can be computed” and “ERP ROI cannot be computed”, there were more contradictions regarding the respondent’s view. This particular point was always raised with the respondents while interviewing. Some firms respondent that ROI can be computed but is hard to quantify its benefits. Besides few respondents said that ROI cannot be computed as intangible benefits are more as compared to tangible benefits and thus ROI will be less in spite the fact of the utility of ERP beyond doubt.

## 4. Conclusions

The findings show that after completing the ERP implementation in most large firms, suppliers aim to penetrate now the SME's. In our sample data enterprises have local/global ERP. The study also revealed that SEE- SME's are using ERP to integrate several of data everywhere into single software. Almost all firms have reported that they are benefited by the ERP implementation in reducing inventory, decreased lead time, and reduced planning cycle time and improved communication and customer service. Yet, authors feel that SME's are not extracting benefits from ERP to a fullest extent. In addition, there are more intangible benefits of ERP and therefore implementation should not be related with ROI.

The major contributors of ERP success are: top management support, user involvement and participation along with the understanding the ERP concept. In the present time of globalization, it is clear that the survival of the SME's will be determined and must be addressed extensively. Accessing the right information at the right time is the main objective to manufacturers/suppliers so they can operate with lowers cost, with less delivery time, minimum defects by using less resource. The issue of ERP is the need of the moment and thus the need of ERP in SME's is beyond doubt. The fear of SME's about its failure histories is high but this should be tackled intelligently.

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# Identifying Successful Knowledge Exchange Practices between Academia & Industry in University-city Regions: The case of Thessaloniki Greece

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**This paper aspires to contribute to the dialogue on the modes of cooperation and success factors of the knowledge exchange between research and entrepreneurial communities at local level. We present the results of a survey aiming at the identification of successful knowledge exchange practices between academia and enterprises in the wider Thessaloniki area. The results of the survey, combined with the examination of the context within those cases take place; aim to identify relevant best innovation policy practices at local and regional level. The survey constitutes a core activity of the INNOPOLIS project, an Interreg 4C project focusing on the investigation of existing knowledge endowments in university-city regions, the advancement of innovation, and by implication economic development.**

## **Keywords**

Knowledge exchange, knowledge transfer, innovation policy, entrepreneurship, intellectual property

## **1. Introduction**

Universities are an important source of new knowledge creation and dissemination, which is a fundamental element for the promotion of regional development. The transfer of technologies from universities to enterprises is considered to boost competitiveness, stimulate economic growth and increase prosperity [1]. Whereas the benefits of knowledge exchange between universities and enterprises have been documented in various cases, there is still a long way to go considering the identification of the best-suited policy framework for the enhancement of this process, on national and regional levels.

In recent years, a number of contributions have been developed considering the models that describe the process of university to industry knowledge transfer [2], as well as the relative importance of the different channels for its diffusion [3], [4]. In the literature, the transfer of technology has been met as a linear sequence of steps [5], but also, in the framework of informal interpersonal networks and established relationships that promote knowledge sharing and learning [6].

Regarding the potential paths through which knowledge is being transferred; these include publications, network formation, recruiting cooperation in R&D, joint ventures, contract-based research, and consulting. Next to these, people's mobility by visiting conferences and workshops is considered to create social networks and generate knowledge spillovers. A lot of attention has also been drawn in the intellectual property rights (IPR), in the form of patenting, co-patenting, licenses,

and academic R&D valorization. The proliferation of patent-related empirical studies cannot be attributed to its importance as a knowledge transfer mechanism, since it has been proved to represent only a fragment of the total effort [7], but mainly to methodological convenience due to the availability of quantitative data [8]. Finally, a popular mechanism for the introduction of a new technology into the market, especially in industries like biotechnology or ICT, is through the formation of spin-offs. The relative importance of the above mentioned knowledge diffusion channels have been assessed in many empirical studies with, sometimes, contrasting results.

Having identified the possible ways of knowledge transmission, a number of policies have been developed with the aim to stimulate interaction between academia and enterprises and to foster knowledge exchange partnerships. Policies studied include the setting of institutional frameworks favoring technology cooperation and the formation of intermediating organizations, i.e. organizations which seek commercial applications for university research, the development of business incubators as managing facilities in support of new technology-based business [9], the development of technology platforms and virtual innovation environments [10], the establishment of international networks etc. So far, many of these policies have failed to provide a sustainable model for the regional fueling of university produced knowledge and to address the observed inability of European regions to transform top-level scientific research into commercial products, a problem expressed by the Community as 'the European paradox' [11], [12].

Still, knowledge exchange between academia and industry is a highly complex and risky process that often fails due to a number of factors. These factors can be addressed to the particular properties of the knowledge exchanged (tacit-explicit, interdisciplinary, basic-applied) [4] or to the specific context in which the knowledge is developed and transferred, such as the institutional structures (legal framework) or the individual (culture, habits) and organizational (norms, regimes) characteristics of the stakeholders involved [13]. The latter also include firm characteristics that influence its ability to learn and utilize externally generated knowledge, such as the level of 'connectedness', or the firm's 'absorptive capacity' [7], [14]. Finally, it should be added that empirical evidence shows large differences in the way knowledge is being exchanged in different countries, universities [15], sectors [16], and types of industrial knowledge bases (analytical, synthetic, symbolic), a fact that requisites the disposal of a wider set of policy measures that should be taken according to the circumstances.

The complex, interactive and mutually benefiting activity in which new knowledge is being transferred to and utilized by enterprises can be seen as the central function of a 'university-based innovation ecosystem' [17], comprised by a number of components which interact with each other and work cooperatively in a specific/local environment. Apart from the main players at the two ends of this process (universities and enterprises), in this web of interactions are also included technology transfer and liaison offices, financial organizations or even governmental institutions. In this context, it is crucial to identify a set of national or regional good practice policies for the enhancement of knowledge exchange and network creation that would match the regional structural conditions and fit to the specific properties of different ecosystems.

## 2. The INNOPOLIS project

The survey presented in this paper constitutes a core activity of the INNOPOLIS project (funded by the INTERREG IVC Programme of the European Commission). The main idea of the INNOPOLIS project is to realise the potential impact of the mobilisation and valorisation of the existing knowledge endowments in university-city regions towards the advancement of innovation, and by implication economic performance. More specifically, the project aims to enhance the process of knowledge exchange between universities and enterprises with the support of local/regional authorities, with the aim of facilitating knowledge co-creation & innovativeness. The main methodology of the project consists in the identification of regional and national best policy practices that foster knowledge exchange as well as the creation of networks and learning tools that support best policy transfer. INNOPOLIS focuses on localities of high academic concentration (at least three multi-departmental universities and 60,000 students) which are labeled as "university city regions". The metropolitan area of Thessaloniki is a "university city region" identified in Greece [1], which hosts 3 public Universities, one of the biggest public research institutes and a number of public and private academic and research organizations, concentrating more than 100,000 students in total. A mapping of the knowledge exchange between these institutions and companies in the area has been attempted though the examination of 35 best practices of knowledge exchange between academic institutions and enterprises.

### 3. Methodology

The best practices survey was conducted by interviewing thirty five researchers and company representatives that have been engaged in knowledge exchange activities during the past three years. The survey focuses on identifying the details of existing knowledge transfer collaborations between academic institutions and companies. The participating researchers and company representatives have already been active in knowledge exchange at least once. In this sense, this was not a statistical survey of how much knowledge exchange is taking place between academia and industry in the region, but rather provided an in depth understanding of what the two sides of the exchange are expecting, how they interact and what is the added value they gain from the exchange.

Table 1 depicts the type of companies that participated in the best practices survey. It should be noted that the majority of the surveyed companies belong to the ICT sector, which can be explained by the fact that ICT companies are knowledge intensive companies coupled by the fact that Thessaloniki has a very dynamic ICT sector and also is the home of important ICT academic units. The existence of incubators among the companies was a predictable finding since Thessaloniki has the highest incubator concentration in Greece. Finally the participation of associations of companies underlines the crucial intermediary/facilitator role in KE practices that these organizations play, especially regarding the initialization and the sustainability of the practice.

**Table 1** Type of companies participating in the survey.

Sector	Number of companies
ICT	20
Consulting	2
Manufacturing	4
Energy	3
Retail	1
High tech incubators	2
Other services	1
Associations	2

The participating Higher Education and Research organisations are shown in Table 2. As expected the biggest University of Thessaloniki (Aristotle University) holds the bigger share, followed by CERTH which is one of the major public research centres in Greece. It is worth noting that a number of companies have knowledge exchange relations with academic institutions outside of the wider Thessaloniki and Central Macedonia area.

**Table 2** Academic institutions participating in the survey.

Name	Location	Number of cases
Aristotle University	Thessaloniki	18
CERTH	Thessaloniki	5
CITY College	Thessaloniki	3
TEI of Thessaloniki	Thessaloniki	2
University of Macedonia	Thessaloniki	1
SEERC	Thessaloniki	1
University of Patras	Patras	1
University of Thessaly	Volos	1
TEI of West Macedonia	Kozani	1
Mediterranean Agronomic Institute	Chania	1
Perrotis College	Thessaloniki	1

Thirty five pairs of interviews (one at the company, one at the academic institution) were held based on a pre-defined open questionnaire which was structured around the following issues:

- Description of the knowledge exchange practice
- Characteristics of the organisations involved in the knowledge exchange

- Type of knowledge transferred / exchanged
- Formal aspects of knowledge exchange
- Benefits of the knowledge transfer / exchange
- Risks along the knowledge exchange
- Key success/failure factors & policy for the knowledge exchange

## 4. Discussion of results

### 4.1 Key motivators

The factors cited by the two parts of the KE practice as motives that encourage the engagement in such activity, vary depending on whether the viewpoint is academic or business. Table 3 presents a collection of the most important of them.

**Table 3** Key motivators of knowledge exchange.

Academia	Companies
Establishment of a market	Financial benefits
Exploitation of research results	Benefits of working with experts
Ability to use in practice and improve knowledge that has been designed in the institute's labs.	Identification of entrepreneurial opportunities
Contribution to the society	Development new products and improvement of existing products
Ensuring practical experience for their students	Easier goal achievement through the use of academic knowledge
More and better academic publications	Use of universities' infrastructures
Gain specific expertise from companies	Acquire knowledge and know how in a specific field that will open new markets
Publicity and dissemination of research results	Explore the possibility of fruitful co-operation with academic teams
Practice new research on fields of interest	Development of human capital

### 4.2 Type of knowledge transferred / exchanged and IPR issues

The majority of the cases (52%) involved transfer of knowledge from academia to the companies. Still a significant percentage (34%) involved reciprocal knowledge exchange and a smaller one (14%) transfer of knowledge from companies to academia. In the cases where knowledge was transferred from academia to companies, this involved highly technical and scientific knowledge in various fields (i.e. atmospheric physics, image processing, 3d modeling, genetic analysis, photo-electro-chemistry) while in the cases where the company disseminated the knowledge towards the university, the knowledge transferred was market oriented knowledge and included i.e. market intelligence, production technology, costing techniques, marketing, branding and product management. The majority of the knowledge created in academia has been "produced" through the core activities of universities/ research centers such as research and teaching activities. In many cases, those activities were part of projects funded by EU or regional/national programmes and initiatives. However knowledge transferred from companies to universities was mainly acquired through market perception, product development and marketing.

Focusing on the recipients of knowledge, it is interesting to note that about 50% of the cases indicated the existence of previous related knowledge in the organisation, approximately 30% answered that there was limited previous knowledge and not sufficient for their operational needs, and 20% claimed that they didn't have any relevant knowledge prior to the KE practice.

Around 40% of the KE cases involved the transfer of intellectual property (IP) and in most cases an intellectual property agreement was in place. It has been noticed that in some practices that involved IP, there was no agreement signed and on the other hand, in cases where there was no issues of transferring intellectual property, an IP agreement was signed. This can be explained by the level of

confidence build between the two parties as well the general mentality and procedures of the organizations involved.

### 4.3 Benefits and risks of the knowledge transfer / exchange

The main benefits of the KE practices are differ significantly for academia and companies and can be divided in 4 categories: Financial, Knowledge, Image and Networking. The following tables describe the main benefits for the two types of organisations involved:

**Table 4** Main benefits for academia

<b>Financial</b>	<b>Knowledge/ know how</b>
<ul style="list-style-type: none"> <li>• Increased income</li> <li>• Easier access to research funds</li> <li>• Creation of extra professional opportunity to researchers</li> <li>• Financial support for travel / conferences / staff mobility</li> </ul>	<ul style="list-style-type: none"> <li>• Testing and improving research results</li> <li>• Getting precious feedback from the market</li> <li>• Increase of theoretical and practical knowledge</li> <li>• Training material and workshops designed and implemented based on the results of a KE practice.</li> <li>• Re-usage of knowledge gained in other fields and areas</li> <li>• Involvement of students in the KE practice procedures</li> <li>• Gaining experience on how to bring purely scientific knowledge closer to the market</li> </ul>
<b>Image / prestige</b>	<b>Networking</b>
<ul style="list-style-type: none"> <li>• Academic publications</li> <li>• Publicity, fame and market appreciation</li> <li>• Recognition of the role of the university towards the society</li> <li>• Professional recognition for the university's labs and teams</li> </ul>	<ul style="list-style-type: none"> <li>• Development of new contacts</li> <li>• Gain complementary knowledge regarding the market, entrepreneurship etc</li> <li>• The participation of an organisation in a project, often brings the participation of the same organisation in new projects</li> </ul>

**Table 5** Main benefits for companies

<b>Financial</b>	<b>Knowledge/ know how</b>
<ul style="list-style-type: none"> <li>• Creation of new product/service</li> <li>• Gaining a competitive advantage</li> <li>• Expansion to new markets, which were not accessible without the implementation of the KE practice</li> </ul>	<ul style="list-style-type: none"> <li>• Gain of know-how</li> <li>• Reuse of knowledge gained</li> <li>• Experience gained by the co-operation with high skilled scientists</li> <li>• Participation in R&amp;D proposals</li> </ul>
<b>Image / prestige</b>	<b>Networking</b>
<ul style="list-style-type: none"> <li>• Improvement of corporate image and prestige</li> <li>• Publicity</li> <li>• Creating value that can be transformed into a business opportunity</li> </ul>	<ul style="list-style-type: none"> <li>• New contacts</li> <li>• Enhancement of the relation with the University for further co-operation.</li> <li>• Networking for further participation in new projects</li> </ul>

Knowledge exchange practises involves also risks that the participants were ready to point out. The major risk that both universities and companies have taken in consideration is the possibility of wasting time and effort with no tangible results. This risk is considered the most important inhibitor for sustaining knowledge exchanges between universities and companies. For that reason, most of the KE practices take place in the framework of EU and other funding programmes that provide for the reduction of the financial risk. Other risks that were common to both academics and companies include the risk of not reaching the desired results, the potential problems due to potential copyright infringements and the possibility of losing the goodwill between the parties. On the other hand academics pointed out the risk of potential disorientation towards entrepreneurial oriented activities while companies were afraid that failure to deliver might affect their image.

#### **4.4 Key success and failure factors**

Key success factors for a successful KE practice can be identified for the organisations and the people involved. At the level of organisations, the quality of the counterpart organisation plays a significant role. Flexibility, readiness to deal with bureaucratic procedures, clear setting of objectives and roles, having realistic expectations and identifying early the expected benefits for both sides are also important. Finally, existence of previous related know-how, frequent and smooth cooperation and respect towards agreed procedures are also considered as valuable assets in KE cooperation.

At the level of individuals, it is important to establish good communication at a personal level, to assign experienced staff and to make available open-minded, professionally skilled people. The most important success factor though is trust and this has to be build on a personal level.

Other key success factors include higher management commitment, the necessary time frame given to the KE practice, the careful selection of partners and the geographical proximity.

On the other hand, factors contributing to the KE failure are the state bureaucracy, involvement of third parties, unwillingness to cooperate, lack of time, last minute changes to KE practice objectives and the excessive focus on maximizing short term financial gains.

According to academic institutions, the most important barriers for cooperation are the high cost of the cooperation, the lack of trust between potential partners and the lack of appropriate partners for conducting a KE practice. Other barriers reported are the shortage of time, difficulties in communication, bureaucratic obstacles, the lack of devotion of partners to the KE, lack of geographical proximity with large companies and lack of cooperative mentality within their own organisation.

According to the companies the major barriers for the conduction of KE practices are the high cost involved and the lack of knowledge of market needs by the universities. The latter is explained as a possible reluctance on behalf of the academic community to get involved professionally with the private sector. Other barriers include the absence of a mechanism that will bring researchers and industry closer together, the knowledge gap (or complete ignorance) on the part of the private sector about the research activities and results produced by the universities within the region and the lack of incentives for universities to liaise with the industry.

## **5. Conclusions**

Knowledge exchange between academic institutions and enterprises is a complex activity that involves high risk and is build upon trust. The survey confirms the existence of a variety of paths towards knowledge exchange that may or may not involve IP agreements and the importance of informal networks and good interpersonal relations. It also underlines the need for more focused policies that will take into account the large differences in the way knowledge is being exchanged based on country, sector and cultural specifics, minimize the inherent risk involved and focus on creating sustainable human networks.

The survey demonstrates that successful experiences tend to be repeated and become sustainable after a number of repetitions. The benefits as well as the direction of the knowledge transfer are often reciprocal, with the academic institutions benefiting from market knowledge and entrepreneurial approach of the companies, as much as the latter benefit from the new research results and knowledge stemming from the earlier. From the point of view of the participants to the KE exercise, it is important to proceed having recognised the risks involved and be clear about the expectations of both sides. It is also important, for anyone involved, to recognize from the beginning the fact that this is a long process that might not yield immediate tangible results but it is one that when pursued consistently brings benefits in the long run.

Based on the results of this survey, the key elements of a successful “university-based innovation ecosystem” as defined in [17] would be:

- Building of mixed teams that will allow for a continuous flow of ideas and knowledge between the researchers and the enterprises based on trust.
- Designing and implementing strategies and policies that will encourage exchange and minimize risks.
- Involve liaison/ intermediary mechanisms that will recognize the expected benefits, reduce bureaucracy and allow the involved parties to engage with flexibility.

- Taking advantage of EU and other funding mechanisms, viewing them not as short-term financial incentives for both sides but as tools to build sustainable relations that will yield major reciprocal benefits in the long term.
- Defining clear and flexible strategies on IPR exchange that will protect knowledge but also make it available for mutual benefit.

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# SDI-EDU for Regional and Urban Planning: Innovation training and education tools

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Planning and mainly spatial planning has relation about the spatial dimension of development. It concerns not only the architecture work, but mainly where people live and work, like the location of social and economic activity. Also, the way in which resources that we possess in limited supply, how much are exploited so as to achieve socio-economic objectives. The SDI-EDU project aims to transfer former experience from EU research projects dealing with education in Spatial Data Infrastructure (SDI) spatial planning as Humboldt and Naturnet Redime towards planners in European Regions and municipalities. The project will use innovating educational methods that can combine methods of distance learning vocational training, e-learning and knowledge sharing that will allow transferring the experience and teaching how to deal with SDI spatial planning for real users. The project will also transfer newest research results from Humboldt Project and it will transfer it into research courses. The SDI-EDU project aims to support training focused on spatial planers. The SDI will be extended in the frame of the implementation phase of the INSPIRE Directive (General framework for a SD) for the purposes of European Community environmental policies and policies or activities which may have an impact on the environment). It will run until 2019. For two years, SDI-EDU will support training of responsible people to set up and use some of these services according to the specific problems of the EU regions in local and regional level. Thus, the project will let the regions participate actively in the implementation of the INSPIRE Directive and enter into the modernity permanently. The acquisition of these best practices is irreversible and will create a new demand of new services. The SDI-EDU project aims to participate in the creation of interregional education portal which will be a crucial element of the implementation of European INSPIRE Directive. The European regions, provinces and municipalities will use the results of SDI-EDU to promote their cultural and socio-economic heritage and will find the SDI useful to the regular management joining their territories to the others from Europe with the ambition to exchange the knowledge between all the regional identities. In conclusion, the SDI-EDU project will be presented before explaining the different education and training tools with their roles. The last part analyses the added value of this project for target groups in the regional spatial planning.

## Keywords

Urban planning, Spatial Data Infrastructure, INSPIRE directive, cooperation, education, training.

## 1. Introduction

The geographical information takes an important place in studies and projects in relation with the regional and urban planning. It represents 80% of the general information and they are inevitable for making studies of spatial planning. It is particularly demonstrated at the European level for the

INSPIRE directive application. This Directive aims to build a geospatial database having a relation with the environment themes in the 27 countries of the European Union.

The content of the INSPIRE Directive is complex and that explains the needs of facilitations to help clearly the planners. It is important to support planners and people in relation with the geographical data. They must understand how to apply correctly this directive for the planning projects.

The SDI-EDU is a Regional and Urban Planning project and it was accepted by European Commission within the Framework of the Leonardo Da Vinci – Multilateral Projects/ Transfer of Innovations Program.

The project aims to improve the quality of the European Vocational Education and Training system by adapting and integrating innovative content of results from previous Leonardo da Vinci or other innovative projects into public/or private vocational training systems and companies.

This project has been programmed for 24 months with a beginning on October 2009. It regroups 10 partners in 6 countries of the European Union. The University of West-Bohemia is the project coordinator.

This project permits the former transfer experience from E.U research projects dealing with the education in SDI and Spatial Planning towards planners in European Regions and municipalities. It will use innovative educational methods of distance vocational training, e-learning and knowledge sharing. They will be available by the public services and companies for the national frameworks.

The project objectives are presented successfully and firstly about the former transfer experience from European projects.

It presents the SDI-EDU project in a second part as an innovative project using educational technologies. Finally a last part presents knowledge transfer experience from SDI-EDU to the final users which have a role in the national spatial planning.

## **2. The SDI-EDU project aims to transfer former experience from EU research projects dealing with the education in Spatial Data Infrastructure (SDI) spatial planning**

### **2.1 State-of-Art**

A first step is to build a state-of-art in relation with the theme of Spatial Data Infrastructure, Regional Planning and INSPIRE Directive. It is an important phase before the building of the future SDI-SDU computer system. The SDI-EDU project is based on implanted methods from the Humboldt and Naturnet Redime Projects. This application demands cooperation with companies but not only.

This State-of-Art concerns the following aims:

- Cooperation with others projects at the construction level.
- Analysis of active examples on the territories for the application of methods and tools of SDI construction based on the INSPIRE Directive.
- Analysis of ready tools and data sources available to be used during the training for the SDI construction.
- Preparation of materials from previous experiences with tools and data to contribute at the SDI-EDU project.

### **2.2 Requirements guide of the training environment**

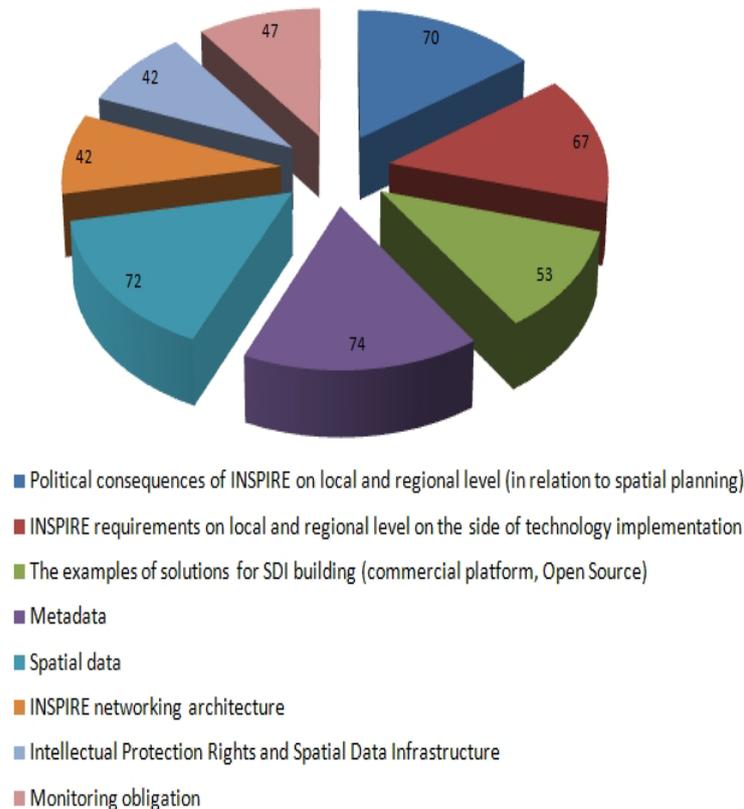
It is necessary to have a Guide for the collection of user requirements. In fact, it is not possible to imagine what the requirements for each final user are. So, it is important to create a questionnaire diffused in different organisms having a relation with each project partner.

This questionnaire shows the principles themes of the possible training:

- Political consequences of INSPIRE on both local and regional level (in relation with the spatial planning)
- Inspire requirements on the local and regional level from the technological point of view
- The examples of solutions for SDI building
- INSPIRE, spatial data and spatial planning

- INSPIRE networking architecture
- Intellectual property rights and Spatial Data Infrastructures
- Monitoring Obligation
  - + Practical examples (*how to*)

This guide is available in multiple languages. It shows a respect towards each partner for a better comprehension and efficient results. The results are in the following scheme:



**Table 1** Scheme about the results of the questionnaire in relation with the needs of training for the final users (120 respondents).

From this scheme 1, the spatial planners seem to be interested by the following themes:

- Political consequences of INSPIRE at the local and regional level (in relation with the spatial planning)
- Inspire requirements on local and regional level from the technological point of view
- INSPIRE and metadata
- The examples of solutions for SDI building

The state-of-art and guide is a first step for the final users in order to aim the objectives.

### 3. USE OF INNOVATIVE METHODS FOR TRAINING

#### 3.1 Tools used for training sessions

The used tools for the training sessions are principally issued from computer technologies and they allow the former transfer knowledge. Uniform Resource Management (URM) and WIKI are two of them. The users have an access to the tools that they are a part of a Spatial Data Infrastructure. The

tools are a theme for the training system. The used material for the training is linked to the SDI and its name is Computer Assisted Educational Processes (CAEP).

### **3.2 Uniform Resource Management (URM)**

The SDI-EDU project permits the capabilities transfer by a portal hosted based on services using the Web Semantic methods (<http://portal.sdi-edu.zcu.cz>). This portal uses the GIS, e-learning platform, CAD (computer aided design) and the virtual reality. All the necessary material for the training sessions is published on the project website.

### **3.3 Computer Assisted Educational Processes (CAEP)**

The tools permit to help users for an education by innovating technologies like an e-learning platform. For example, the Biz-biz tool has been developed by one partner of the SDI-EDU project.

This tool is one open web browser based on tools for the e-conference, cooperation, the training and it supports presentation (slide shows), website browsing, pre-recorded video display, chat and online discussion with a web camera. The on-line video, website and presentation are dynamic with the explanations of the users. They are downloaded for a future training. The training contents have been created with the help of metadata and they are implanted in the metadata catalogue for a greater access to the information and data. The Biz-biz tool has been developed by the Mathematics and Computer Institute (IMCS) of Riga. It is available on this website: <http://bizbiz.ccss.cz>

## **4. REGIONAL AND URBAN PLANNING WITH HELP OF THE SPATIAL DATA INFRASTRUCTURE FOR THE FINAL USERS**

### **4.1 Training completed from real users and specialists.**

The training sessions are 17 lessons with common themes: the INSPIRE directive, spatial planning and Spatial Data Infrastructures:

- SDI – importance, awareness and its role in spatial planning
- INSPIRE directive and mechanisms for its application
- Transfer of the INSPIRE directive in the national law
- Application of the INSPIRE directive and innovation in the European project.
- Consequences of the INSPIRE directive in the national context
- Application of INSPIRE in the national environment
- Laws, rules, practises, methodological institutes and cooperation
- Metadata, catalogs for/in spatial planning
- Spatial data – Approach of the INSPIRE directive in spatial planning
- Use of software in spatial planning
- What is necessary to make with the spatial data; having a relation in spatial planning and have compliant with the INSPIRE directive?
- How can we find, appreciate, choose and use heterogenic spatial data and metadata?
- How to create a new spatial metadata in order to be compliant with the INSPIRE directive?
- How to manage and to improve the existing metadata in order to be compliant with the INSPIRE directive?
- How to create new spatial data in order to be compliant with the directive INSPIRE?
- What is seems harmonization of geodata?
- Important and special cases in countries

## **4.2 Cooperation with others projects**

The SDI-EDU project is setting up by a cooperation with other research European projects that use geomatics technologies. This is the case for the HUMBOLODT and the PLAN4ALL projects.

### **4.2.1 PLAN4ALL project**

The SDI-EDU project can re-use contents and materials from the PLAN4ALL project (source: <http://www.plan4all.eu/>).

The spatial data was used in this project and has been referenced in the themes of the Annex II and III of the INSPIRE directive. Aims of the PLAN4ALL project:

- Promotion of the Plan4all project and the INSPIRE directive in countries, regions and communities ;
- Creation of one profile metadata for the spatial data in relation with the spatial planning ;
- Creation of a standard of the data in relation with the spatial planning.
- Creation of one network architecture for the exchange and the centralization of spatial data and spatial services in spatial planning ;
- Certification of a metadata profile, data modelization and network architecture on local and regional level ;
- Installation of a European Portal for the spatial data in planning ;
- Data and metadata production in local and regional level.

These results can be inserted directly in the training sessions of the SDI-EDU project. They are in relation with the subjects of metadata; INSPIRE directive and use of spatial data in spatial planning.

### **4.2.2 HUMBOLDT project**

The Humboldt project has like a mission the creation of a European SDI (ESDI) with an implantation of spatial data disposed by a lot of European organizations. It aims to improve the number of users of this ESDI.

(Sources: <http://www.esdi-humboldt.eu/home.html>). The main objective of this project is to contribute for an harmonization of the spatial data.

### **4.2.3 Nature Net Redime project**

The main aim of the NaturNet-Redime project is to support a sustainable development of the knowledge in relation with the permanent evolution and to provide the training. They concern the social, economic and environmental capacities for the strategic application of the sustainable development in the European Union.

(Sources: <http://www.naturnet.org/>)

One of the axes for the realization of this project is concerning knowledge and training by the use of tools like the GIS and virtual image tools.

## **5. CONCLUSION**

The SDI-EDU project concerns an innovating opportunity from previous research European projects. They are linked to the use of geospatial data and tools that permit a great use of them.

It illustrates a path of the future INSPIRE directive application in different European projects. The comprehension of setting up this directive for the spatial planning work is complex. It is a reason that explains why the SDI-EDU project aims to promote the indispensable tools to the users and to local organizations, so as to overcome the technical and theoretical difficulties.

The ten partners concentrate their knowledge and capabilities to provide to the final users the tools and materials. They permit them to gain more knowledge for a best understanding of the European directive. This is a crucial step for his application in all European scales.

By an external cooperation with different European research projects, this project has an important source of material about the new technologies of information and communication. It refers the development of innovative tools based on GIS, computer design and in virtual reality for a better comprehension from the final users of this directive.

In conclusion, it is important to refer the results of this project because they will be transmitted to the final user (that is in relation with the spatial planning affairs) in order to assure the correct application of the INSPIRE directive with a final aim of a better equality between the territories.

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# With the right idea to leadership of a regional cluster of suppliers

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Technological and green entrepreneurship are today's driving factors for many Small and Medium Enterprises (SME's). In our paper we present the Ydria Motors d.o.o. company case study which produces semi products for household appliances. The company is a part of ebmpapst international Group and focuses on new products due to environmental standards and logistic services. In the Slovenian regional area the company is important member and cofounder of supply cluster. Now cluster consists of 27 companies from different parts of Slovenia, which are divided into three groups: material suppliers, service providers and suppliers of tools and equipment. Most of the cluster members are smaller companies. Much attention is devoted to education and mutual knowledge.

Knowledge and development will provide needed supplier base cluster, which together with Ydria Motors Company will become an important factor in the supply chain, especially for the companies of household appliances in the EU and beyond.

Within our survey we stressed the influence of implemented management standards on the products, people and society. The survey question is: Which performance indicators (PI) should be measured to fully fulfill the strategy and what are their causal relations? Preliminary results are indicating the benefits and opportunities for improvements on the field.

## Keywords

Causal relations, Granger test, management standard, stationarity, technological entrepreneurship

## 1. Introduction

Ydria Motors d.o.o. (YM) company produces small electrical motors and fans and is one of the leading players in the industry of motors for home appliances in Europe and in the world in terms of quality, quantity and flexibility.

The company was first located in the vicinity of the 500 years old town Idrija known as one of the largest mercury mine in the world and famous for the Idrija lace. It developed from the former plant of Iskra from Železniki, which later became Iskra Rotomatika, then Rotomatika, part of which finally became Ydria Motors. Due to problems with space, the company decided in 2002 to find a more suitable location and moved to Podskrajnik, the Municipality of Cerknica.

The company is wholly owned by the company ebm-papst from Landshut, Germany with a wide spread sales network all over the world. YM exports as much as 95% of its production and only 5% is sold on the Slovenian market. In 2006 it established a new international logistics centre which is in charge of accepting materials and dispatching equipment from the parent company in Landshut and Mulfingen and distributing products directly to end buyers. It is also a system supplier of electrical motors and fans for key large customers – producers of top-class home appliances e.g. AEG, Electrolux, Bosch-Siemens and Miele.

The company manufactures more than one thousand different end products, differing in terms of appearance and integration options (drying and washing machines, refrigerators, fan and microwave ovens, independent fans).

The company follows the principle of contributing to the social responsibility with care for people, society and environment in which it operates. Therefore, sponsorships and donations are an essential

part of YM operations. Above all, company support activities that are in any way connected with our employees and investments in the area where the employees come from. YM also support sustainable impacts on the environment and the society and the activities based on voluntary work. Thus the company fulfils part of its social responsibility, its values and care for the future [1]. The company, according to its development, is facing questions about its future organic growth. Thus, the company faced the challenge of setting PIs', which are the central theme of our research.

Analysis of researches, documents and records and processes KPI's values indicates the latter's significant influence on the company's strategy fulfilment. Analysis of many qualitative and quantitative researches about KPI implementation performed all over the world indicates the general favourable influence of KPI's on the strategy fulfilment of organizations [3], [4], [5], [6] [7], [8]. Namely, a recent trend in companies' performance valuation is the increasing emphasis on the intangible, qualitative and non-financial perspectives [19].

## 2. Literature review

Balanced Scorecard (BSC) or key performance indicators (KPI) origins date back to the time when the management of organizations generally rely on short-term perspective and taking into account historical data, which represented mainly financial indicators [2], [3].

Gradually, the need arises to take into account perspectives such as customer satisfaction, the internal process perspective and the perspective of learning and growth. In nineties of the last century, the consideration of various perspectives of business operations and associated financial and non-financial indicators has become an important topic of practitioners, experts and researchers.

On the basis of cause - effect relations between these four perspectives can be completed long-term strategic goals of the organization. This can be achieved by the degradation of vision and strategic objectives of the organization on a set of causally related performance indicators (PI), which represent financial perspective, customers and internal processes and learning and growth perspective. Suchlike set of indicators should be cascaded across all levels of management so as to promote understanding of the objectives of the organization from the perspective of managers and all employees [4], [3], [5], [6].

As a rule, are determined PIs' from past experience, and by regularly reviewing. Where appropriate, expands range of PI is confirmed, and some of them are also being phased out.

It is necessary to clarify why we measure, what and how often we measure, before we decide how to measure [17]. Managers should be first asked questions about what they want to achieve, what their objectives are and how they describe them. Therefore, we begin to set up the system of performance indicators by consensus of managers regarding the description of their goals in four aspects. This will facilitate the determination of measurement as well as changing the PI themselves and the sources of data [7], [8], [5].

Historically, the processes in the organizations were investigated mainly qualitative, verbal and linguistic. Previous research in the field of business processes have been predominantly performed with the data within a short time period.

Meanwhile, the longitudinal and dynamic researches for developing theories in this area are very rare. An example for updating the research methodology could be the theoretical physicists (e.g. Einstein), who think in the context of mathematical equations. Thus, the mathematical tools are appropriate to increase the exactness of the conceptual and empirical research. Completion of qualitative research business processes with statistical tools hold great potential in this area. Namely inclusion of the process approach and methodology of longitudinal treatment of business processes makes very important addition to the conceptual thinking of researchers [9], [10], [11].

Given the framework of the strategy map, which consists of four perspectives, and within them a large number of related strategic objectives, it is considered that business processes added value is increased by indirect and mixed in mutual relations. Added value in business processes is manifested in the form of chains of cause - effect relations from nonfinancial and quantifiable PI in the learning and growth perspective, all to the results in customers' perspective [12] and financial perspective [13].

Since we do not know exact lawfulness between the observed variables, or PI, which were taken into account, in addition to the available literature, researches and documents and records we especially took into consideration information's contained in the time series of observed variables (PI).

Already through the observation of linear regression between pairs of variables or PI we can presume causality, which is then confirmed by Granger causality test [14]. It should be noted that from the literature review so far we did not found any similar case study.

### 3. Methodology

Purpose of our research is to explore and clarify the cause - effect relations between PI. This will give us a basis for understanding these relations and understanding about the relations between business strategy and operations at all levels. In this quantitative research the influence of the measured process PIs' on the company's strategy fulfilment is discussed. As a research method was chosen case study [15] of the YM Company which is based on the following criteria:

- Environmental management system ISO 14001 certificate is received in 2000,
- Quality management system ISO 9001 certificate is received in 2003, and
- Family-friendly company certificate is received in 2010.

Documents and records were studied closely and included analysis of public available data from company's documents and records and web sites. Observations were performed during research which is still being continued in its preliminary phase. Data for the model testing, application and analyses were gathered in August and September 2010.

The main research question is: Which performance indicators should be measured to fully fulfil the strategy and what are their causal relations?

### 4. Empirical findings and discussion

Due to limited space, we present only some of the findings of calculating a linear relationship to the selected PIs'. To calculate the model parameters were collected PIs' of the company. All variables represent PIs' that are monitored by the company annual reports which are submitted to the company owner, ebmpapst Landshut. The PI used are: production volume of the three selected products, sales quantities of the three selected products, total production, total sales, number of production workers and the number of supervisory workers. Performance indicators used were ten in total.

We analyzed linear relationship between pairs of PI during the period from January 2004 to July 2010. The analysis was carried out in the manner that:

- the relations between the indicators are linear,
- we considered scatter diagrams and,
- linear regression was calculated between pairs of selected PI.

In general, the degree of linear relationship and the variance between the performance indicators is medium to high (e.g. from  $EM25S = 0.8886 \times EM25 + 139087$  and  $R^2 = 0.3141$  to  $EM21S = 1.0136 \times EM21 + 1677.3$  and  $R^2 = 0.9527$ ), as a result of numerous factors.

One of the most important is the quality and consistency of the data used since the time series are based on monthly data. In addition, production has been subject to instability, such as the impact of the global crisis in the period from 2007 to 2009, from which the company bear the consequences even today. All these factors affect the quality of the identified linear relationship between PI. For this purpose, we continued analysis of the empirical testing of the causal relations between PI.

#### 4.1 Stationary test

We first performed a stationarity test (see Table 1). Stationarity means that the time series has its mean and variance constant during the observation period and the value of covariance between two time periods depends only on the lag between the two periods [16]. Stationarity was tested to confirm that there is no spurious regression between the PI.

**Table 1** Stationarity test.

PI	T1	T2	T3
EM21	0.223554	-3.499143	-2.504887*
EM25	1.062103	-2.387780*	-0.702753*
EM30	-1.423983*	-1.987317*	-2.313793*
EM21S	0.342541	-3.100907*	-1.696859*
EM25S	0.766911	-2.768304*	-2.751491*
EM30S	0.561337	-2.356120*	-1.251995*
TOTALPP	0.736998	-1.905930*	-1.426430*
TOTALSP	0.810399	-1.650425*	-1.595853*
PRODW	0.418330	-2.019898*	-1.548013*
SUPRVW	1.078856	-1.701756*	-2.274803*

Note: values marked with an asterisk \* means stationary time series; T1 stationarity test - None, T2 stationarity test - Trend and Intercept; T3 stationarity test - Intercept. Selected critical value of t statistics is at 10% level.

EM21, EM25 and EM30 are numbers of produced pieces; EM21S, EM25S and EM30S are numbers of sold pieces; TOTALPP is total number of produces pieces; TOTSLSP in total number of sold pieces; PRODW is number of production workers; SUPRVW is number of supervisory workers.

Based on the stationarity test (see Table 1) we formed twelve causal relations. These relations were defined on the basis of the relations between business processes: e.g. (1) Production of product EM21 may be related to quantity of sales of this product EM21S, (4) Production of product EM21 may be related to the total products quantity produced TOTALPP, (6) the quantity of product EM21S sold may be related to the total quantity of products TOTALSP sold, (9) the number of production workers PRODW may be related with the total quantity of produced products TOTALPP, etc (for more see Table 2).

#### **4.1 Causal relations between performance indicators**

Selected relations were tested with Granger causality test in the statistical software Eviews 7.1. Each test was performed by taking into account the different periods between successive values of PIs'. Thus, we considered the period from 1 month in the first test to one additional month for the next test, all the way to 24th months in the last test (i.e. 1 month, 2 months, 3 months, etc., up to 24 or 25 months). In Table 2 are the causality test results for the period between the selected indicators, which include 1, 2, 4, 6, 10, 11 and 12 months.

Our results show that between the production of EM30 and sale of EM30S there is a statistically significant causal relationship where EM30 is the cause and EM30S the effect. Under certain conditions, as a statistically significant are causal relations between the rest of the PI: e.g. TOTALPP and EM21, EM25 and TOTALPP, TOTALSP and EM25S, etc. Very interesting is also a causal relation between the number of production workers PRODW and the total quantity of manufactured products TOTALPP, and the total quantity of products sold TOTALSP and the number of supervisory workers SUPRVW. Other examples of where it was possible to identify statistically significant causal consequent relations can be seen in Table 2.

**Table 2** Causal relations.

	<b>Causality / lags</b>	<b>1</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>10</b>	<b>11</b>	<b>12</b>
1	EM21S → EM21	0.7847	0.8635	0.8237	0.6640	0.7281	0.6404	0.6343
1	EM21 → EM21S	0.1366	0.4978	0.4069	0.1934	0.5990	0.5740	0.6596
2	EM25S → EM25	0.8764	0.4744	0.5094	0.8323	0.2889	0.2665	0.2102
2	EM25 → EM25S	0.1823	0.3729	0.3982	0.4621	0.7219	0.6143	0.8404
3	EM30S → EM30	0.6385	0.7059	0.4329	0.6018	0.6345	0.1622	0.0931
3	EM30 → EM30S	0.5029	0.5727	0.3215	0.3971	0.0247*	0.0243*	0.0021*
4	TOTALPP → EM21	0.5537	0.0967*	0.1482	0.5114	0.6442	0.4692	0.2689
4	EM21 → TOTALPP	0.9849	0.7746	0.9641	0.7109	0.7999	0.4441	0.3021
5	TOTALPP → EM25	0.0173*	0.2028	0.5809	0.1751	0.1579	0.2034	0.0099*
5	EM25 → TOTALPP	0.4394	0.4020	0.5806	0.5152	0.6464	0.7866	0.6707
6	TOTALSP → EM21S	0.7107	0.0456*	0.1594	0.2737	0.2519	0.2156	0.1428
6	EM21S → TOTALSP	0.4949	0.6679	0.8037	0.8399	0.8219	0.6301	0.4070
7	TOTALSP → EM25S	0.0002*	0.0046*	0.0112*	0.0133*	0.0071*	0.0055*	0.1223
7	EM25S → TOTALSP	0.0029*	0.0235*	0.3211	0.1124	0.0823*	0.0685*	0.2924
8	TOTALSP → TOTALPP	0.5284	0.2765	0.2664	0.7528	0.2953	0.0666*	0.2908
8	TOTALPP → TOTALSP	0.8138	0.2709	0.0276*	0.1056	0.0605*	0.0153*	0.4670
9	TOTALPP → PRODW	0.2030	0.1904	0.1334	0.1344	0.0239*	0.0438*	0.0404*
9	PRODW → TOTALPP	2.E-06*	8.E-07*	7.E-05*	3.E-05*	0.0012*	0.0077*	0.0607*
10	TOTALSP → PRODW	0.2739	0.2689	0.1925	0.1927	0.0582*	0.0322*	0.0589*
10	PRODW → TOTALSP	2.E-07*	3.E-06*	8.E-05*	5.E-05*	0.0020*	0.0056*	0.0733*
11	TOTALPP → SUPRVW	0.2533	0.2529	0.1568	0.1011	0.1162	0.0634*	0.0180*
11	SUPRVW → TOTALPP	0.0023*	0.0418*	0.4030	0.6281	0.2116	0.3334	0.2674
12	TOTALSP → SUPRVW	0.3461	0.1151	0.1909	0.1053	0.0878*	0.0627*	0.0164*
12	SUPRVW → TOTALSP	0.0002*	0.0189*	0.3836	0.5569	0.5843	0.7191	0.2662

Note: values marked with an asterisk \* means a causal relation between PI provided by the Granger test. The necessary conditions for causality, is that the cause happens before the effect and contains unique information about the latter [18].

In the case of production of EM21 and EM25 products, it was not possible to identify causality with their respective quantities sold EM25S and EM21S. This fact can be seen as recognition by the Granger test that it is the same entity, i.e. produced quantity of product EM21 and quantity of sold product EM21S and in the same manner EM25 and EM25S. Which opens up further research sub-questions in the context of causality and what relations we should add into the consideration in the further analysis? Based on preliminary results we will further develop our case study research methodology with its qualitative dimension.

## 5. Conclusions

From this preliminary test of causation, we come to important conclusions. The first is that the PIs' are systematically monitored and that the resulting data are consistent and suitable for further study. The second observation relates to the period from 2004 to 2010 which covers the information about causality contained in the time series in the long term and is crucial for determination of causality [14]. In addition, in the data is captured the impact of global crisis on the company. The third finding relates to the fact that the company has opportunities for improvement in the field of relations between the PIs. Which consequently enables support to the company's management in taking a leading role in cluster of supply companies. A recent trend in companies' performance valuation is the increasing emphasis on the intangible, qualitative and non-financial perspectives [19]. As we can conclude from analysis of many qualitative and quantitative researches about KPI implementation performed all over the world, which indicates the general favourable influence of KPI's on the strategy fulfilment of organizations [3], [4], [5], [6] [7], [8].

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# The National Policy Mixes of the Republic of Macedonia toward European Research Area

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The competitiveness of small countries economies mainly comes from their ability to develop and internationalise their R&D and innovative systems and to create knowledge that can be transferred in successful products. The national policy mixes have the crucial role in achieving these objectives.

Research, education and innovation are three central and strongly interdependent drivers of the knowledge-based society. In the last few years, the need to better coordinate activities within the knowledge triangle (education – research – innovation) both at national and at international level has been spelled out repeatedly in several policy documents in the Republic of Macedonia, but the implementation has remained slow. A wide range of initiatives are taking place within individual parts of this triangle without systematic consideration of interactions between the three parts, which leads to non consistent policies. To make the triangle fully functional a smooth flow of information and knowledge has to be guaranteed thus leading to complementary activities and policies.

The main objective of the paper is to present and to assess the national policy mixes of the Republic of Macedonia in the perspective of the Lisbon goals and the Europe 2020 strategy. The assessment will focus on the national R&D and innovation targets, the national policies and investments into R&D and the articulation between research, education and innovation. The methodology that will be used is primary based on the framework recommended by EC, and is adopted by all countries monitored through the ERAWATCH initiative in order to ensure the comparability between countries.

## Keywords

Policy Mix, R&D, Innovation, European Research Area, Republic of Macedonia

## 1. Introduction

The importance of determining optimal policies towards R&D and innovation is immense, given the worldwide interest in their fostering [1]. The importance of R&D and innovation as main factors of sustainable growth in highly industrialised economies is undisputable, especially on the background of the structural shift from resource-based economies to modern knowledge-based economies [2]. Advanced economies see innovations that fuel IT and “New Economy” as a major goal to partake in the processes associated with the current wave of innovations, and therefore their interest in R&D policy is immediate and pragmatic [3].

EU Member States are aware that enhancing their economic performance and responding to societal needs will require R&D policy to be placed in a broader context and to be developed in coherence with other policy fields. The most apparent approach is the link with the innovation policy, but other policy domains are also taken into consideration by national policy makers, such as industrial policy, education policy or fiscal policy [4].

Since the Republic of Macedonia became a candidate country in 2005, European Research Area (ERA) and ERA-related policies have been integrated into the main national research programmes. In order to support the integration of the Western Balkan countries, a consortium representing organisations from 14 European countries including all Western Balkan countries was formed in 2004 and launched the Southeast European ERA-NET (SEE-ERA.NET). The importance of the R&D policies for Macedonia should not be neglected, especially when the outcome of the R&D can improve

the competitiveness of the country. However, R&D policies are, by their very nature, medium to long term, implying that a proper assessment can be made only over such an extended time horizon. Therefore, it is important to assess whether appropriate policies are supported towards reaching those objectives (even if, of course, to assess their effectiveness more time is needed).

The objective of this paper is to present a summary of relevant information on R&D policies in Macedonia and in second part to make evaluation of the R&D policies through the lenses of strategic ERA objectives.

Furthermore, in this paper the strengths and weaknesses of the Macedonian research and innovation systems will be evaluated from different perspectives: the integration of Macedonian researchers into European labour market of researchers; participation of Macedonian researchers in the European research infrastructures; strengthening the research organisations; identification and supporting of the Macedonian national R&D and innovation challenges.

## 2. Main features of Macedonian R&D and innovation system

The Republic of Macedonia was granted a candidate country status for EU membership in 2005 (total population of the country is 0.41% of EU population and 0.6% of the EU total surface area). Those shares do not correspond to the overall level of economic development having in mind that in 2008, Macedonian GDP represented only 0.054% of EU GDP, the GDP per capita was only 13% of the EU-27 average. Country's total spending in R&D or GERD was €15.08m (only 0.006% of EU 27 GERD or as a percentage of GDP, GERD was 0.225% which was significantly lower than the EU 27 average of 1.85%)[5,6]. The Republic of Macedonia for example lags significantly behind not only to Slovenia (1.45%), Czech Republic (1.54%), Estonia (1.14%) and Hungary (0.97%) as recently accepted members, but also when compared to candidate countries, Croatia (0.81%) and Turkey (0.72%). [5,6]. One can distinguish three levels of the R&D and innovation system of the Republic of Macedonia: policy, operational and performing. The main ministries involved in R&D and innovation policies, the Ministry of Education and Science (MES) and the Ministry of Economy (ME) are responsible for the operational level. The main work for developing and administering Macedonia's science and innovation system is performed in the MES to the phase of the prototyping of the products and services. This is fully focused on both research policy and all levels of education. Other ministries with a focus on their specific sector-oriented responsibilities are also active in the field of research and innovation policies such as the Ministry of Information Society, the Ministry of Agriculture, Forestry and Water Management, the Ministry of Health, the Ministry of Environmental Protection and the Department for European Integration.

On the real performance level main subjects are faculties and public research institutes, as units of the five state universities, with the biggest university, "Ss. Cyril and Methodius" in Skopje, comprising 56% of the total research and teaching personnel in the country or 71% of the total research and teaching personnel in the state university sector for 2008 [6]. According to the methodology for providing R&D figures, public research institutes are considered as part of the government sector. The Macedonian Academy of Science and Arts (MASA) is the second biggest player in the sector considered as a part of the government sector. Consequently, the government sector is the largest R&D performer in the country with 40% of the total GERD, while the higher education (HE) sector is the second largest R&D performer with 31.1% of total R&D expenditures (in 2008) [6]. The private universities that employ 20% of the total research and teaching personnel are small research performers with marginal participation in the R&D activities as they mainly perform educational activities.

Important R&D performers are R&D units in the industry sector and the different forms of science-industry cooperation like technology parks, business start up centres and incubators, as they perform 28.9% of the total R&D and participate with 37.4% in total R&D funds [6]. The main actors in the business sector are big companies. Intramural business expenditures represent 77% of the total funds provided by the business sector [6]. We should stress out that the growth of business expenditures is the main positive structural change in the national R&D system. For example, in 2003 the Republic experienced the lowest level of business expenditures as a percentage of GDP, only 0.003% [6]. The main reasons for the lack of business sector R&D finances were the prolonged privatisation processes and the economic problems that the country has been facing since its independence in 1991. However, from 2003, intramural business expenditures have been increasing, achieving 0.065% of GDP in 2008, whereas the total business expenditures rose to 0.084% [6]. Still, undoubtedly significant increase of business R&D expenditures was not accompanied with a permanent increase of GERD. Quite the opposite, the absolute minimum for GERD was achieved in 2007 ( 0.175% of GDP)

[6]. In 2008, GERD was increased to 0.225% of GDP, because of increase in both private and public funds [6]. For 2009, it is known that the economic crisis significantly decreased public funding (GBOARD was €4.26m when compared to €6.92m in 2008) [7]. The conclusion is that in Macedonian relative R&D expenditures are much lower than the EU 27 averages in total R&D expenditure (1.85% of GDP) and business R&D expenditures (1.21% of GDP) [5,6]. Therefore, the Republic of Macedonia urgently strives for major increase of both public and private investments in R&D in order to narrow the gap between the country and EU 27.

### 3. Recent R&D policy changes in the Republic of Macedonia

The legal framework for scientific research and technological development in the Republic of Macedonia is made of five laws: Law on Scientific and Research Activities, Law on Encouragement and Support of Technological Development, Law on the Macedonian Academy of Sciences and Arts, Law on Higher Education and Law on Industrial Property. The country still doesn't have a separate national R&D and innovation law. Therefore, the main policy development directions for the R&D sector are part of the general programmes of the Government of the Republic of Macedonia and in the policy documents for HE. In the Programmes, the government has defined a long term strategy for promotion of knowledge, in order to stimulate young people to get to a HE diploma. In these programmes, the government promotes science as an important factor for economic development. It needs to be noted that the economic decline because of the crisis has influenced the implementation dynamics of some R&D policies. On the other hand, the Ministry for Education and Science has been engaged in a more proactive approach toward science, R&D and education through new measures, like equipping laboratories for scientific research.

Recent policy changes with the highest impact expected are the changes in the Law on Higher Education adopted in August 2010, and the programmes that directly target the goals, measures and priorities of the Industrial policy of the Republic of Macedonia for the period 2009-2020. By the new rules on HE, the public universities must allocate 40% from students' tuition fee to R&D activities. It is unpredictable to estimate the direct financial effects these measures will have on the R&D budget, but it is obvious that with €47.4m in 2010, the self-financing budget segment available for the HE sector is higher than public GUF as self-financing represents 55% from the total budget for the HE sector [8]. Regarding the involvement of the business sector in R&D the MES increased the government participation for R&D projects proposed by the business community through programme for technological development (from 30% to 50%).

In 2010 the Decree on Norms and Standards for Establishing Higher Education Institutions and Performing Higher Education Activities was adopted that defines the criteria required for recognition of a HE institution and the performance of scientific research. One of the mandatory requirements is the involvement in the educational process of professionals with experience from the business community. The Industrial policy for the Republic of Macedonia 2009-2020 involves programmes oriented towards support of R&D and innovation in different industrial sectors. The programmes of the industrial policy 2009-2020 that have direct impact are those for support of the textile industry, development of Clusters' Associations, development of entrepreneurship, competitiveness and innovation of SMEs. For successful implementation of specific programmes, the Government will have to double the annual budget costs for competitiveness of the industry, by increasing the designated budget from 0.43% of the national budget in 2008 to 0.85% in the years to come [9].

In the last two decades, it was hard to recognise a specific fiscal policy that supported the R&D sector in the country. Fiscal policy instrument that indirectly supports R&D investments is a zero corporate tax on all profits that are re-invested into company development. This policy does not differentiate between R&D and other investments, but it encourages all profit-oriented companies, including private universities, to reinvest the profit for their development. A clear step is made towards direct fiscal policies by exempting VAT for purchases made with funds from EU projects.

In this direction as a part of the Programme of the Government of the Republic of Macedonia 2008-2012, the government developed a "Higher Education for All" policy with the long term strategy goal to have 25% of the population with HE. To achieve this goal and enable a larger group of students to enrol at universities, in 2008 the government opened a new university in Shtip and dispersed studies of faculties located in other cities with low tuition fee. Furthermore, in 2009 the government opened the University for Information Science and Technology in Ohrid with the intent of becoming the leading ICT university in the region. Although not clearly covered with a specific measure, the government has stated that it will stimulate the return of Macedonian professors from abroad to teach in their home country.

Another set of measures refers to providing scholarships and other funds for students. The complete costs are covered for students that will enrol into PhD or master studies at one of the top 100 world universities or top 20 European universities from the Shanghai Jiao Tong University ranking. In a similar competitive selection process the MES is awarding scholarships for under-graduate, post-graduate and doctoral studies at local universities.

To get more researchers exchange Republic of Macedonia is part of the Euraxess Jobs Portal (formerly known as Mobility Portal) and Euraxess Service Euraxess Service Network (formerly known as the ERA-MORE network). The participation of Macedonian researchers in EU programmes is strongly encouraged and is considered as one of the most important potential for human resource development. Research mobility is mainly achieved through bilateral agreements between universities and through EU programmes, such as Erasmus Mundus, Marie Curie, CEEPUS, NUFFIC, DAAD, etc. Furthermore, the signed Memorandum for Cooperation between the main universities and chambers is expected to strengthen their cooperation on R&D projects. Furthermore, in 2010 the government made a decision for a compulsory 30 days internship in a company or government institution for all students, which is in line with the objectives of the National Strategy for the Development of Education in the Republic 2005 – 2015. We don't think that this plan is feasible having in mind the scope of economic activity in the country and the capacity of firms that are prepared to accept internships.

A few policy developments were initiated by the State Office for Industrial Property in 2009 which improve the protection of intellectual property and promote innovation markets and regulations. A new Law on Industrial Property entered into force in 2009. The new solutions in this law refer to further harmonisation of legislation with international agreements of the World Intellectual Property Organization (WIPO), particularly the Patent Law Treaty and the Trademark Law Treaty. Hence, the procedure for implementation of industrial property protection is simplified and benefits are introduced for the users. At the end of 2009 the Parliament of the Republic of Macedonia passed the Law on Ratification of the Patent Law Agreement, adopted by the World Intellectual Property Organization. The aim of the agreement is to harmonise, simplify and improve the formal procedure of submission of national and international patent applications. In 2009, the Government of the Republic of Macedonia passed the Strategy for Intellectual Property of the Republic of Macedonia 2009-2012 and Action Plan of the activities for operational implementation of the Strategy.

According to the new Law on Public Procurement, 70% of the public procurements have to be done electronically or through e-auctions in 2011 which will additionally encourage the public and private entities to implement the electronic public procurement system.

Starting from 2005, ERA and ERA-related policies have been integrated into the main national research and innovation policies and programmes. Some of the EU targets and priorities are set as national goals, and some are adopted according to the capacity of the national research and innovation system. What is common for all national targets is that their realization relies on cooperation and openness of the national research programmes in the ERA framework. The dedication of the country towards ERA is also manifested through delegated country representatives in European Strategy Forum on Research Infrastructures (ESFRI) and the following European research bodies: European Research Area Committee, the European Strategy Forum on Research Infrastructures and the Steering Group on Human Resources and Mobility.

#### **4. The instruments and targets of the national policy mix**

From 2008, the Government has communicated a high degree of commitment for strengthening R&D and innovation.

The main directions of the current research policy were introduced with the Programme of the Government of the Republic 2006-2010. The focus is on improving the scientific-research infrastructure, support through fiscal policies, and promotes the internationalisation, knowledge transfer and cooperation with foreign scientific-research institutions. More focused research policy goals are specified with the Law on Scientific and Research Activities and with the Law on Encouragement and Support of Technological Development, both adopted in 2008.

The oldest measure for encouragement of private R&D investments, by co-financing R&D and innovation projects in the business up to 50% of the total value of the project, is strengthened by new measures and instruments based on the Industrial Policy for the period 2009-2020, Programme for Developing Entrepreneurship, Competitiveness and Innovation in SMEs and changes in the Law for Higher Education.

The main instruments of the policy mix, along with their specific goals are the following:

- Co-financing R&D and innovation projects up to 50% of their value stimulates greater R&D investments in R&D performing companies;
- The policy developments in the protection of intellectual properties, along with financial support for patent applications and support by several fiscal measures are expected to have impact on innovation;
- Co-financing of business incubators and clusters and business centres, through the programme of the ME promotes the establishment of new indigenous R&D performing firms;
- Innovation Voucher counselling scheme stimulates firms that do not perform R&D yet;
- Financing international projects attracts R&D performing companies (and universities) from abroad. The establishment of Technological–Industrial Development Zones can attract foreign companies to invest in the country;
- The mandatory involvement of industry professionals in the universities' educational and R&D activities, along with government support for university start-up centres and centres for transfer of technologies are supporting extramural R&D by the business sector in close cooperation with the public sector;
- Institutional funding of scientific public research institutes through block grants and for specific projects, and equipping laboratories for scientific research and applicative activities, increases R&D performance in the public sector.

The objectives in all policy documents and programmes for development of the national R&D system in the period 2002-2010 are focused on increasing R&D investments, adoption of EU goals, and integration of the national R&D system into the European research system. National R&D targets for GERD and BERD (Business expenditure on R&D) were set for the first time in the Programme for Development of Scientific and Research Activities for the period 2006-2010 at 1% of GDP for GERD and 0.36% of GDP for BERD until the end of the period [6]. Still, in 2008, the government proposed a more ambitious national R&D target to increase the R&D funds for 35% per year, which in essence was a target in accordance with well known EU goal of 3% of GDP for R&D. The GERD as a percentage of GDP was increased from 0.175% in 2007 to 0.225% in 2008 [6]. For 2009 there is no official data for this target, but due to the global economic turmoil it is difficult to expect that. In reality, the country is still far away from both targets.

There are numerous barriers that jeopardise the achievement of R&D investment goals. According to the official statistics, only several companies have considerable investments in R&D. Specialised research and technology organisations and agencies with the capacity to enhance the number of innovative business entities, including SMEs are still lacking. Only one company comprises 88% of the reported intramural business R&D expenditures in 2008. Unfortunately, the general impression is that there is low awareness among companies that investments in R&D could be the main driver for improving their competitiveness. Out of 1367 researchers in the country in 2008, only 15 researchers were employed in the business sector and the companies lack employed researchers on a permanent contract [6]. Having in mind that business sector performs 29% of the total R&D in the country, it is obvious that either the quality of statistical data is not very good or additional in depth analysis is required to clarify this issue. Another inconsistency with official business sector R&D data for 2008 is the zero reported funds by business sector from government and from abroad. The business sector received some funds from projects financed by EU, but they are really small compared to the funds received by HE and governmental sector. In EU 27 the biggest share of the funds from abroad are used by the business sector (75% in 2006) [5]. The conclusion is that the Macedonian companies are not competitive enough for international funds, which is another big barrier for fulfilling the R&D investment targets. The links between HE and the business sector are weak. The main reason is lack of finances for R&D and innovation programmes, not only because the GERD as a percentage of GDP is very low, but also because the country has a very low level of GDP per capita. Furthermore, the direct fiscal incentives are missing while the direct foreign investments are very low.

The research infrastructure in the Republic is in an indigent state. Research laboratories are primarily located in MASA and at the public universities and institutes. In the business sector small number of businesses has established research laboratories. This is a result of modest investments in research infrastructure in the past two decades. Even more, most of these investments were result of international projects initially financed through various donor programmes.

Internationalisation of company activities is a key factor for the success of any small economy. According to a survey conducted in 2008 [9], the main market for Macedonian companies is the domestic market (55.2%), followed by neighboring countries (2.2%), EU countries (17.3%) and rest of the world (5.2%). As expected, it is not surprising that only 11.3% of SMEs have introduced new products or processes either in-house or in combination with other firms [10].

The structure of the economy relating to export is not favourable, since Macedonia's share of high tech exports for 2008 was 4.7% of EU average [9]. Foreign Direct Investments (FDIs) as very important driver for the internationalisation of the R&D and innovation system of the small countries, like Macedonia are not even close to satisfactory. Since the country's independence in 1991, the FDI inflow per year has created only a small portion of the Macedonian GDP. FDI inflow has been mainly realised through acquiring existing companies that were positioned as a monopoly on the domestic market. Under these circumstances, the foreign investors have not expressed more than a nominal interest in making additional R&D, innovation and technology transfer investments [11].

## 5. Assessment of different policies within the knowledge triangle

The general characteristic of the Macedonian research system is its underfunding by both private and public sectors. As a consequence, low quality of the produced knowledge, the presence of brain drain and low demand for knowledge from the private sector, are the biggest challenges for the policy makers. Additionally, according to the SSORM, in 2008 the business sector reported zero funding from the government and from abroad. Although it is obvious that current data is inconsistent with previous reports, both statistics confirm the passive role of the business community within the national R&D and innovation system.

In the period 2008-2010 the Government had set very ambitious R&D goals, but these goals have not been supported by appropriate measures. In other words, due to the unfavourable situation of the R&D system, instead of individual, isolated measures, a set of coordinated measures is needed in order to achieve the objectives. The financial support is lacking. This is obvious with policies that affect all knowledge domains: demand, production and circulation of knowledge. In 2010 some very ambitious measures were promoted like new quality criteria in the HE sector and dedication to stop brain drain process. Unfortunately, they are not supported with clear financial measures. Also, new research laboratories valued 10 times higher than the Government Budget Appropriation for R&D (GBOARD) for 2009 are promoted. However, until these measures are realised, no real effects in national R&D and innovation system could be discussed.

The Macedonian economy is a small open economy where exports and imports account for a considerable part of GDP. In 2010, employment in high-tech manufacturing sectors and knowledge-intensive services as percentages of total workforce were 4% and 4.7% respectively [10]. Similarly, the exports of medium and high-technology products as a share of total exports were only 0.98 in 2008 [10].

In the last decade the number of researchers and R&D employees in the Republic has fallen for 30% on average, with very sharp decrease of 70% in the business sector [6]. The number of researchers (FTE) per 1000 population in the Republic of Macedonia was 0.37 in 2008, whereas the EU 27 average for 2007 was 3.01 [5,6]. From the presented statistics it can be concluded that the overall decrease in the number of researchers for the period between 2000 and 2008 is a trend that has already existed before the latest crisis, primarily because of the under-funded R&D sector.

Since two thirds of researchers are employed in HE and HE in the country is the main supplier of potential researchers, the policies that refer to HE have the biggest influence on the balance of demand and supply. The supply of potential researchers is relatively low when compared to EU 27 averages, with new doctorate graduate per 1000 population aged 25-34 set at 0.4 for the country and 1.6 for EU 27 [5,6]. Furthermore, there is no inflow of researchers from abroad. Conversely, the demand for potential researchers with a PhD in the HE sector has increased, due to the many new HE institutions opened by the Government and the private sector.

Low salaries for researchers, along with the low availability of cutting-age research infrastructures, make the domestic research market unattractive for foreign researchers. On the contrary, foreign research markets are very attractive for domestic researchers because of the working conditions and higher salaries. As an outcome, since its independence the country has experienced brain drain. The government has tried to prevent brain drain and repatriate researchers that leave the country through political measures. However, the main reasons for brain drain still exist.

The quality of the knowledge produced by the HE sector in the country is not on an acceptable level. Not a single Macedonian university is ranked in the first 1000 positions on the world ranking lists with good reputation. Also the mobility of students and professors is very limited, due to the fact that there is almost no possibility to study/teach on English.

According to the National Science Foundation statistics, the total Macedonian scientific and engineering article output growth in the period 1995-2007 is very modest and the maximum of the

country's article output was achieved in 2001, when it was 68. (The output is measured as contained in the journals tracked by the Science Citation Index (SCI) and Social Sciences Citation Index (SSCI) [7]. In the period between 2007 and 2010 Macedonian organisations have shown the biggest interest for the FP7 inter-governmental scheme. They have participated in 271 eligible proposals, with 45 proposals retained for funding with a total amount of €7.47m [7]. With a success rate of 17%, the country has achieved the average rate of South Eastern European countries, which is lower than the EU 27 average success rate of 21% [7].

The Republic of Macedonia has been a member of EUREKA since 2008. In this period the Republic has been involved in seven projects in the fields of Industrial Manufacturing and Materials and Bio Sciences and Technologies. According to the total national value of the projects of €0.98m and number of participants until October 2010 [7], the performance of the Republic of Macedonia in this programme is worse than those of Serbia and Croatia [7].

The bilateral international cooperation is one of the main instruments for international cooperation as evident from the signed agreements for cooperation in the area of education, science and technological development. In the period from 2006 to 2010, the MES realised a total of 99 scientific research projects, and gave 42 scholarships based bilateral agreements with ERA countries [7]. From a total of 99 projects, 67 projects are with EU countries with total value of €0.676m and 32 projects with non-EU countries with total value of €0.351m [7].

The main changes and issues in the research policies are increased governmental participation from 30% to 50% for R&D projects proposed by business community through a Programme for technological development; mandatory spending of HE on R&D from their self-financing budget; and decreased GBOARD in 2009 for 38% when compared to 2008 [8].

The strength of these recent changes is that the business entities now have more stimuli to perform R&D activities. This can subsequently increase the business share in the total R&D funding of the country. Also the HE – industry linkages are encouraged, which are very weak at the moment. The absence of separate research policy, along with a lack of quality R&D data, could create a situation where the policies are not based on well elaborated analysis. Furthermore the small R&D funds in absolute terms (very low GERD as percentage of GDP, along with a very low GDP) are still a strong weakness of R&D in Macedonia.

The biggest number of policy changes is made in HE. The strengths from this can be twofold. First, providing researchers with diploma from foreign prestigious universities, and second the quantity and quality of tertiary and doctoral graduates could be increased. Still, the following weaknesses should be taken in account. Changes in quality criteria can cause decrease on some quantitative figures, which are anyway much lower than EU 27 averages (number of tertiary and doctoral graduates). Regarding the human resources aspects the frequent legislative changes can cause uncertainty among researchers and universities regarding long term human resource policies. The increased number of HE institutions in a very short period could have a negative influence on the quality of the education process. Also, without clear and significant financial incentives for foreign professors and researchers, the very low average salary in the country is a barrier for spreading out the inflow of foreign researchers and professors and probable return home to our scientist now working abroad.

The developments in the policies for Intellectual Property and Public Procurement contribute towards promotion of innovative markets; harmonisation of national legislation with European legislation; and simplification of the procedure for submission of national and international patent application.

The recent policy changes address the following ERA objectives:

- Ensure an adequate supply of human resources for research and an open, attractive and competitive single European labour market for male and female researchers
- Increase public support for research
- Increase European coordination and integration of research funding
- Strengthen research institutions, including notably universities
- Promote structural change and specialisation towards a more knowledge - intensive economy

## 6. Conclusion

The presented analysis and assessment of the Macedonian knowledge triangle effectiveness is based on related laws, policies and measures as well as on available statistical data and published studies along with our own estimations. The general conclusion is that the Macedonian research and innovation system is still very weak, reflecting in reality the state of the national economy. Fast improvement of the current level is not possible, but with appropriate measures and active policy measures positive changes can be recorded on mid term.

According to the recently adopted main governmental policy documents, R&D, innovation and HE have the highest priority and are regarded as the main drivers for the development of the national economy. However, the main weakness of the adopted policies is the insufficient financial support from the public budget, weak and inactive private sector, unfavourable structure of the national economy and the export and low level of FDI.

The Macedonian research system is underfunded by both private and public sectors and GERD as a percentage of GDP was 0.225%, in 2008, which is one of the lowest figures in Europe [5]. Low demand for knowledge from the private sector, low quality of produced knowledge and the presence of brain drain are challenges for the policy makers in the country. Additionally, the number of researchers is extremely small, particularly in the business sector.

The main R&D performers in the business sector are large companies, while SMEs participation is not significant. The biggest share of these expenditures was directed towards the manufacture of chemicals products and was spent by one company. Firms do not innovate, especially small ones. As expected, the country has not experienced an inflow of new technologies, innovations, new knowledge and increased export through FDIs.

Most of the EU and ERA targets and priorities have either been set as national goals or adopted in accordance with the capacities of the national research and innovation system. Macedonian organizations have been active in FP7, EUREKA, COST and ERA-NETs programmes more than to bilateral projects induced by the government.

There are several opportunities, but also risks that the targets will not be met. The technological obsolescence of the companies creates a potential risk to slowdown the process. New universities, new PhD programmes in accordance with Bologna and financing students are opportunities that could increase the number of quality researchers. However, fast pace and quantity of the produced highly educated workers is not guaranteeing their quality. The mandatory involvement of business placements of students probably is not feasible in the current economy. Previous human resource policies at HE institutions were primarily focused on education and the research criteria will be hard to achieve for a considerable part of the university staff.

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# Linking strategic decisions and operations in an enterprise

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Aligning strategy with operational activities is one the top management issues and one of the biggest challenges that organizations are facing. In other words, there is a discrepancy in the decision making on different management levels.

The decisions made at the operational level need to be aligned with the organizations' strategy; but also, the decisions made at the strategic level need to be carried out according the possibilities, capacities etc. on the operational level. So, one of the biggest challenges would be to develop a system that will link and "synchronize" the decisions made at the two different levels using simulation tools.

A hybrid system consisting of system dynamics (SD) components at the higher decision level and discrete event simulation (DES) components at the lower decision level will be developed. The system should enable the decision makers to select the optimal set of control parameters based on the previous estimated behaviour of the system. These control parameters should be used by the SD and DES models to determine the best plan based on the actual behaviour of the system.

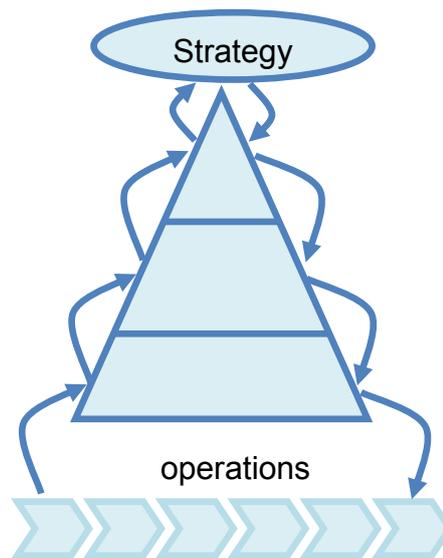
As a result, an integrated system of system dynamics and discrete event simulation model focused on a certain problem area will be created, in order to achieve optimal decision making in the field of enterprise restructuring/improvement.

## Keywords

Discrete event simulation, integration, simulation, strategy alignment, system dynamics.

## 1. Introduction

Aligning strategy with operational activities is one the top management issues and one of the biggest challenges that organizations are facing. In other words, there is a discrepancy in the decision making on different management levels [1]. An illustrative example of the interactions that are undertaken can be seen in Figure 1.



**Figure 1** Interactions between different management levels

The decisions made at the operational level need to be aligned with the organizations' strategy; but also, the decisions made at the strategic level need to be carried out according the possibilities, capacities etc. on the operational level. As an example, types of decisions on strategic level would be to increase the quality, decrease the costs, increase productivity etc.; on operational level would be to decrease the additional time in production, the scrap percentage, idle time etc. This means that certain adjustments should be done to the decision supporting tools in order to fulfil previously mentioned efforts. Due to the fact that different management levels are dealing with different levels of structured knowledge, different tools that do not communicate to each other are used. So, one of the biggest challenges would be to develop a system that will "synchronize" the decisions made at the two different levels using simulation tools. This can be arranged through various systems like the SDES described in [1].

The same situation is with the Modelling and Simulation systems as one of the most prominent and perspective decision support tools. Namely, system dynamics modelling is a set of conceptual tools that enable business process designers to build models and develop computer simulations of complex business process behaviours.

Concerning the modelling and simulation of the enterprise performance and behaviour there are two general types of models, system dynamics and discrete event simulation.

System dynamics models provide accurate description of system behaviour along the time dimension [2]. The system dynamics has found most of its use in situations which cannot be represented with mathematical formulation and are of nonlinear type, like the unstructured knowledge within an enterprise. It uses very basic elements, like stock and flows to simulate even the most complex systems. It is a convenient tool to conduct what-if analysis through dynamics points of view and it is the most convenient tool for modelling at the strategic level of the organization.

A business process model is an abstraction of its target business operations in the real world. Intuitively, a business process can be represented by a set of activities with a set of links connecting them. A best representation of the activities in the business processes is through discrete event simulation (DES). The simulation model advances by executing specific procedures at discrete points in time and terminates when all events have passed. DES is a widely used method for studying the design and operations of manufacturing systems [3]. DES allows tracking the status of individual entities and resources through the business process and estimating numerous performance measures associated with those entities. Additionally, with some modifications, DES can even use real-time data from the system (already integrated Enterprise Resource Planning solution, for example [4]). Following all of these, DES are very appropriate for simulation on the operational level of the enterprise.

## 2. System dynamics as a methodology

System dynamics is a method for studying the dynamics of the real-world systems around us. It has its origins in the control-engineering work of Jay Forrester [5]. He views system dynamics as a conceptual approach to facilitate the understanding of complex problems. Its central concept is that all the objects in a system interact through causal relationships. These relationships come about through feedback loops, where a change in one variable affects other variables over time; these variables, in turn, affect the original variable, and so on. System dynamics asserts that these relationships form a complex underlying structure for any system. This structure may be empirically or theoretically discovered. It is through this discovery that the causal relationships become clear and predictions of the future behaviour of the system become possible. The creation of a complete dynamic model of a system requires the identification of the causal relationships that form the system's feedback loops [5]. Feedback loops can be either negative or positive. Causal loop diagrams are important tools for representing the feedback structure of systems. A causal loop diagram consists of variables connected by arrows denoting the causal influence among the variables. The important feedback loops are also identified and displayed in the diagram.

Traditional mathematical programming approaches to generate strategic plans use production capacity and demand forecasts, for example, with both assumed to be known and fixed for each time period. However, making a prediction of the manufacturing system capacity at the beginning of each period is very difficult. This can result in infeasible plans. SD presents a natural way to model the dynamics associated with the production rates in the system. The interrelationships between the production rates with inventory, labour, and capacity utilizations can be explicitly modelled. The identification of the key factors, their relationships, and the time delays among those relationships can be captured in the causal feedback loops. Simulating such loops can provide insight into important causes and effects, which can lead to a better understanding of the dynamic and evolutionary behaviour of the system as a whole. Hence, SD helps develop a time-based plan suitable to the actual dynamic system. One example of using SD in an enterprise environment can be seen in Figure 2. This is only part of the simulation model and represents the influence of the scrap in the production process. Using the iThink<sup>®</sup> software different options for managing the scrap are presented.

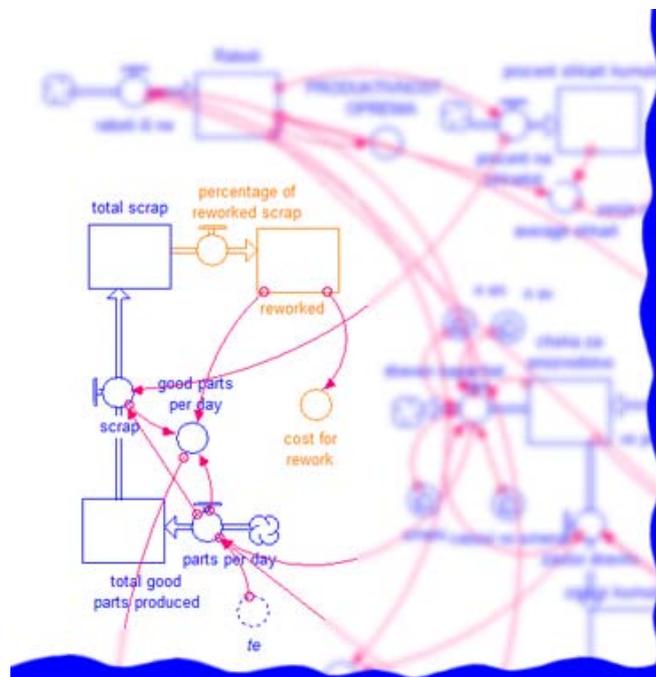


Figure 2 Simulating types of scrap in an enterprise environment [6]

### 3. Discrete event simulation as a methodology

DES is typically used for performance data collection where important entities such as parts and resources are modelled using state variables that change only at discrete points in time, called event times. The simulation model advances by executing specific procedures at these event times and terminates when all events have passed. DES is a widely used method for studying the design and operations of manufacturing systems. There are two main reasons:

1. DES can describe the most complex manufacturing systems and include stochastic elements, which cannot be described easily by mathematical or analytical models.
2. DES allows one to track the status of individual entities and resources in the facility and estimate numerous performance measures associated with those entities.

These properties are especially important for the detailed operations level. As noted above, DES can model the uncertainty and unforeseen disturbances typical of manufacturing systems. Hence, we believe that DES is the best choice to model accurately the required level of detail to ensure that the developed operations plan is valid. Furthermore, the models can be changed easily and run quickly to reflect changes that occur in the real time. When problems occur, the SD model can be informed immediately, as described below.

One example of DES model can be seen in the following Fig. 3. It is basically a part of a simple model of a glass manufacturing enterprise that is currently developed at the Division of Industrial Engineering and Management at the Faculty of Mechanical Engineering. As it can be seen, this is the last phase of the production, where the glass is packed, the workers are “released” from this item and will continue to work on the next one, where items are then counted and placed in a box of 6 pieces.

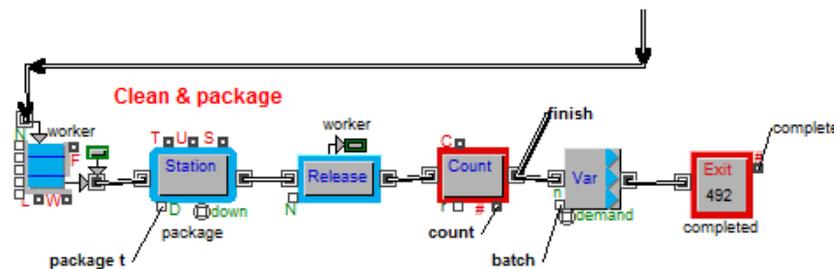


Figure 3 Example of a DES model

### 4. Discussion

There are numerous attempts to incorporate two different types of simulation. An approach for integrating agent-based simulation models with systems dynamics for the need of the automotive industry can be seen in the work of Kieckhaefer and others, [7]. In the work of Dubiel and Tsimhoni an agent based simulation model was combined with a discrete event simulation model for the needs of a theme park, [8]. There are even examples where the Balanced Score Card has been utilised together with simulation models in order to improve the performance of the emergency department in the hospitals, [9]. Applicability of this kind of simulation models and this kind of supporting tools is not so unfamiliar in the healthcare industry. Two of the many relevant papers describing applications are [10] and [11], each of them describing situations in the emergency departments. These are all examples where one simulation model or one homogenous model can not address the problems of one situation on itself.

So far, at the Division of IEM there were only homogenous models developed, particularly using the DES methodology. Typical example of such developed models is a simulation model for a specific performance measurement methodology [12]. It was developed in the iThink software. The simulation model was mainly utilized in the part of the methodology that deals with the generation of the actions for the improvement of the current situation and evaluation of the effects of their utilization i.e. it was focused on the operational level. In other words, it was used to learn and to model how different

changes in the enterprise environment would affect its performance. Due to the proposed goals of the model, it encompassed only 3 key indicators: Productivity, Quality and Finances.

## 5. Challenges

An enterprise consists of multiple business processes. Along the way of the business process, many decisions have to be made in order to finalize the process. In everyday practice, a finished process does not mean that every decision that was made was the “best” one or the most optimal in the given situation. Business processes are very dynamic and should not be repeated solely on intuition or historical performance. Wrong decisions at the beginning of the process may lead to catastrophic consequences to the goal of the process and thus on the performance of the business organization.

Every department in the organization is important for the achieving the overall goal of that organization and all departments need to work together and align their efforts for the same highest goal - profit. That same philosophy guided us in the idea of making an integrated simulation model, consisted of DES and SD models. This combined model, according to our previous experience, would be based on some performance indicators that would be simulated and analysed. The processes at the operational level would be simulated using DES. On the upper management level, the results of the operations would be monitored and transformed in the SD environment. This SD model would take in considerations that environmental factors and would try to model them and send the new “situation” to the DES model. The idea is to adjust the operations of the enterprise to the external factors and demands as soon as possible. We believe that implementing separate models for this kind of situation (problem area) would result in getting sub-optimal results, if any at all.

The communication between the models can be achieved to be manual or automatic through the High Level Architecture [13] and [14]. The HLA will be the mediator that will transfer the data between the models. In order to do this, the simulation softwares are required to have really good exporting and importing capabilities. If the exporting data from one software cannot be read by the HLA or the other software, than the integrated simulation model will not function. At this moment, a small research is being conducted about the different simulation software capabilities and what needs to be utilized in order for everything to function as it should be.

In general, the goal is to develop an integrated simulation model for the PMS and that model to be easily modified so that it can tackle different kinds of problems. That was one of the goals of the PMS model itself. Of course, this is more easily said than done. Because of the complexity for modelling every possible key indicator of the PMS, in our previous works we did not use every key indicator, only the ones that are the most affected in the current situation. In this future combined model, the idea is to represent every key indicator of the PMS as a separate module. These modules will be separately saved and will be combined as needed. In this way, there may be models with three-four modules, but there can also be modules with up to 18 different modules.

The idea of using the principle of combined modules came as an option when we discussed where this integrated hybrid model would be applicable. As scientists in the field of Industrial Engineering and Management, the application area is very wide. From production to service based organizations, from medium to large in size and practically every industry area. This universal approach is also very applicable for the PMS itself. The goal is to adjust the model according to the current situation and the demands of the customer. So, for a particular industry, type and size of organization, an appropriate set of modules will be selected, organized and connected with each other in order to meet the goal. It must be noted that this type of modules will be more exploited in the SD simulation; for the DES model and the operations that need to be modelled we think that it is more useful to stay with customizable models and not to use any patterns. They will only set boundaries and you will lose the creativity for modelling the details at that level.

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# Business and Financial Support to Small and Medium Enterprises in Serbia

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In developed economies and in economies in the process of transition, small and medium enterprises are considered as a source of local and national economic growth. Economic potential of the SMEs and their importance for an economic development is getting more and more emphasized, but in order to generate it, it is necessary to make stimulating business environment, both institutional and financial one as well as to provide direct measures of support to this sector's development.

Expectations of the SMEs sector are large, but from another side, their business is made harder by a number of obstacles. Thus, it is necessary to provide better business environment which considers an adequate approach to the fresh capital, development of business support that would support interests of the sector and implementing of training programs for entrepreneurs. In the frame of business support, it is very important to underline an importance of availability of advisory services that are closely connected with financial services.

Despite of obvious significance of SMEs in Serbia, their treatment by banks and other institutions is not appropriate, especially in the area of lending. An approach to finance is partly obstructed by the lack of the loan methodology for the SMEs financing and by expensive administrative procedures. The short-term loans are dominated, interest rates are high and procedures of obtaining the loans are long and expensive. Taking into consideration an absence of financial specialization for this area of banking support, the SME financing is considered as a challenge which the banks are to be faced with.

This paper is dedicated to an analysis of the business and financial support to the SMEs development with a special emphasis on Serbia, and to an anticipation of some proposals for the development of an optimal and interactive relationship of these enterprises and environment.

## Keywords

Banks, business support, counseling services, financial support, small and medium enterprises

## 1. Introduction

Small and medium enterprises and entrepreneurs (SMEEs) are considered as a backbone of economic development and the main carriers of employment, creating new working places, generating gross domestic product, export, import and other indicators of the market economy development.

An importance of small business and small enterprises (employing up to 100 persons or significantly less) is not a phenomenon of recent days, but it is undeniable that today "giants" renounce their place to the small enterprises. That is proved by comparative analyses confirming extremely high presence of SME in economies of developed countries. There is a very indicative data stating that small enterprises, of approximately 60 fundamental discoveries in XX century, produced around a half of them; all of them were individual discoveries and innovations done by people bearing all costs of those actions [1]. In certain number of developed countries, small enterprises are involved into the production programs of large enterprises. It is to say that the way of collaboration vary depending on economy system and economic development degree. Thus, the world's experiences show that small enterprises are moving up from the activity where they are competitors to the large ones, precisely on the activity they are complementary.

## 2. An importance of small enterprises for economic development

Only large enterprise existing is not sufficient or crucial enough for the economic prosperity of one country. Small, medium and large enterprises stand both in competitive and complementary relations. In a modern economy, especially in developed countries it is not simple to define the term of small enterprise, primarily because determining if some enterprise is a craft, small or large enterprise depends on a number of factors that, moreover, differ in countries and sectors. Therefore, there is no unique approach in defining that term, both in West-European countries or in global scale. Theory and practice of many countries in the world define the term of a small enterprise differently and, mostly, very incomplete.

According to the legislation in force, in the Republic of Serbia (primarily, the Law on Accounting and Auditing) all enterprises are classified as small, medium and large ones which depends on the number of employees, budgetary revenues and summary of operating assets and liabilities per annual calculation for the last two years. In that sense, small enterprises are those ones that fulfill at least two of listed criterions:

- according to the number of working hours, number of employees is up to 50 workers,
- annual income is up to 2.500.000 EUR,
- an average validity of business assets is up to 1.000.000 EUR.

This term "small enterprise" itself may be misleading because small enterprises in EU represent 99,8% of all enterprises and 66% of all employees who make 65% of total turnover.

It is relatively easy to establish small enterprises; they link their fate to the marketability of their programs. Since is very hard to survive in competition, near 90% of enterprises stop working relatively quickly, but their capital is not going to be destroyed, it just changes its owners and is engaged for some other programs and similar [1].

Entrepreneurship brings several advantages to some society. It encourages an economic growth, production, produces new technologies, products and services, changes and makes younger the market competition, forms new working places etc.

1. **Economic growth.** One of the reasons which made economists to pay more attention to small new companies is their ability to ensure majority of working places in our economy. According to some researches in the USA, more than four fifths of all new working places have their background in the sector of small economy. More than 30% of these working places are ensured by companies working less than 5 years. However, not all enterprises are of those ones that create working places. This is mainly a few that start and spread out in "youth", going out of the framework of "small" during that process. New companies, and, as well an employment they create, are more and more often found in the sector of services, not in the sector of producing.
2. **Productivity.** One of the reasons for an increased interest for entrepreneurship was more often recognition of its role in increasing of productivity. The main engine of focusing on productivity was an international competition. More productivity is mostly the matter of production techniques improving. Two keys for higher productivity are researching and development on one side and investment in new equipment, on another one.
3. **New technologies, products and services.** One consequence more between entrepreneurship and change is the role that the entrepreneurs have in promoting some innovative technologies, products and services. Many people who have developed those new technologies, products and services, were employed in big corporation that refused to apply those inventions, pushing the inventors to become the entrepreneurs. However, it is unlikely that small enterprises will play a strong role in innovations where we find high capital costs and where are required economies of the scope but it is sure that small enterprises will have a big role in innovations in segmented markets for special products.
4. **New working places.** Those new working places steam from generating new enterprises and their later expansion. Advantages as flexibility of working time, general independency and independency in working, more often have a greater importance than financial compensation. Apart of that, due to small enterprises, the level of competition has been increased and the market of manpower has been made dynamic, especially qualified and manager ones.

Never in history of mankind had been created so many new enterprises like at the end of 80s and 90s of the last century. This process is very characteristic for all parts of the world, starting from more developed west countries to developing and former socialist countries.

### 3. Analyses of business support to small enterprises in the Republic of Serbia

The experiences of highly developed countries tell us about widely developed networks of institutions for encouraging both establishment and development of small enterprises. Those states, which today have the most developed small economy, simultaneously have the longest tradition, the most jagged system of support and the most outspread network of institutions over which that help is given.

The lack of wider offer of consulting services often is a consequence of the following factors [2]:

- Lack of the number of private consulting companies;
- Poor network of regional agencies for small enterprises development;
- Lack in connection between the system of education and economy;

In developed countries, consulting services have a long tradition. Their appearance is connected to 19<sup>th</sup> century and services developing through the Chamber of Commerce. Since then, different kinds of institutions which provides this kind of service (public, private, non-governmental etc) are developed on different levels, starting from national to the local ones, with variations in their targets, way of providing services as well their funding.

In the domestic entrepreneurs there is no developed preference for using business advices from specialized institution or companies. In business, mostly they rely on advices of their colleagues and business partners or the accountants. Approximately 74% of surveyed responds are related to those categories of the consultants. National institutions consulting services and chambers have absorbed 9% of the answers and private consulting institutions consulting services have absorbed 4%. Business advices of the accountants are likely used by micro enterprises and shops, as well as the entrepreneurs from the area or retail, catering, software producing while the managers of production, graphic and transportation companies are more relied to the colleagues from the same business. The following figure represents the kind of business support that the entrepreneurs in the Republic of Serbia mostly use [3]:

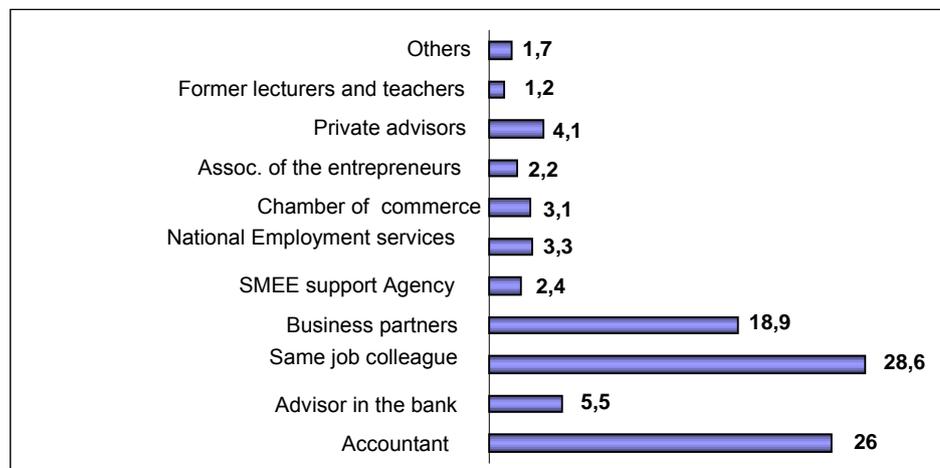


Figure 1 Business consultants

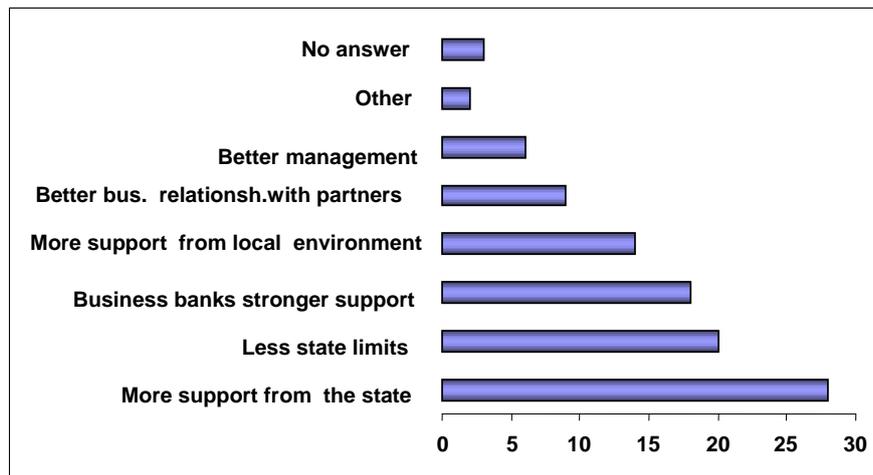
In the Republic of Serbia, in the previous period, the entrepreneurs have been left to their own capabilities and financial assets. They have been faced with an unfavourable environment in which they've performed their business without consulting, financial, organizational or any other kind of support in the process of their establishment and further development.

The circumstances in which operates today's domestic entrepreneurship are the following [4]:

- narrowed market,
- lack of information on business and development circumstances,
- high price of capital,
- financial indiscipline,
- insufficiently stimulating tax policy,
- shortcomings of technical and technological knowledge,

- expectation of big and quick profit.

According to the researching done by Republic Agency for Development of SME and Entrepreneurship, in collaboration with the Republic Institute for Statistic during 2009., there was a conclusion that improving and success of business depend on external influences; the biggest of them is an influence of the state (through the larger scope of support or decreasing of limiting) and support of local environment. There is 62% of all answers related to these aspects, and greater support of business banks, as a condition of business improving, is related to 18% of answers. The benefit of better business relations to the partners takes the pre-last place on the scale of conditions for improving business, and the last one belongs to improving of management functions in the enterprise (6%). Above stated conclusions are shown by the following graph [3]:



**Figure 2** The conditions of business improving

Realization of strategic providing of support to SME and entrepreneurship development suggests:

- An adequate business ambient and suitable legal regulative;
- Non-financial institutions which will provide the best business services created according to the market demands i.e. adjusted to demands of existing and potential small enterprises and entrepreneurs;
- Financial institutions which will provide establishing of new small enterprises and growth of activity of existing small enterprises;
- Educational systems that will provide an advance knowledge acquiring and an entrepreneurial culture accepting;
- Special programs that will increase the resource usage effective level and provide making new profit prices [5].

In the Republic of Serbia, an institutional infrastructure, made by Government, Ministry of Economy and Privatization, Republic Agency for SME an Entrepreneurship development, a number of local agencies, National Employment Service, National Bank of Serbia, financial institutions, Universities, associations of the entrepreneurs and other.

For a success of institutional infrastructure and their benefit to creating surrounding for small enterprises, it is very important that those institutions act in entrepreneurial manner, to be innovative and flexible.

In the Republic of Serbia, at the general level, a big obstacle is an ignorance in the area of possibilities and effects of business support utilizing. A national network for small enterprises development support is made of relatively new institutions still developing their programs and methodology of work with the entrepreneurs. Except of the national network supporting the small enterprises development, on the area of the entrepreneurial training, consulting and informing, there is a market to be developed in the framework of private sector. Since this market is still being in the stage of development, a competition still hasn't separated any organization with proved quality of services and there are no determined standards of valuation for programs and contractors in private sector. In the area of business consulting, we can notice a rapid growth of a number of private advisors, auditors, associations, entrepreneurial centers where, in quality estimation, all small enterprises are left to themselves.

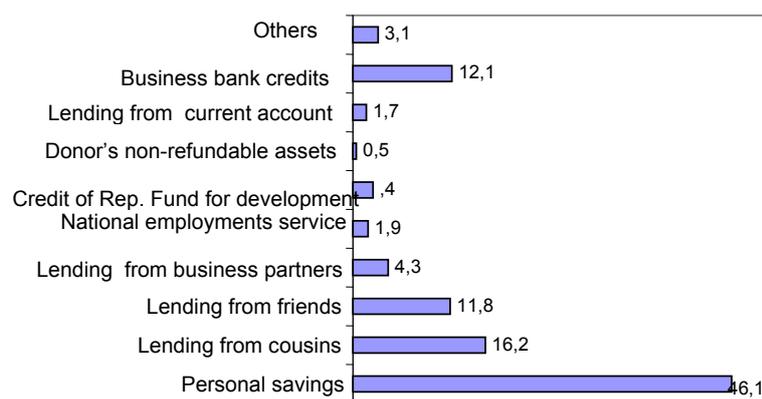
The most important categories of advisory services in Serbia are an approach and management with finance, support in business plan development, marketing services (researching of the market, contacts in selling and distribution), entrepreneurial training, training in management etc.

#### 4. Financial support to the small enterprises in the Republic of Serbia- achievements and limitations

A lack of financial assets is very often stated as the one of the biggest obstacles while establishing and spreading private enterprises in the countries of transition. In literature on entrepreneurship, very often is possible to read that money is not the main factor for entrepreneurial investment success achievement. According to the statement of the theoreticians, the most important is an idea. If there is a good idea, the way for ensuring financial assets will always be found. However, capital is a big problem for the entrepreneurs in Middle and East Europe and very often it represents a serious obstacle on their way towards an achievement of success [6].

In Serbia, the entrepreneurs provide an initial capital most often from their own sources. Personal savings is represented in 46% of cases while only 13% is relied on banking sources. Development Fund and National Employment Service were supported only by 4% but one should bear in mind that a significant number of enterprises was established before activating the program of state support for beginners in business.

This graph shows SME funding sources in Serbia, according to researching of Republic Agency for Development of SME and Entrepreneurship [3]:



**Figure 3** Sources of the business beginning funding in %

In the past and in recent time, banks have had aversion towards supporting small enterprises. Some of most common reasons are [7]:

- Unfavourable bank strategy of lending that do not meet requirements of small enterprises;
- High risk connected with lending to small enterprises;
- Lack of collateral;
- High operative costs;
- Poor education, management and entrepreneurial skills;
- Inadequacy of investment project submitted to the bank;
- Unreliable financial reports that makes credit analyses hard and unreliable;

The biggest problem for a big number of SME in the Republic of Serbia and in developed countries is the approach to financial sources. Although total value of granted credits in those enterprises is increasing all the time, an individual small enterprise has some difficulties in providing loans needed for business. Namely, bankers associate a lack of credibility to small companies, so entrepreneurs and enterprises have a lot of problems while convincing banks that their suggestions are qualitative. While considering applications for granting loans, very often entrepreneurial qualities are not appreciated enough or aren't taken into consideration. The factor, considered as even more serious obstacle in obtaining loans for small enterprises, is related to procedural issues. Of course that every entrepreneur would gladly accept decreasing of interest rates, but long and, often, unclear procedures while submitting an application for taking loan, is considered as something that the entrepreneurs

would like to change as well. The loan granted to late is considered, in its core, as the loan that is refused.

An access to finance is partially hindered by the lack of credit methodology for small enterprises funding and by expensive administrative procedure. This is the main reason why banking systems usually avoid providing their services to micro and small enterprises although the small enterprise can be capable to pay real interest rates and be very profitable for financial institution, under condition of having constant and reliable access to different credit products.

The biggest problems in banking and financial sectors are connected to dealings with small enterprises; they influence a possibility of estimation of the creditworthiness and are listed as following [8]:

- Lack of experience, especially in estimation and monitoring of the small enterprises and entrepreneurs business, which creates a consequence in considering funding of those enterprises as too risky;
- Lack of registration on the entrepreneurs and small enterprises business in previous period of time, in correlation with the fact that an environment is being changed very quickly, makes an inherent risk of projects to be more higher than in comparable west economy;
- Lack of diversified financial institutions that are common in developed countries, such as for example "venture capital" institutions. A reason for that is not just in environment but also in the lack of suitable legal procedure and experiences, as well as of resources;
- Lending to small enterprises is very risky because of high level of uncertainty that small enterprises are faced with (non-existing of qualified non-financial services that would decrease an influence of the non-financial risk of those factors- quality analyzing of the market, competition, managing weak points, weaknesses of products and services organization and distribution, etc);
- Small enterprises often are not able to ensure any pledge and or security instruments required from credit institutions;

It is true that a number of small enterprises don't fulfil a minimum of criterions settled by banks. Many banks agree in one: There are a lot of credit applications, but there are very few good projects and qualified clients as well.

More than 70% applications are refused due to the following:

- Business plans are not real;
- Non-existence of an adequate security;
- State of incomes doesn't show real state;
- Enterprises are overloaded by debts

Despite of limitation listed, business policies of banks and other financial institutions pay more and more attention to interests of small enterprises.

It is approved also by the fact that a significant number of banks have organized special parts, specialized for dealings with small enterprises while, in the purpose of providing all required financial assets for this sector, Guarantee Fund's activities as well as donor support through credit lines, have been intensified. Also, an advisory support and trainings of bank staff for an estimation of the entrepreneurs application, will have a positive implications to an affirmation of small enterprises sectors as an important targeted group of banking institutions.

## 5. Conclusions

Small enterprises in developed countries deal in different business environment and have a significant assistance and support by the government, which certainly contributes to economic development of the state in general.

In the Republic of Serbia the entrepreneurs were, in previous part left to their own skills an personal financial assets. They were faced with an unfavourable ambient where they were performing their business with no advisory, financial, organizational or any other kind of help in the process of their establishment and latter development.

Unequal position of small enterprises on the market imposes a special need for taking some additional affirmative measurements by the state and regional i.e. local authorities, pointed to this sector development. Basic incentives can be noticed throughout simulative tax policy, state assets, increasing of risk capital and as the most important, changes of business policy of banks related to small enterprises financing.

Support to small enterprises in the area of financing, is a very important part of an encouraging policy of small enterprises in all states where this part of economy is considered as very significant. Realization of that support in large scope depends on following question: how big part of policy in the area of entrepreneurship financing is adjusted to entrepreneurship in reality? Except of above stated, difficult approach of small enterprises to financial services can be avoided by combination of supportive measurements and scheme of financial support. Supportive measurements, such as advisory services, trainings etc., should have the target in increasing awareness of small enterprises on existing financial services and better understanding of banking procedures.

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# Reengineering of Industrial Manufacturing – Imperative of Development and Competitive Capability

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Reengineering of production is a process of continuous innovation and advancement of existing products, technologies, production processes and systems, and the survival of numerous manufacturing and business systems depend on the efficiency of their application. Reengineering radically changes a traditional solutions instead the slow implementing of a production-organization changes reengineering demands the fast and radical changes with the aim of achieving a competitive advantage. Reengineering of manufacturing systems is the procedure of the continuous and radical redesigning and/or redefining of manufacturing. The general trend of development a manufacturing in technologically developed countries are increasingly based on reengineering and modernization which means the implementation of new technologies, a flexible automation and organization and computer integrated manufacturing with basic aim in order to produce in terms of quality, cheaply and faster. The restructuring has to be done in the area of the business system, which means in the area of technology, organizational structure, process and information. Restructuring programs include not only changes the orientation of the titular private ownership. It is necessary production and business restructuring that provides returning of lost markets, higher level of producing capacity utilization and other resources as well as competition. The practice till today has shown the gap between expectations and the way of real execution. In the paper are spoken about reengineering and new manufacturing philosophy, phases in the development of the modern industrial production, simulation, quality system at reengineering and the algorithm reengineering of manufacturing processes.

## Keywords

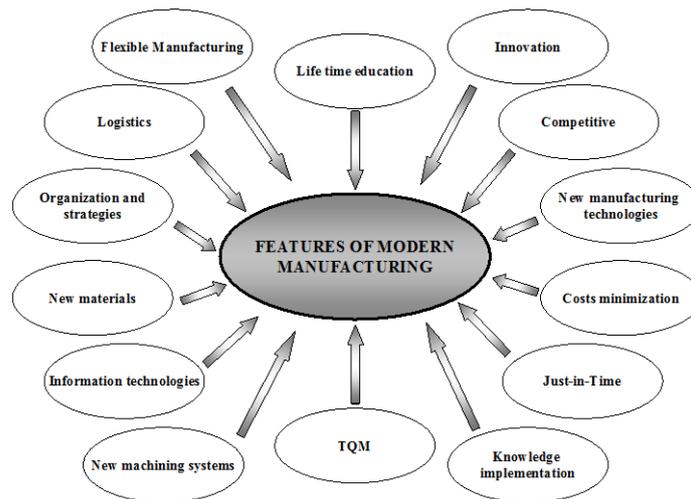
Industrial manufacturing, New philosophy, Quality system, Reengineering, Simulation

## 1. Introduction

Industrial manufacturing is realized with a continuous and intensive changes that is consisted in the adaptation of new technological and manufacturing circumstances, the market demand, competitiveness and changing of a production structure.

Reengineering of industrial manufacturing is a process of continuous innovation and advancement of existing products, technologies, production processes and systems, and the survival of numerous manufacturing and business systems depend on the efficiency of their application. The need for the reengineering is greater at the companies of transition countries which kept a planned economy for the most part and where the radical changes in the all elements of company, the logistical support and particularly at system of quality are needed.

Because of that reengineering is the basic concept of the transition of company without reference to their quantity and profitability. The usefulness of reengineering can be observed in terms: the maximal simplification of working processes, reduce the amount of work, the improvement of business results, the implementation of new techniques and technologies, the advancement of product quality and market recognized manufacturing.



**Figure 1** Features of modern industrial manufacturing

In the paper is performed industrial manufacturing and new manufacturing philosophy, reengineering of industrial manufacturing, simulations in the reengineering and some effects of reengineering [1-15]. The basic feature of modern industrial manufacturing is great number of variables influential parameters (Figure 1.), which have influence in the improvement of business results and to achieve a competitive advantage.

## 2. Industrial Manufacturing: New Manufacturing Philosophy and Reengineering

General trend as regards the growth of industrial production in technological developed countries is more and more based on reengineering and modernization, application of new technologies, flexible automation and organization of production and computer-integrated manufacturing, with basic objective which is to achieve a higher-quality, cheaper and faster production.

New manufacturing philosophy is: introducing a new manufacturing and information technologies, new materials, expert systems, integrated and flexible manufacturing, improvement of product quality, minimization of manufacturing expenses, increasing of productivity and the high level of implemental knowledge.

Therefore, a new manufacturing philosophy is founded on knowledge, a new manufacturing and information technologies and manufacturing Just-in Time (Figure 2.). In industrial manufacturing is definitely need to implementation of new manufacturing philosophy, that is principle of modern manufacturing.

The main basis in the development the modern industrial production are: new manufacturing technologies and technics, information technologies (CAD/CAPP/CAM-CAQ), rapid development of products, application of knowledge, innovations, flexibility and modern production systems with the aim to achieve a competitive advantage and the decreasing of production costs.

The basic aim of the reengineering is to reduce the running costs of production per unit product and improvement of quality by the application of new manufacturing philosophy.

A new manufacturing philosophy is founded on knowledge, a new manufacturing and information technologies and manufacturing Just-in Time. The basic aim of the reengineering is to reduce the running costs of production per unit product and improvement of quality by the application of new manufacturing philosophy (Figure 2).

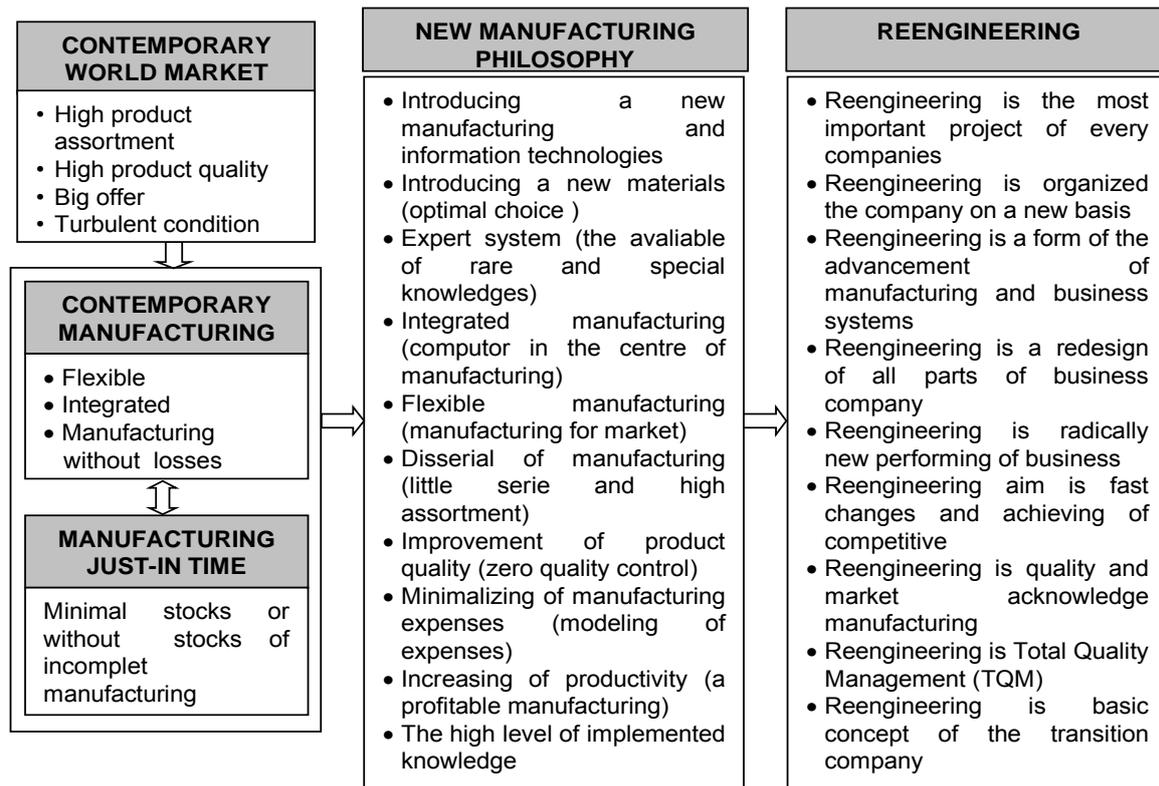


Figure 2 New manufacturing philosophy and reengineering

### 3. The Main Phases in the Development of the Modern Industrial Production

Reengineering of industrial manufacturing is defined as the organizing of production on a new basis which will be radically redesign a manufacturing processes in order to improve the efficacy of business (quality, expenses, the speed of materials flow, the duration of cycles, the degree of a consumer service,...).

The reengineering of industrial manufacturing means the following steps:

- analysis and evaluation of existing manufacturing state,
- research of markets needs and competitors,
- identification of bottlenecks in manufacturing process,
- definition of problems and target function of reengineering,
- alternative and solution for achieving of target function of reengineering,
- to choose optimal solution for accomplishment of reengineering aim,
- realization of the procedure of reengineering,
- maintenance of manufacturing system in reengineering,
- analysis of reengineering results,

- reengineering successfully accomplishment and
- manufacturing system improved by reengineering.

The main phases in the development of the modern industrial production are (Figure 3):

1. Defining the bases that are indispensable for development of the modern industrial production (real state, product and design, human resource and knowledge, new technologies and technique, information technology, ...).
2. Implementation of new manufacturing philosophy.
3. Realization of the reengineering project of industrial production (Advance of processes).
4. The modern industrial production.
5. Analysis of results (terms, competitive, costs, quality, profitable, Just-in-Time).

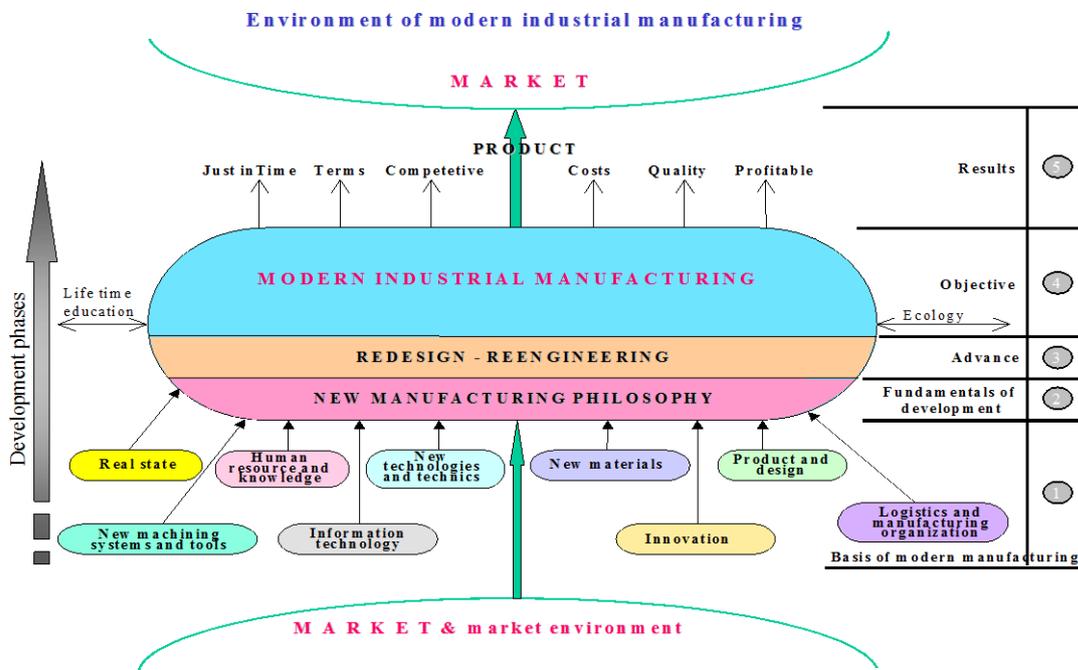


Figure 3 Phases in the development of the modern industrial production

#### 4. Simulations in the Reengineering

Simulation is one of the methods for the verification of model. A simulation in modelling and the analysis of activity at reengineering implementation has a important part because it gives the quantitative evaluation of redesign processes. For the past ten years the simulation is most often applied in manufacturing activities for the purpose of controlling and increasing of the productivity of manufacturing processes.

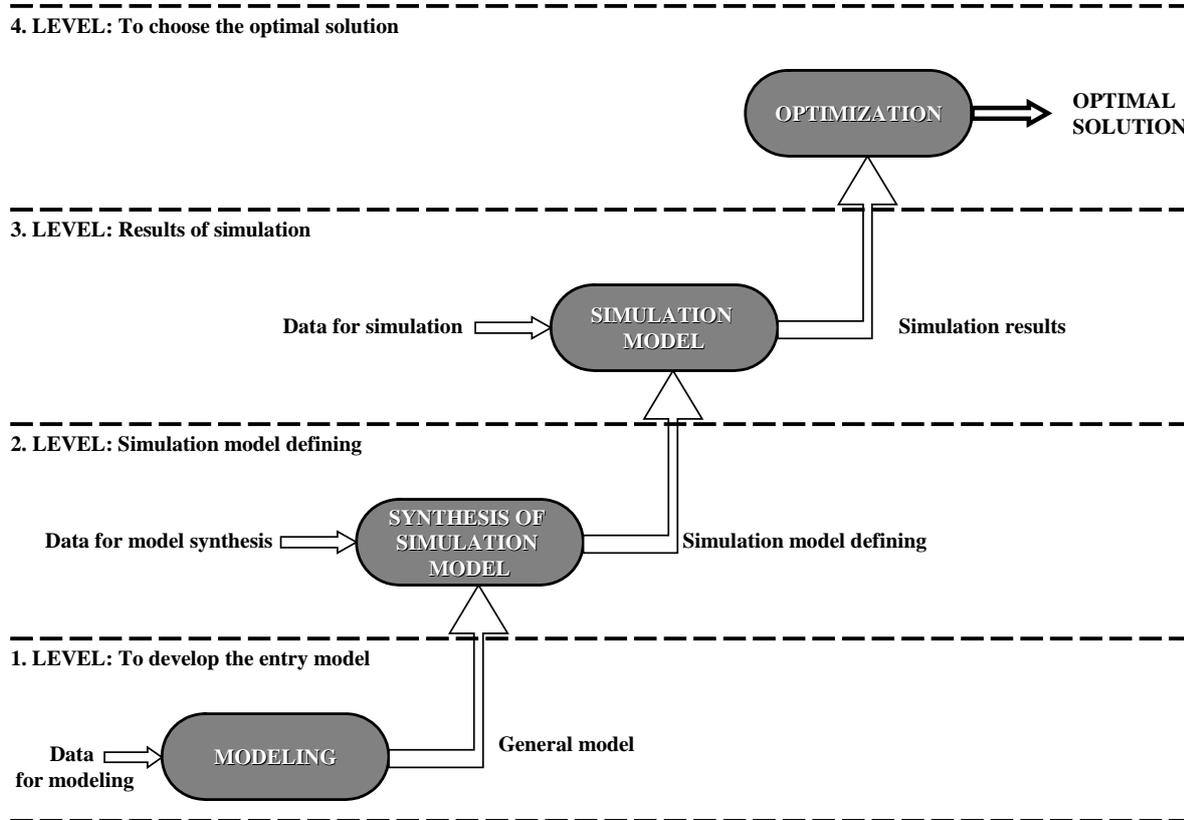
For the purpose of the faster development of new products, the reducing of manufacturing cycle and the introducing of the new procedure of machining the application of simulation in the reengineering of processes is irreplaceable.

The basic feature of simulation is the possible of repeating and changing of input parameters as well as following of influence of those changes on output results. Hereby, the communication between the user, who change the conditions of performed simulation, and simulation model is enabled.

Some of that reasons for applying a simulation in the reengineering of manufacturing and processes are:

- The possibility of the survey of process dynamics (the length of time, time of resources use, waiting time, ...).
- The including of the influence of random variables on the development of process.
- The prediction of reengineering results at quantitative values.
- The using of simulation software enables visualization and animation of a existing and new processes.
- The simulation of variant solutions, analysis and forecast of process state at designing phase.
- The constant innovating of technologies and products.

Simulation and choice of optimal solution have four steps (Figure 4.).



**Figure 4** Simulation and optimal solution choice

Tools for modelling and simulation of processes have to fill the following functions:

- the textual and graphic documentation of process (analysis of a existing condition and the development of model),
- the changes in the structure of process (reducing the production time, and reducing the number of needed manufacturing systems...),
- the expressing of the performances measures of systems by quantitative (the process time, the standard of material consumption, the number of needed machines,...) and by qualitative (the priorities of performing a procedure, materials,...),
- communication links,
- the use and the implementation of knowledge.

According to that, the simulation is important for reengineering of manufacturing processes and systems.

## 5. Reengineering and Quality System

Quality system is the superstructure of reengineering process. At the beginning, it realizes slowly, however, by realizing the determined activity of reengineering the development of quality system is emerged (Figure 5). Thus, by introduction of quality as the system of quality (SQ) or a total quality (TQ) the process of advancement obtained with reengineering keeps the trend of growth. The system of quality enables the achieving of a optimal results of reengineering and the application of standard ISO 9000, ISO 14000 and others needs the application of further reengineering.

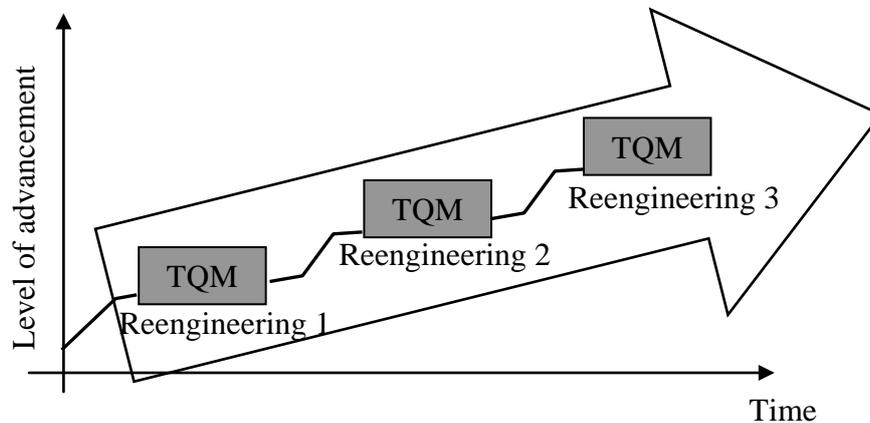


Figure 5 Reengineering and TQM

A total quality assurance and reengineering are not contradictory and complementary than two parts of the same approach and aim.

## 6. Algorithm of Manufacturing Reengineering and Some Effects of Reengineering

### 6.1 Algorithm of Manufacturing Reengineering

Technological reengineering is the basic foundation for the successful reengineering of manufacturing and the main element for acquiring a competitive advantage (Figure 6).

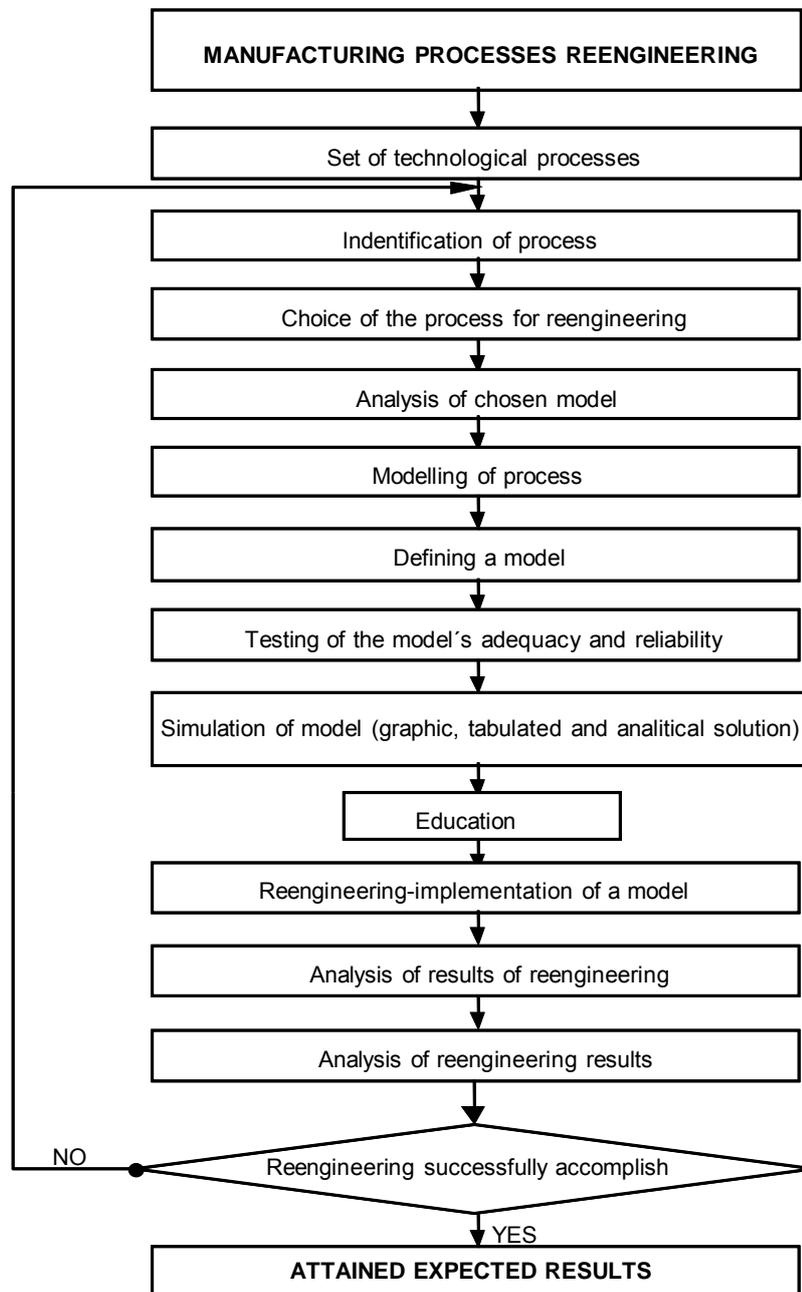
### 6.2 Some Effects of Reengineering

The efficiency of reengineering can be shown through the following basic characteristics:

- The maximal simplification of working processes that are the reflex of buyer's demands with clear aims.
- The innovating of technology and products.
- Reduce the amount of work and the time cycle of manufacturing.
- The improvement of business results of company.
- The constant advancement of business with the implementation of new techniques and technologies.
- The advancement of quality system of a working process and product quality.
- The market acknowledges manufacturing.
- The radical advancement of a total business system is the foundation of the development strategy of company.
- Implementation of new methods and improving the existing ones as well as improving the machining procedures.

- Reengineering is basic concept of the transition and advancement of company without reference to their quantity and profitability, etc.

**Figure 6** Algorithm of manufacturing processes reengineering



## 7. Conclusions

- Company founds its development strategy, on reengineering as the radical procedure of advancement of a manufacturing and total business system.
- Reengineering of industrial manufacturing is organized the company on the new bases with the aim of achieving a competitive advantage.
- The need for the reengineering is greater at the companies of transition countries which kept a planned economy for the most part and where the radical changes in the all elements of company, the logistical support and particularly at system of quality are needed. Because of that

reengineering is the basic concept of the transition of company without reference to their quantity and profitability.

- The usefulness of reengineering can be observed in terms: the maximal simplification of working processes, reduce the amount of work and the manufacturing cycle, the improvement of business results, the implementation of new techniques and technologies, the advancement of product quality and market acknowledge manufacturing.

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# Innovation and Advanced Technologies for Transition Countries

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For the past ten years the innovation and advanced technologies is most often applied in manufacturing activities for the purpose of optimization, controlling and increasing of the productivity of manufacturing processes. The usefulness of innovation and advanced technologies can be observed in terms: the reduce the amount of work, the improvement of business results, the implementation of new techniques and technologies, the advancement of product quality and market acknowledge manufacturing. The need for the innovations and reengineering is greater at the companies of transition countries which kept a planned economy for the most part and where the radical changes in the all elements of company, the logistical support and particularly at system of quality are needed. Because of that reengineering is the basic concept of the transition of company without reference to their quantity and profit. Industrial manufacturing is realized with a continuous intensive changes that is consisted in the adaptation to new circumstance and of the market claims. Competitiveness and change of a production structure, market orientation, reengineering and revitalization of a business and manufacturing processes and systems are an imperative of company existence.

Industrial production require continuous innovation and advancement of existing products, productions processes and systems, technologies and work quality and the survival of numerous production and business systems depend on the efficiency of their application.

In the paper are performed innovation, advanced technologies for transition countries, information technologies, implementation of knowledge methods (modeling and simulation), advanced technologies and reengineering of production in transition countries.

## Keywords

Advanced technologies, Innovation, Modern industrial production, Reengineering, Transition countries

## 1. Introduction

Innovation manufacturing processes and systems is a process of continuous innovation and advancement of existing products, technologies, processes and systems, and the survival of numerous manufacturing and business systems depend on the efficiency of their application. General trend as regards the growth of production in this technologically developed world is more and more based on human resources, knowledge's, innovations, reengineering and modernization, on application of innovations, new technologies, flexible automation and organization of production and

computer-integrated production, the main aim of which is to achieve a higher-quality, cheaper and faster production.

The development and application of innovations in machining processes are based on application of knowledge, which is condition for transformation of the conventional processes into the modern ones, with what criteria of process optimality in technological, economic and market terms are satisfied. Consequently, and machining technologies, that have been applied for a number of years in definite conventional form can be innovated by applying corresponding innovations without considerable financial investment but by using high knowledge from the area of: simulations, optimisations, computer technique and other close areas [1-15].

The usefulness of innovation, new technologies and reengineering can be analyzed and observed in terms of: enlargement of process productivity, usability of machining system, increasing product quality, reduction of machining time and preparation expenses, respectively.

Modern technology and technological processes reduce the direct consumption of living labor (the work time on the machine and alike), and increased participation of intellectual labor (the time of preparation, design, programming, etc.) Figure 1.

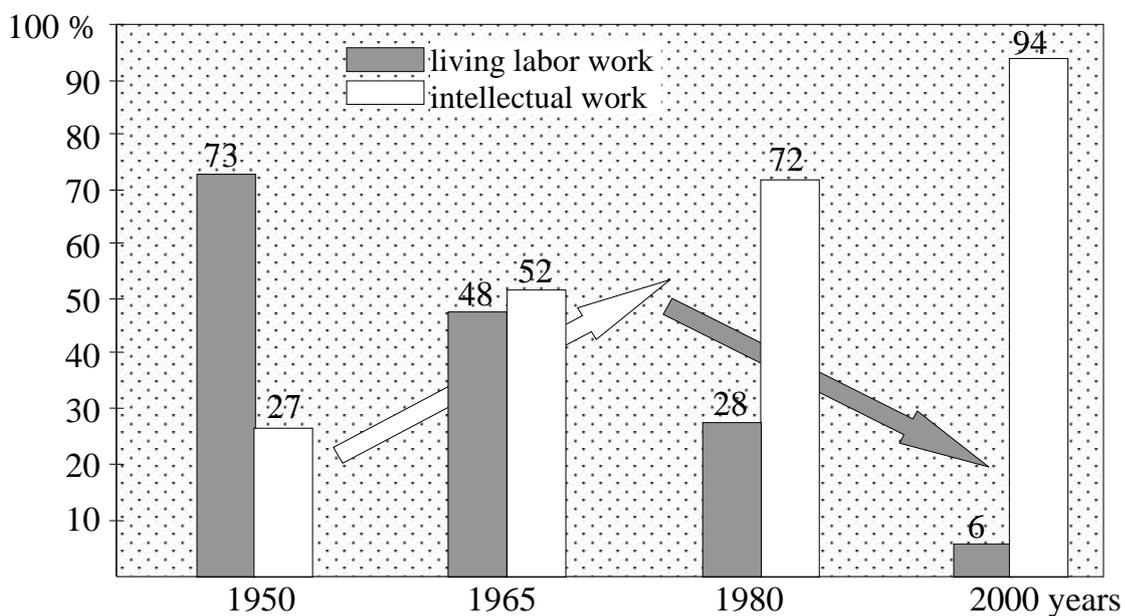


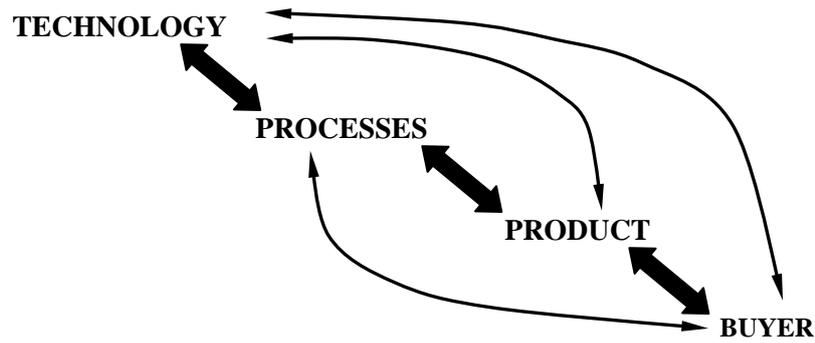
Figure 1 Living labor work and intellectual work (%) included in product price

## 2. Process Innovations at Reengineering

The system of innovation has an important place in the modern manufacturing engineering because of that management functioning as an innovation is developed to insure a favourable environment for the development of innovative activity [1,2,3]. Because of that:

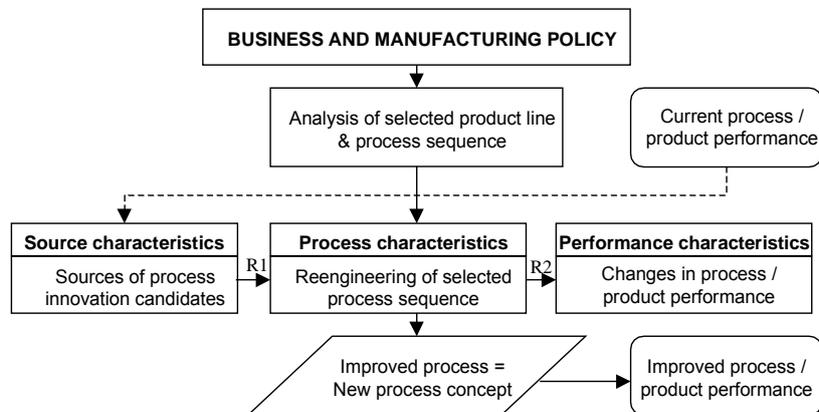
- Innovative factory is supposed to be in condition to present its new product in short order.
- Innovative factory has to be flexible.
- Ability of innovating is a key for the realization of a competitive advantage on the market.

Process innovation means performing a work activity in a radically new way. Process innovation is generally a discrete initiative and it also implies the use of specific change tools and technology for enterprise engineering and transformation of business processes [1,3], Figure 2.



**Figure 2** Industrial innovation field

In Figure 3 are shown the model elements of process innovation [11] (R1: effects of innovation initiatives on process characteristics, R2: change in processes-change in performance of processes).



**Figure 3** The basic model of process innovation

### 3. Reengineering and Information Technologies

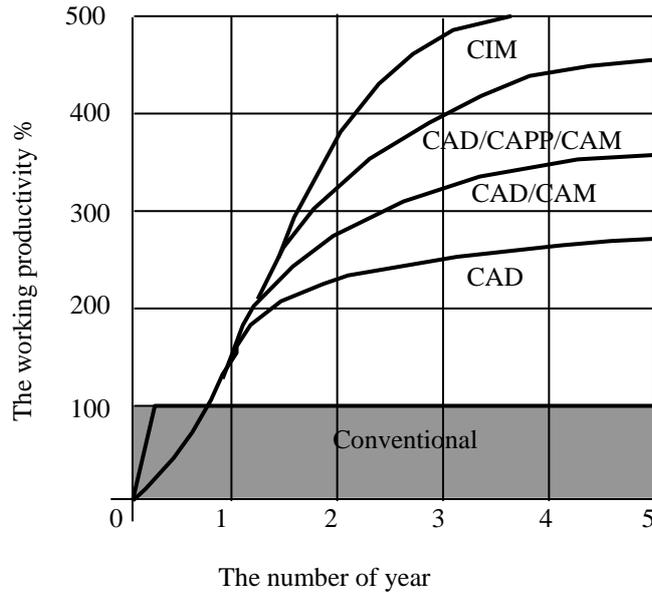
Reengineering means the implementation of information technologies in the stream of a manufacturing and business processes as [1]:

- the advancement of technological and manufacturing processes,
- the optimization of manufacturing processes and systems,
- the innovations of a manufacturing and non-manufacturing processes,
- the changing of manufacturing structure (redesign and/or redefining).

Information technologies are in the centre of the reengineering of a integral manufacturing and business processes where they serve as tools for making the competitive advantage of company (Figure 4).

By applying informative technologies realize competitive advantages.

Characteristic	Information technology
• The reducing of organizational complexity	improves and facilitates the communication of all organizational entities
• The management of knowledge	facilitates the transfer of knowledge in real time
• The control	enables and improves monitoring and informing on the condition of individual resources, products, materials,...
• The time cycles of working processes	reduces a cycle and enables the application of the simultaneous stream of working processes instead of sequence one
• The information abilities	improves and simplifies the application of complex analytical models and processing of the great numbers of informations needed for a business deciding
• The automatization	the increasing of a product quality, the shortening of technological time, reducing of workers
• The dislocated ness of object	transfer a needed information on to long distance fast and simply
• The integration of a manufacturing and business processes	a integrated factor CIM, CIB
• Inovative activity	facilitatess, accelerates and improves the organization of working operation
• The technological preparation	shortens the time of a technological preparation and increases the number of a process variants needed for the choice of a optimal variant
• Modeling and the simulation of processes	enables the efficacious application of modeling, particulary simulated modeling for the outline of process and the choice of optimal variant
• The analysis of process and system	shortens the time of analysis and enables the exact identifation and analysis of process and system



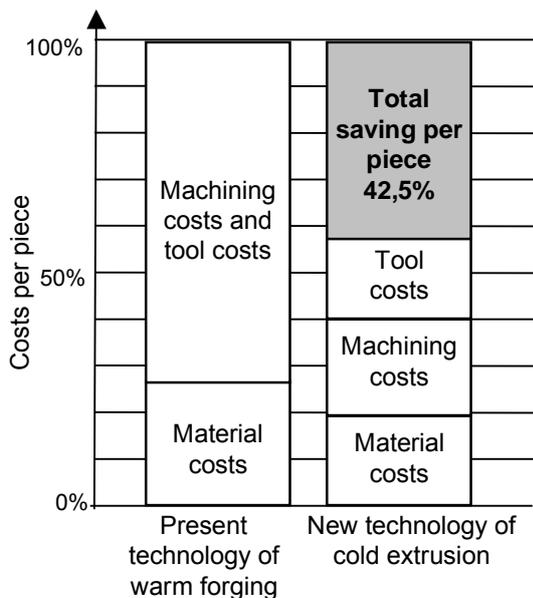
**Figure 4** The increase of productivity by applying information technologies

## 4. Some Examples Reengineering of Manufacturing Technologies

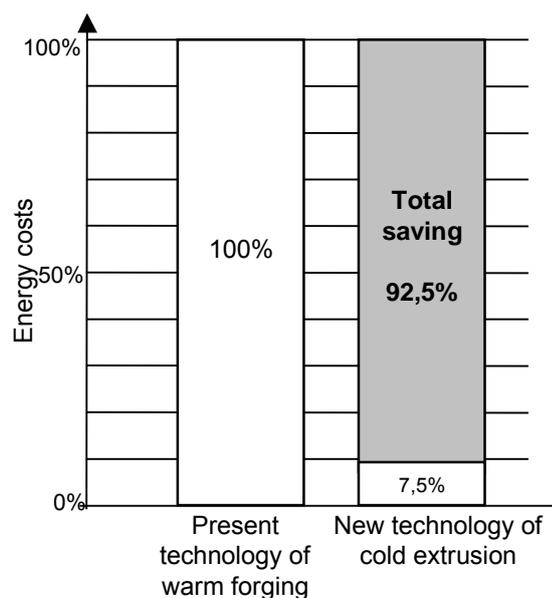
Reengineering means radically a new way of performing a business which shows following examples. Technology is the basic foundation for the successful reengineering.

### 4.1 New Machining Technology and Reengineering

In Figure 5 and 6 is shown the considerable reducing of manufacturing expenses at the substitution of conventional technology (warm forging) with a new technology (cold extrusion) at the manufacture of machine elements [1]. Consequently, it is achieved total saving 42,5% per piece and energy saving 92,5%.



**Figure 5** Reducing costs per piece by using of new technology



**Figure 6** Energy saving by using of new cold extrusion technology

Therefore, in Figure 5 and 6 are presented the effects of reengineering by using of cold extrusion technology.

## 4.2 High Speed Machining in Reengineering

The high speed machining (HSM) is reflected in: reduced machining time and production costs, decreased non-machining time, improved work surface quality, etc. Figure 7 and Figure 8 show the advantages of high speed cutting (HSC) in die and mold making [1, 11].

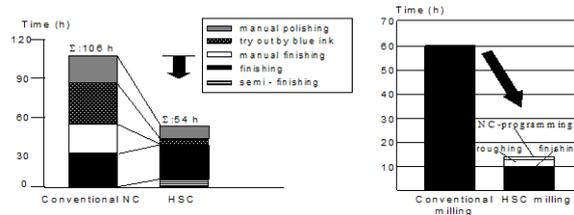


Figure 7 Conventional NC and HSC machining

Figure 8 Conventional milling and HSC milling

## 5. Modeling and Simulation at Reengineering

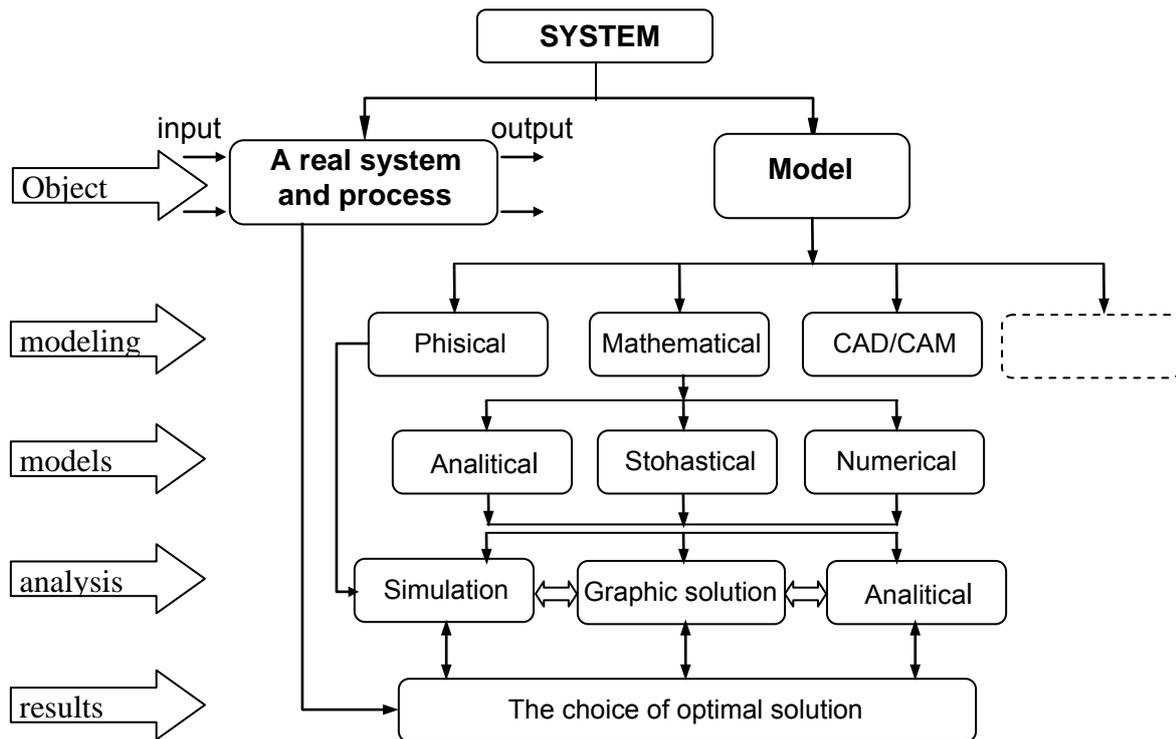
### 5.1 Modeling

The basic purpose of modeling is the defining of mathematical and other models (graphic, analytical, software...) that are indispensable for reengineering of processes and systems. Reengineering as the method of improving of process and system sets the procedure of modeling of processes and systems at the first place. Defined model is the foundation of improving of analysis and simulation of process which needs to enable the choice of a optimal solution [1, 2] (Figure 9).

### 5.2 Simulations

For the past ten years the simulation is most often applied in manufacturing activities for the purpose of controlling and increasing of the productivity of manufacturing processes. With the faster development of new products, the reducing of manufacturing cycle, the introducing of the new procedure of machining as the aim of the application of simulation in the reengineering of processes is irreplaceable. Simulation is one out of the methods for the verification of model. A simulation in modeling and the analysis of activity at implementing a reengineering has a important part because it gives the quantitative evaluation of redesign processes. Some out of reasons for applying a simulation in the reengineering of processes are:

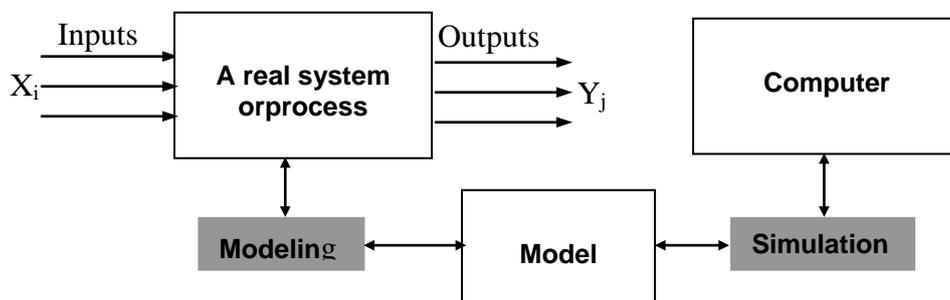
- The possibility of the survey of process dynamics (the length of time, time of resources use, waiting time).
- The inclusion of the influence of random variables on the development of process.
- The making possible of foreseeing of reengineering results at quantitative values.
- The using of simulation software enables visuality and animation of a existing and new processes.



**Figure 9** Modeling and the simulation of solution

The basic feature of simulation is the possible of repeating and changing of input parameters, following of influence of that changes on output results. With that, the communication between the user that changes the conditions of performing a simulation and a simulation model is enabled (Figure 10.). Tools for modeling and simulation of processes have to fill the following functions:

- the text and graphic documentation of process (analysis of a existing condition and the manufacture of model),
- the changes in the structure of process (reducing the length of time, and reducing the number of needed manufacturing systems...),
- the expressing the measures of the performances of systems by quantitative (the length of process time, the standard of material consumption, the number of needed machines,...) and by qualitative (the priorities of performing a procedure, material,...)
- communication links,
- the use and the implementation of knowledge. According to that the simulation is important for reengineering of manufacturing process [1].



**Figure 10** Modeling and the simulation

## 6. Conclusions

The need for the innovations and reengineering is greater at the companies of transition countries which kept a planned economy for the most part and where the radical changes in the all elements of company, the logistical support and particularly at system of quality are needed.

Reengineering is the contact form of the advancement of manufacturing and business systems even at technologically developed countries.

A simulation in modeling and the analysis of activity at reengineering implementation has a important part because it gives the quantitative evaluation of redesign processes.

Because of that reengineering is the basic concept of the transition of company without reference to their quantity and profitability.

The producing reengineering is one of the most complex action of radical improving and modernizing of producing in the aim of competitive advantage at the global market.

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# ICT diffusion and use in student environment in Tetovo

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**It is considered in general that ICT is a support for a new economical development. But those considerations are mixed with misgivings, because the equipment of the population in ICT equipment is characterized by inequalities. Found in a situation of general economical and political transformation, the country is in front of a development marked mostly by the changes and market in a context of a general transition than the necessity for the population to master those equipments.**

**The situation was studied in the higher education environment in Tetovo (two universities and a secondary school) for having also a local and regional view on the use of ICT. The paper presents the results of a study which try to measure the level of penetration of ICT technology in this student environment and by them to their families. The survey, done during June-November 2010, shows the environmental situation and tries to compare it with the country situation. It seems that the diffusion of new technologies is characterized some times by inequalities between regions, generations, and technologies.**

**The principal results concern the equipment and mode of use of the telephone (fix and mobile), the computer and the internet. The situation is considered for two groups: the students from higher education and the students from the secondary education.**

## **Keywords**

ICT, e-readiness, regional digital development, economic development

## **1. Introduction**

ICT (Information and Communication Technologies) is part of contemporary human life, is undivided part of his daily activities and synonymous with readiness to deal with the problems of the present and the future. Over the last decade ICT and internet have brought significant changes in economic and social development. However, ICT and the Internet revolution have not been over yet. In recent years internet is much faster, with lower prices compared to fix and mobile phones, and the possibility of fast media, etc. ICT has recently been part of student life and their family, where it becomes a comparison of the use of ICT by students and their families with all families in our country.

The main purpose of this paper is to see how students use information and communication technologies and for what purposes they use them. In order to find out about this state, a questionnaire was designed, which can be seen as part of the following results.

The results were found through a questionnaire carried out within students of SEE University and State University of Tetovo. The questionnaire was based on certain principles: Initially, a correct representation of the environment of university students, secondly the content, in order to better reflect the current situation.

The survey analyzed 1382 students, 47.5% were surveyed in SEE University and and 52.5% in the State University of Tetovo, respecting the proportionality of respondents: data for the number of

students were in instructional secretaries. At university level, the representation was achieved on the basis of faculty and year of study.

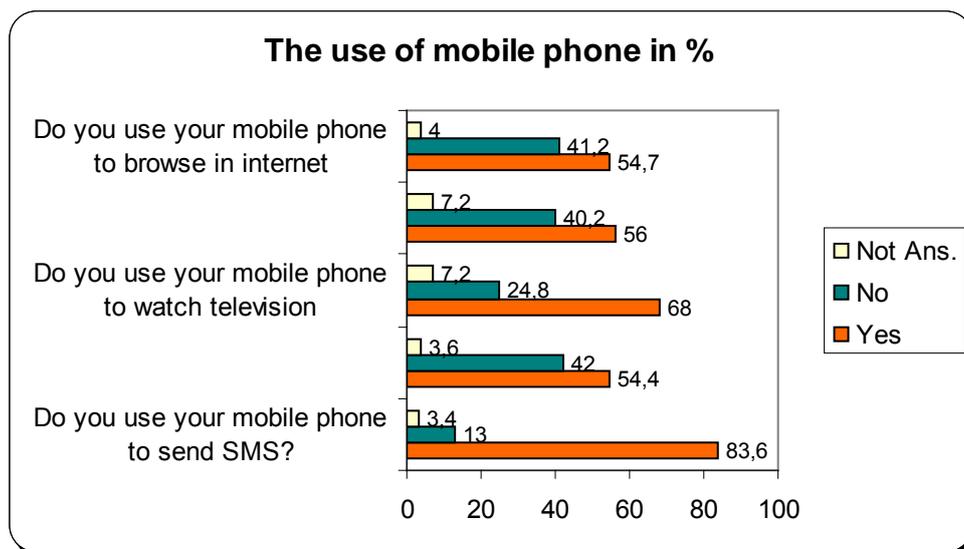
The data were collected: for person, equipment with fix phones, equipment with mobile phones, equipment with computer at home, access on internet, etc, for their personal and familiar use, knowing and using the internet, the purpose of use, proposals for development of internet at home, central and local policy evaluation for internet situation and its development. In general this content was discussed in 39 variables (indicators). Here are presented the results for a part of these variables.

One of the most important purposes of our study was data mining of a standard list of indicators as a base on which a situation was evaluated and compared with corresponding indicators of all the country. To these indicators was dedicated with a special attention.

## 2. RESULTS

### 2.1 Mobile and Fix Telephony

It is evident from the study that 74.4% of the students have fix phones in their houses, from which 63.4% are prepaid users with a single operator, where 56.6% use the operator T-Home. Mobile phone has a large extent in student environment. Around 96% have a mobile phone, where 21.5% once have changed their first mobile phone, 16.5% twice, 18.9% three times, , 35.5% more than four times and only 7.6% declared that never changed their first mobile phone. Average number of sending SMS per week is 52. According to their mobile phone use 83.65 use to send SMS, , 54.7% to browse in internet, 54.4% to download games, photos(photo),music (ring), 40.2% to read e-mails and 24.8% to watch television( Graph 1).



Graph 1 The Use of Mobile Phone

### 2.2 Equipment and the Use of Computer and Internet

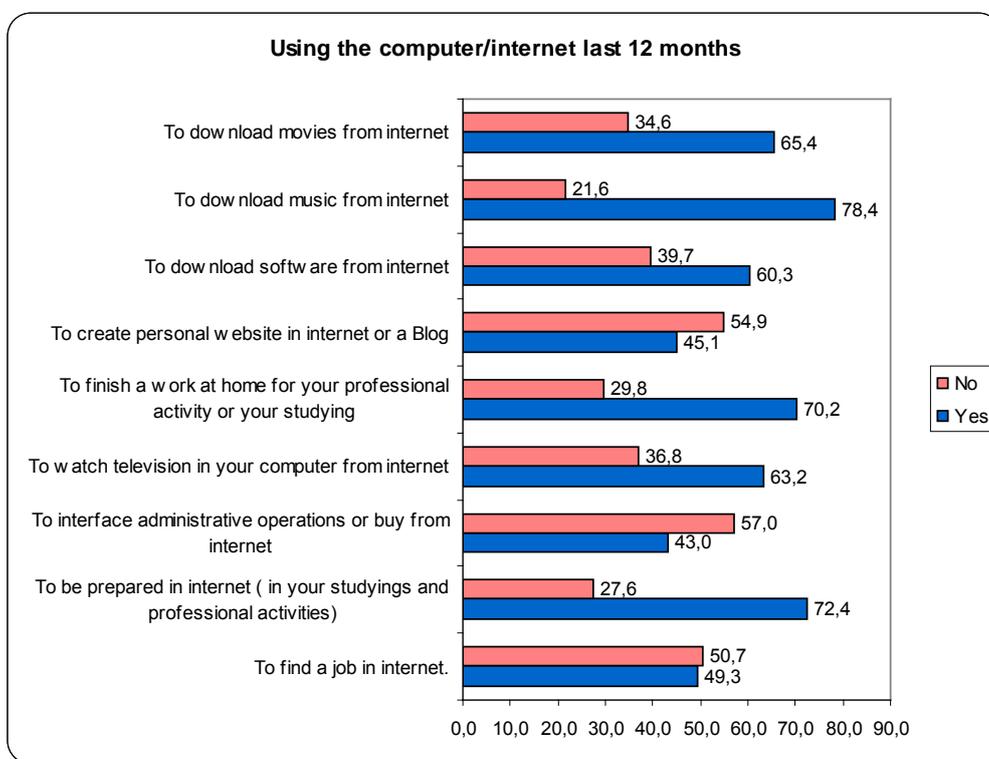
The results of the study show that 94.8% of the students have computers in their houses, where 60.2% of students have one computer and 34.6% of them declare that have some computers in their houses, 53.2% of them have laptops. 87.4% of them that have computer also have internet in their houses. The indicator is higher than corresponding identifier, already twice higher with me 46.1% [4].

Regarding the possibilities of using computer and internet connection at the university where the study 56.9% reported that yes, of whom claim that computer and internet use every day with 75.4%, 14% once or twice a week, 5.5% more rarely and 5% said they do not know. If we take a look between universities shows that most equipped with computer, laptop, IP are SEEU students. And the Internet connection at home, university and more frequent use of the Internet follows the same lines.

Public places (library, internet cafe, commercial centers) are places where students connect to internet with computers or laptops, with other devices (Wi-Fi or, mobile phone), where declare that last 12

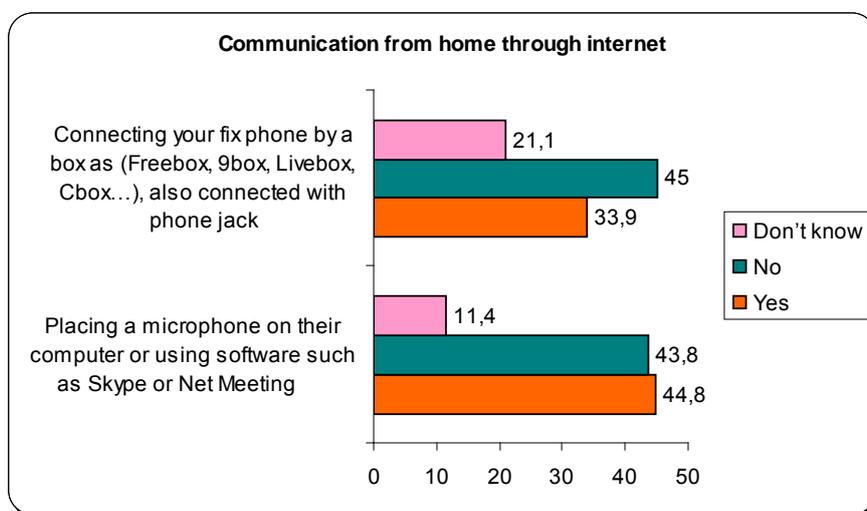
months are connected everyday with 24.0%, 15.3% once or twice a week, 25.4% rarely, 23.7% never and 11.6% declared don't know.

The main use of the Internet in two universities in Tetovo is seeking the information and the materials for their professional activities in the framework of their studies, then its fun, download music, movies and software. Following by watching television, performing administrative activities, creating a website and looking for a job from the internet (Figure 2).



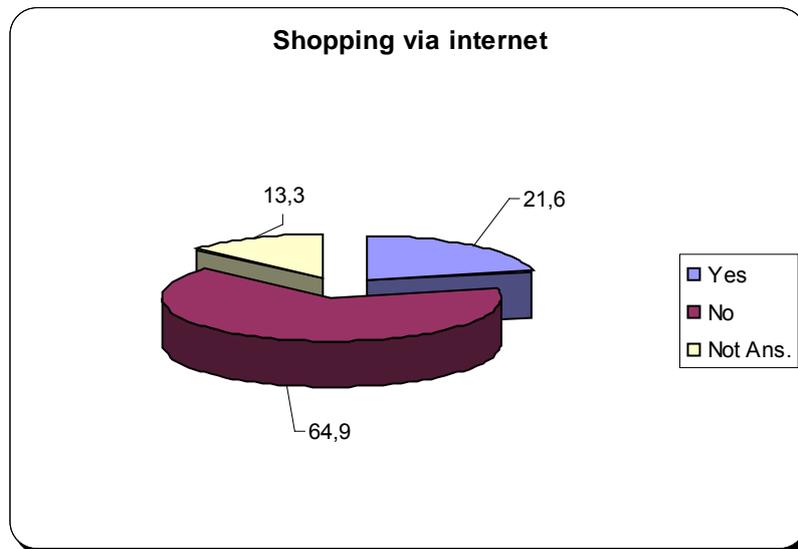
**Figure 2** Among the following uses, indicate what you have done in the past 12 months, on a computer or the Internet?

Regarding the communication of students from their homes via the Internet 44.8% reported that call by placing a microphone on their computer or using software such as Skype or Net Meeting and 33.9% call connecting fix phones on a box as (Freebox, 9box, Livebox, Cbox...), also connected with phone jack figure 3.

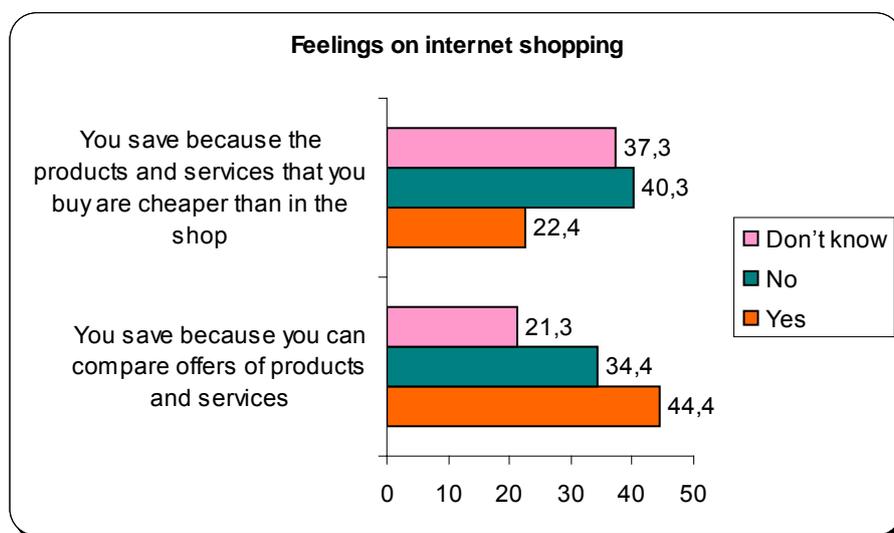


**Figure 3** Do you call from home through internet (by way of the Internet) ..?

Related to shopping via the Internet, 21.6% of students say they are shopping using internet (graph 4)., then review and thanks to the Internet they can save while comparing offers and service, with a large percentage stating that they do not know with 37.3% and 21.3% respectively ( Graph 5). This comes as a result they do not use this service.

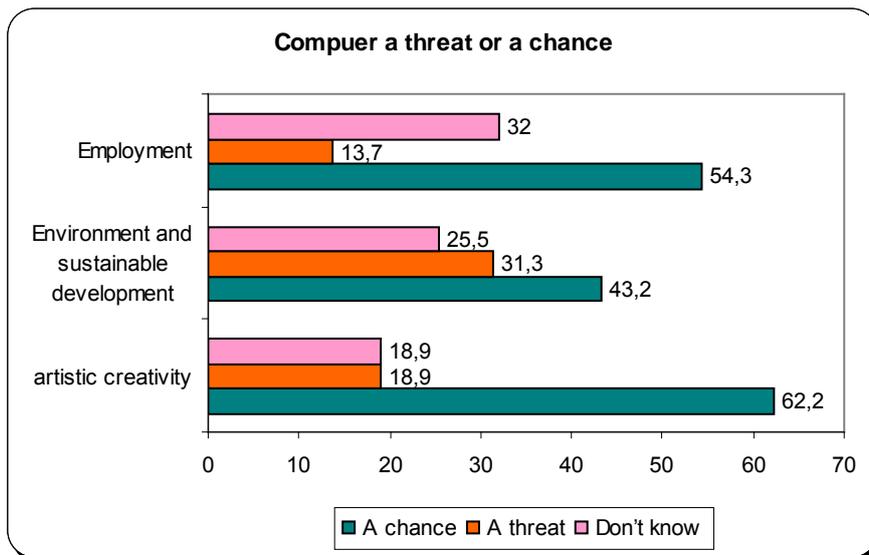


**Graph 4** In the past 12 months, have you made any shopping via Internet (books, disks, travel tickets, computer equipment, food, etc.)?



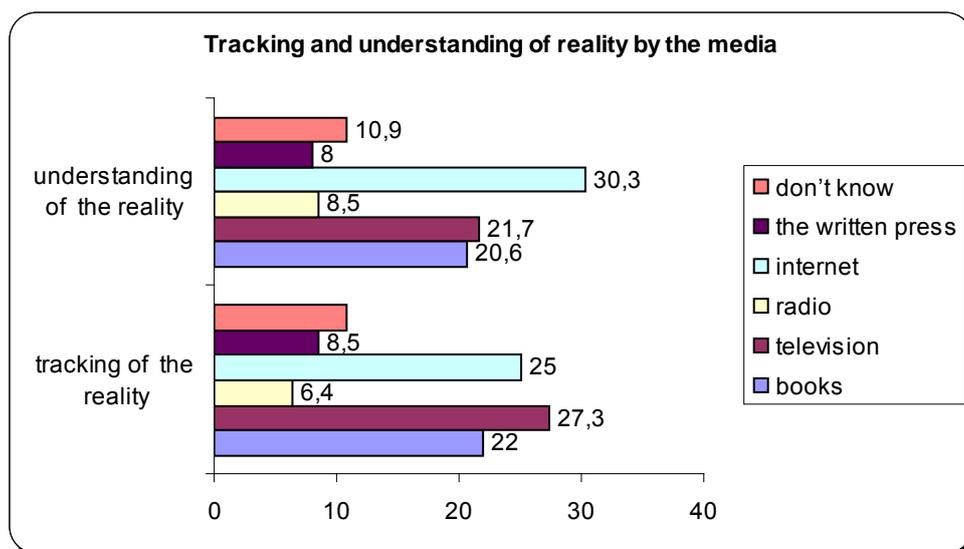
**Graph 5** Do you feel that thanks to the Internet ...

When asked whether internet and computer is a threat or an opportunity for artistic creativity, environment and sustainable development and employment they claim that artistic creativity is a chance with 62.2%, 54.4 employment and environment and sustainable development with 43.2% ( graph 6).



**Graph 6** According to you, computers and Internet are a threat or an opportunity for ...

The Internet is a media that allows better tracking of reality with 30.3%. But to follow the reality is television with 27.3% then the Internet 25% ( **Graph 7**).



**Graph 7** Among the following media, which is according to you that which lets you do better tracking and understanding of reality?

The element that most curbs Internet usage is the quality of service (speed, cuts, .) which is not satisfactory with 21.3%, personal data are not protected properly with Internet 18.6%, following the subscription price and equipment and with a small percentage is that the Internet is not necessary for daily life.

### 3. Conclusions

Results show that information and communication technologies are used more in student environments. They are related to personal development, a typical example is mobile phone, computer, and laptop and so on. The introduction of technologies for domestic purposes also has

huge growth compared to previous years. Internet shows that it has become a mass communication tool. This comes from that the universities in Tetovo created conditions of ICT which are of great importance to students. And the connection to the Internet at home and more frequent use of the Internet follows the same lines. This comes as a result of the fact that most students come from families that have a good economic status. The Internet has become part of everyday life of students, where 75.4% use Internet every day: looking for information and materials for their professional activities under study, for communication fun and different information. Moreover, the use of ICT is very important for the students after finishing their studies. Knowledge of ICT can help students in the future to find a job and gives them a competitive advantage compared to others who are not familiar with ICT.

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# Empowering Youth Entrepreneurship through Online Business

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The notion of entrepreneurship has grown in importance in the global economy over the last couple of decades. Both the theoretical and practical economic and business development literature acknowledge the key contributions of entrepreneurship and SMEs, to the development both nationally and internationally growth of economy. Among the initiatives taken by governments to promote the entrepreneurship and to boost the number of SMEs establishments is through the introduction of entrepreneurship course into the university curriculum. However, previous research highlights the varying degrees of success of this initiative. One of the issues that lower the effectiveness of the entrepreneurship courses offered by these higher education institutions was the lack of teaching tool that enables to students to learn the know-how of being an entrepreneur. It is the aim of this paper to examine and propose the use of electronic commerce (e-commerce) portal as an entrepreneurship course teaching tools. A survey was carried out to explore the potential benefits of implementing such portal as an educational tool and incubator to enhance the entrepreneurship skills among our youth in higher education institutions.

## Keywords

Developing Countries, Electronic Commerce, Entrepreneurship Education

## 1. Introduction

Much has been said on the importance of youth entrepreneurship. In fact, entrepreneurship has been seen as one of the important pillars on which economic health of societies was built [1, 2]. Particularly for developing countries, young entrepreneurs have been identified as critical resources that need to be tapped to enable them to compete in a globalizing market economy [3, 4].

It is also very clear that increasing number of graduate unemployment is driving government policy to equip student with entrepreneurial skills, knowledge and abilities [5]. Despite the widespread recognition on the importance of the entrepreneurial education in higher education institutions, the entrepreneurial action at graduation remains low [5]. This might be attributable to the nature, focus and process of the education in many tertiary institutions that often too mechanistic and does not promote entrepreneurial activities and behaviours [4].

Therefore, it is the aim of this paper to examine the potential benefit of adopting electronic commerce (e-commerce) portal as an educational tool in tertiary institution.

## 2. Entrepreneurship Education

Given the importance of entrepreneurship to a nation's economy, governments have taken their step to promote the entrepreneurship and to boost the number of small firm establishments through the introduction of entrepreneurship course into the university curriculum. However, recent study show that the level of entrepreneurial action at graduation are still far below expectation [5]. Earlier research [6] explained that such phenomenon may be due to the fact that formal education in general does not encourage entrepreneurship. Rather it prepares the students for corporate domain, promotes 'job-taker' mentality and suppresses creativity and entrepreneurship [7]. In other words, the focus and

process of the education, particularly in many tertiary institutions, often too mechanistic and does not promote entrepreneurial activities and behaviours [4]. Thus, these educational and training institutions are facing the challenge of how to create an enterprise culture which will further foster the development of small firms.

Given the critical role of tertiary institutions in promoting more entrepreneurial attitudes and behaviours among their students, more and more attentions have been given towards the research within the area of entrepreneurship education. A number of studies had rigorously assessed the success of many university-based entrepreneurship curricula. Among the recommendations made in these studies was the importance of tertiary education to incorporate interactive learning, experience based learning, role models, as well as community and business links [4, 7-9].

### 3. Teaching Tool: E-commerce Portal

Today, e-commerce is radically changing the dynamics of the business environment and the way in which people and organisations are conducting business with one another. Indeed, Lee et al. [10] suggest that e-commerce has altered the outlook of businesses by focusing more on information which they term as economics of abundance. In addition, e-commerce is known for its capacity to remove barriers to entry and allows competitive local companies to reach more markets in an effective and efficient way [11].

Despite the many anticipated benefits of e-commerce, little or no attempt has been done on utilizing such technology for educational purposes. The author believe that through the use of e-commerce portal, the tertiary institution would be able to create a program that incorporate an interactive learning, experience based learning, role models, as well as community and business links as proposed by earlier research [4, 7-9].

As part of this study, an e-commerce portal – named Geraiserumpun.com – was developed to enable the students to promote their product and run an online business. This portal is aimed to enhance the current entrepreneurship course that mainly focuses on enhancing the skills on writing a business plan.

In addition to the use of this portal as a tool for entrepreneurship teaching and learning, the e-commerce portal will also serve as:

- Forum for students to exchange ideas and information
- An avenue for students to experience managing a real online business
- An avenue for the Government to disseminates any information on assistances and business set up procedures for young entrepreneurs
- Online business incubator

On the implementation of the portal, each student will be given a seller account (see Figure 1) that will allow them to post products or services as they have proposed on the business plan. In the seller's page, the student also would be able to monitor of any order made by customers and the availability of the products being advertised.

Whereas for the instructor of the course, one of important element that could be observed by using such systems is the student's creativity in promoting the product, such as putting the right description, post the right and attractive images of the product, and so on. From the instructor account, the instructor would also be able to monitor and observe students ability and promptness to respond customers' orders and enquiries.

It is also important to be emphasized that the reason of not using the readily available external e-commerce portal – such as *ebay* or other local portals – is due to the restrictions that many these portals have. These restrictions would include the requirement that the student should register using credit card or bank account, and the inability for the instructor to monitor the 'back office' of the students' business. Therefore, in reducing the students' apprehension in revealing their financial information online, this portal will be adopted. Other benefit of using such portal is the ability for the instructor to include the course materials and any other relevant information – such as, government policies and regulations – that would increase the students' awareness in starting up their own business.

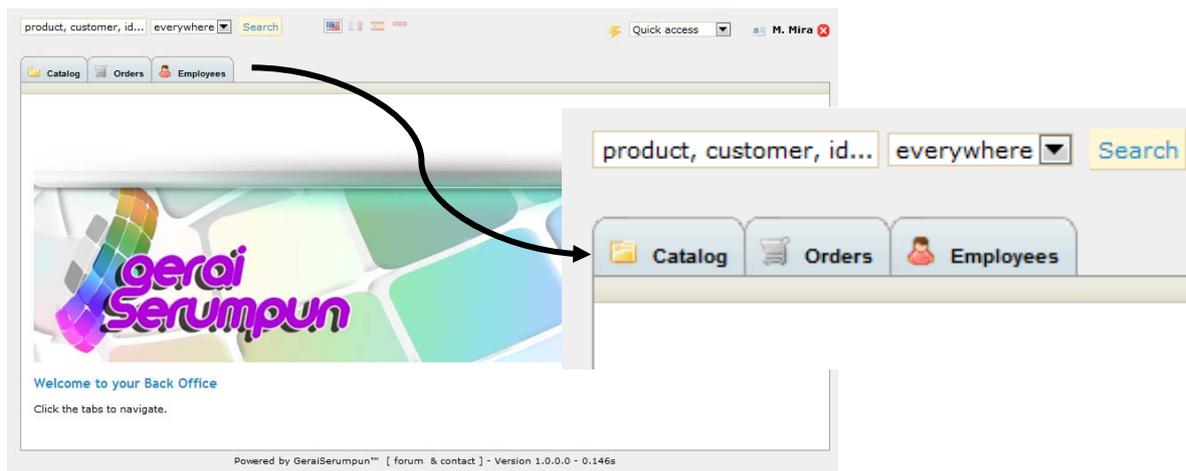


Figure 1 Student's (Seller) Page of Geraiserumpun.com

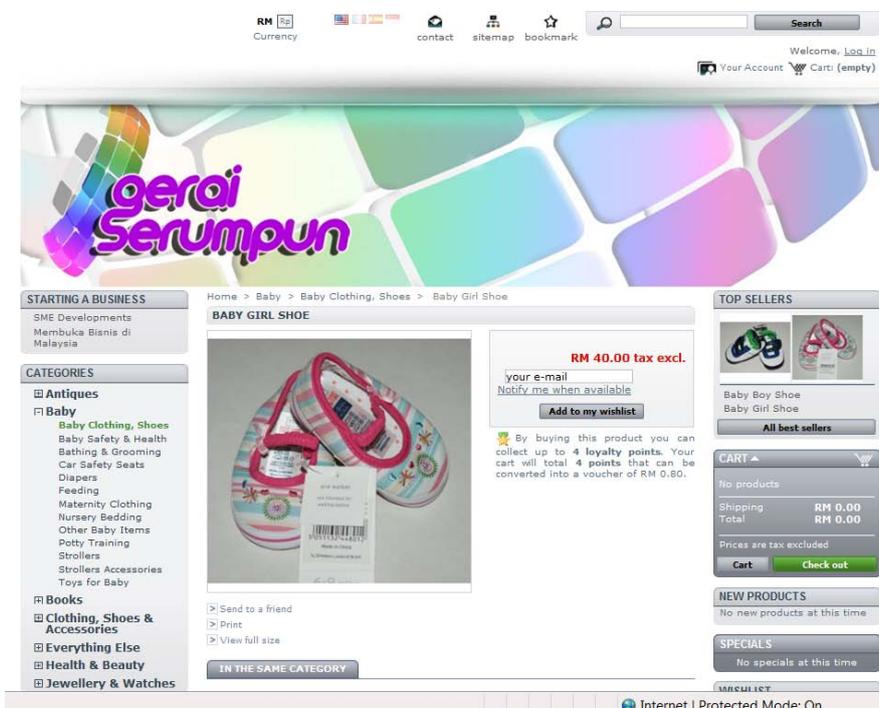


Figure 2 Product Catalogue of Geraiserumpun.com

## 4. Methodology

The aim of this research is to investigate the potential use of electronic commerce (e-commerce) portal as an entrepreneurship course teaching tools. A survey was carried out to explore the potential benefits of implementing such portal as an educational tool and incubator to enhance the entrepreneurship skills among our youth in higher education institutions.

In order to accomplish the above aims, a purposive sampling was used in this study to obtain useful information from local and international undergraduate and postgraduate students studying in International Islamic University Malaysia. Given the nature of purposive sampling, respondents were chosen from different disciplines according to a pre-set quota. In this pilot study, however, the respondents' discipline will be divided into two categories, namely business and non-business disciplines. Each discipline category will be represented by an equal number of respondents.

Self-administered questionnaires were distributed to targeted students. This method allowed respondents to clarify doubts and ask questions on the spot and thus motivate respondents to

participate in the survey. During this pilot survey was conducted, 110 questionnaires were distributed to graduate and postgraduate students within a period of one week.

## 5. Results

The aim of this research is to investigate the potential use of electronic commerce (e-commerce) portal as an entrepreneurship course teaching tools. A survey was carried out to explore the potential benefits of implementing such portal as an educational tool and incubator to enhance the entrepreneurship skills among our youth in higher education institutions.

Cross tabulation and Pearson Chi-square were used to analyse the data obtained from the questionnaires. Gender, level of education, student's educational discipline background and their intention to start their own business were crossed with the perceived of benefits of using e-commerce portal to enhance their learning experience in entrepreneurship course.

**Table 1** Chi-square Analysis of Perceived Benefit of Using E-commerce Portal among Males and Females Students

Gender	n	E-commerce portal will enhance my entrepreneurship course experience		$\chi^2$	p
		Yes	No		
Male	55	39	16	.767	.381
Female	55	43	12		

An examination of Table 1 shows that there is no significant relationship between gender and students' perceived benefits of using the e-commerce portal in their learning experience. This result confirms earlier work by Veciana et.al [12] who found similar finding in their study of university students' attitudes towards entrepreneurship in Puerto Rico.

**Table 2** Chi-square Analysis of Perceived Benefit of Using E-commerce Portal among Undergraduate and Postgraduate Students

Degree	n	E-commerce portal will enhance my entrepreneurship course experience		$\chi^2$	p
		Yes	No		
Undergraduate	73	54	49	.038	.520
Postgraduate	37	28	9		

An examination of Table 2 also shows no significant relationship found between students' level of education and their perceived benefits of using the e-commerce portal in their learning experience. Despite an earlier finding of a study conducted by Bates [13] who suggests that people with higher level of education are more likely to have a positive attitude towards entrepreneurship compared to those who do not, clearly it does not demonstrate in the current study.

**Table 3** Chi-square Analysis of Perceived Benefit of Using E-commerce Portal among Business and Non-business Disciplines Students

Discipline	n	E-commerce portal will enhance my entrepreneurship course experience		$\chi^2$	p
		Yes	No		
Business	55	36	19	4.791	.029
Non-business	55	46	9		

To investigate whether students from business and non-business discipline differ on their perception towards the benefit of using e-commerce portal in their entrepreneurship course, again, a Chi-square was used. An examination of Table 3 shows the Pearson chi-square result indicates that students from business and non-business discipline background are significantly different on their perception toward the benefits of using the e-commerce portal in their learning experience.

In the current study, the result shows that students from non-business discipline are more likely to perceived the benefits of using e-commerce portal compared to those from business discipline ( $\chi^2 = 4.791$ ,  $p < .05$ ). Such difference is perhaps due to a better knowledge and exposure to greater business context that students from business discipline have, thus inspire them to enhance their entrepreneurship through other means. While for students from non-business discipline, an e-commerce portal could be seen as an easier way to experience a 'real world' of entrepreneurship [4].

**Table 4** Chi-square Analysis of Perceived Benefit of Using E-commerce Portal among Students

Plan to open a business in the future	E-commerce portal will enhance my entrepreneurship course experience			$\chi^2$	p
	n	Yes	No		
Yes	81	64	17	5.355	.021
No	22	12	10		

An examination of Table 4 shows the Pearson chi-square result also highlight significant relationship between students' intention to open a business in the future and their perception of benefits of using the e-commerce portal in their learning experience.

As expected, the result shows that students who plan to open a business in the future are more likely to believe that the use of e-commerce portal will enhance their entrepreneurship course experience ( $\chi^2 = 5.355$ ,  $p < .05$ ).

## 6. Conclusions

This paper mainly highlights two important findings. First, align with the findings of previous studies [4, 5, 7], student's attitudes towards starting their own business significantly impact the entrepreneurial learning experience. This thus lead to the second finding, that is, the enterprise education should be tailored to suit the non-business disciplines where many business/product ideas emerge, but are often ignored because the students are not adequately educated with the knowledge and skills required.

Therefore, it is critical for higher educational institutions to engage experts from multidisciplinary background when designing programmes to suit different student groups. This will then improved students' awareness of the reality of working in their field. Also, perhaps at the same time, the well designed entrepreneurial education programmes will provide the students with awareness, interest and preparation for self-employment as a career alternative.

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# E-commerce and Female Entrepreneurship Development in Urban and Rural Developing Countries

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The importance of the small to medium enterprise (SME) sector as the cornerstone of most economies is widely recognised. This is not only borne out by the number of SMEs (almost 90% of the total number of businesses across the world), but also by their significant role in creating employment opportunities. SMEs are considered to be the only realistic employment opportunity for those in lower income brackets, especially women in developing countries. However, studies also show that there are inherent issues impede the growth of female-owned SMEs, particularly those in rural areas in developing countries. Among others are the difficulties in accessing financial assistance to set up a business, the child-rearing obligation which limits women's mobility and access to information of the available market. Electronic commerce (e-commerce), on the other hand, has radically changing the dynamics of the business environment and the way in which people and organizations are conducting business with one another. For SMEs, e-commerce has the potential to become a source of competitive advantage. E-commerce is a cost effective way of accessing customers globally and competing on par with large businesses. Despite the many benefits of e-commerce, little research has been done to investigate the role of e-commerce in mitigating the location and gender specific barriers to SME growth. Therefore, it is the aim of this study to address such gap in the literature, as well as to identify strategy that can be used to stimulate the development of female-owned SMEs in urban and rural developing countries, using Indonesia as case study.

## Keywords

Developing Countries, Electronic Commerce, Entrepreneurship, Gender, Rural Development.

## 1. Introduction

For developing countries, integration into the global economy through economic liberalisation, deregulation, and democratisation is seen as the preeminent way to overcome poverty and inequality [1]. SMEs are considered to be the only realistic employment opportunity for those in lower income brackets, especially women [2, 3] in developing countries. This is especially the case for most of the countries in the Sub-Sahara, South East Asia, and lower income parts of Latin America, where the private economies are almost entirely comprised of SMEs [3].

Electronic commerce (commonly referred to as e-commerce), is where business activities are enhanced and accelerated by the Internet, and is one of the technologies being promoted by Governments to address some of the critical issues affecting SMEs [4]. It provides the opportunity for low-cost entry into the global marketplace [5] where this was once seen as impossible for the SME sector. Among other advantages noted in the literature, are increased access to markets [6], increased partnerships between large/intermediate and small businesses [7], and improved communications with customers and suppliers [8]. Given the benefits of e-commerce discussed above and the strategic roles of SMEs, more and more Governments both in developed and developing countries are now promoting the use of e-commerce in SMEs. However, developing countries are facing different challenges compared to their developed counterparts.

One of the renowned challenges to developing countries is the widening development disparity between urban and rural areas. In their report titled “Reducing disparities: Balanced development of urban and rural areas and regions within the countries of Asia and the Pacific”, the United Nations [9] suggests that rural-urban disparities continue to be much in evidence because development policies are largely determined by urban-based groups, especially those in the main cities. This means that there is little awareness of the actual rural needs or the problems facing rural SMEs, as policies are pre-occupied with urban issues. As a result, many of the policies and development strategies in developing countries seem to be directed to giving more privilege to some groups while the majority of the population feel left out [9]. Therefore, in order to mitigate the urban-rural development disparity and to provide the same opportunities for rural SMEs to grow and succeed, an understanding of the actual needs or the problems of rural areas requires urgent attention. Particularly, promoting e-commerce use to increase female entrepreneurs SMEs’ competitiveness and identifying the urban-rural differences facing SMEs in adopting e-commerce are essential first steps. This is extremely important if Governments believe that e-commerce can foster economic development.

However, no previous research has attempted to examine how e-commerce is being adopted by female-owned SMEs – or issues that inhibit them to adopt – by comparing the situation in urban versus rural areas, particularly in developing countries. Therefore, it is the aim of this study to fill this gap in our knowledge by investigating the differences in e-commerce adoption between urban and rural female-owned SMEs in developing countries, using Indonesia as a case study.

## 2. E-commerce and SMEs in Indonesia

Small and Medium Enterprises (SMEs) historically have played vital roles in the Indonesian economy. They continue to receive significant attention from both Indonesian policy-makers and researchers. This importance is reflected through the high proportion of SMEs in Indonesia, the level of employment in Indonesian SMEs, and the percentage of GDP attributable to SMEs (see Table 1). A survey conducted by the Indonesian Central Bureau of Statistics [10, 11] shows that the majority of SMEs are located in rural areas and are linked to the local economy. As such, SMEs are becoming important players in the development of regional economies and communities as well as in the elimination of poverty by providing job opportunities, particularly for women and people in lower income brackets.

**Table 1** Proportion of Small and Medium Enterprises Contribution to GDP

		2009
		Percent
1	Small Enterprises	43.06
2	Medium Enterprises	13.47
<i>Total SME contribution to GDP</i>		<i>56.53</i>
3	Large Enterprises	43.47
TOTAL		100.00

Source: DEPKOP (2010) Indonesian Statistics of SMEs, <http://www.depkop.go.id>

Furthermore, the growth of SMEs in Indonesia has been dramatic. Currently there are a total of more than 40 million SMEs in Indonesia - in 2009, they accounted for 99.9 percent of the total number of enterprises (see Table 2). Indonesian SMEs has been able to adjust to financial crisis and maintain employment levels while other sectors of the economy have contracted.

**Table 2** Number of Small Medium Enterprises in Indonesia

		2009	
		Unit	percent
1	Small Enterprises	52,723,470	99.92
2	Medium Enterprises	41,133	0.07
		52,764,603	99.99
3	Large Enterprises	4,677	0.01
TOTAL		52,769,280	100.00

Source: DEPKOP (2010) Indonesian Statistics of SMEs, <http://www.depkop.go.id>

As can be seen from the data in Tables 1 and Table 2, SMEs play a key role in the economic development of Indonesia and this has led the Indonesian government to give greater attention to the sector as a whole. SMEs are now a focus of employment opportunities, a large contributor to economic and social development through diversification and provide a structure that can promote and sustain long term economic growth [12].

The prospects of e-commerce in Indonesia are bright as there is a rapid increase in the number of Indonesian connected to Internet, which has placed the country in the “Asia Top 10 Internet Countries” [13]. In recognising the prospect of e-commerce and the importance of SME growth to the national economy, the Government has taken several initiatives dedicated to promoting and encouraging SMEs to go online. This is manifested in symposia and forums organised for SMEs [14, 15], online websites, television and radio programs as well as articles in the media [16].

By adopting e-commerce, the Government aims to improve SMEs access to information – such as to find potential buyers; to locate product/service suppliers; and to undertake price/product comparisons. Other expected benefits of e-commerce were improved marketing and improved competitiveness [17]. Although many programs and incentives have been initiated for SMEs, the level of e-commerce adoption among SMEs is still low in Indonesia. Hence, in order to understand the lack of, or slow uptake of e-commerce technologies, one should look into the environment in which they operate. In addition, previous studies [18, 19] also highlight the significant influence of gender on the perceived factors that inhibiting the uptake of e-commerce.

### 3. Female-owned SMEs in Indonesia

Studies in developed countries show that women are one of the fastest rising populations of entrepreneurs [20]. They make a significant contribution to innovation, job and wealth creation in many economies. However, recent studies also show that the level of women participation in entrepreneurship varies significantly from country to country, and in spite of national variations, women participation rates across countries is measurable at about two-thirds that of men [21, 22].

Despite the rapid growth of women participation in entrepreneurship across the globe, the participation of women in entrepreneurship is still at a very low level. The number of business actors or entrepreneurs in Indonesia is under two percent of the total population, whereas of this, the population of female entrepreneurs is still below 0.1 percent [23]. This low level of women participation in entrepreneurship may be attributable to, among others, the difficulties in accessing financial assistance to set up a business [21, 24]. Other possible caused, particularly in developing countries, is the child-rearing obligation which limits women’s mobility and access to information of the available market [25] and other networks in acquiring resources [26].

### 4. Methodology

The study presented here is part of ongoing study into IT and e-commerce adoption in small to medium sized enterprises in Indonesia. The larger study was concerned primarily with SMEs located in rural areas, especially since no other research has investigated e-commerce adoption specifically in these areas. As a result, the study was conceived primarily as exploratory in nature.

In conducting the survey, the draft questionnaires (both adopter and non-adopter version) were pre-tested by six SMEs entrepreneurs (with 4 adopters and 2 non-adopters). These entrepreneurs were

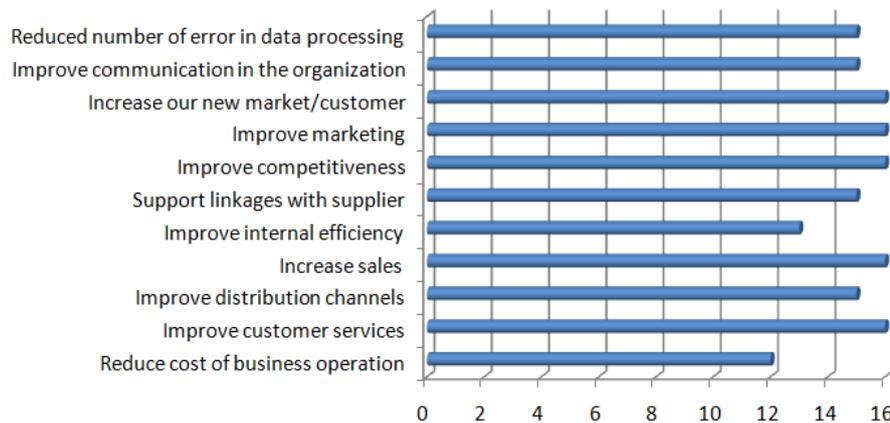
the participants that also contributed to the qualitative phase of this study. The pre-testing provided constructive feedback that served to ensure that the questionnaire could be administered in less than half an hour, that items on the questionnaire were easy to read and understand, that the survey was free from ambiguity and bias, and that the terminology was relevant to SMEs entrepreneurs. Modification was made in accordance with their suggestions.

The final version of the questionnaire was then translated into Indonesian language (Bahasa Indonesia) by the researcher, and was then reviewed and edited with the assistance of IT consultants and lecturers in Indonesia. The questionnaire was then translated back to English by a different person so as to ensure that the translated instrument carried the same meaning as the original version.

A total of 330 questionnaires were distributed, and only total of 179 responses was collected, which gave a response rate of 54.24 percent. Of these usable responses, only 36 respondents were female – with 16 e-commerce adopters and 20 non-adopters.

## 5. Results and Findings

It is the aim of this study to investigate the differences in e-commerce adoption between urban and rural female-owned SMEs in developing countries, using Indonesia as a case study.

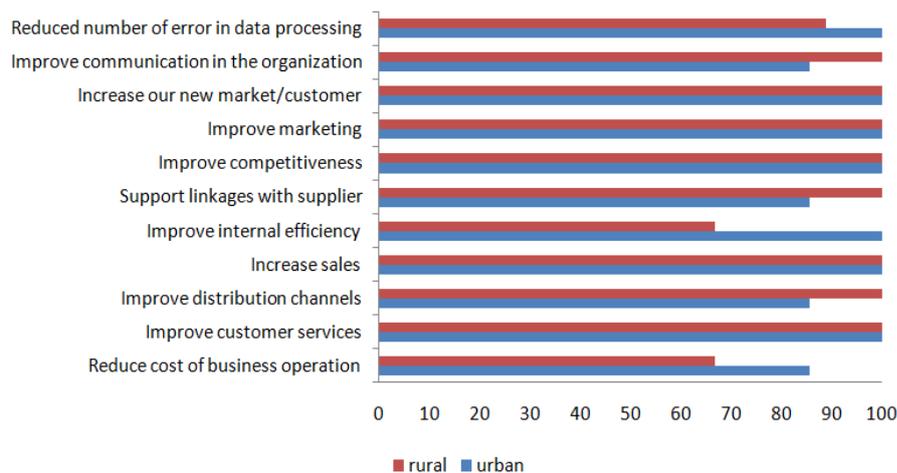


**Figure 1** Benefits of E-commerce Experienced by Female-owned SMEs

An examination of Figure1 shows that, among adopter respondents, it is found that most of the benefits of e-commerce suggested by previous studies were also experienced by female entrepreneurs in Indonesia. However, among the identified benefits, only small number of female entrepreneurs agreed that e-commerce had helped them to reduce cost of business operation. In order to better explain the possible cause of such phenomenon, the data was then divided according to their business location to enable the comparison between urban and rural areas.

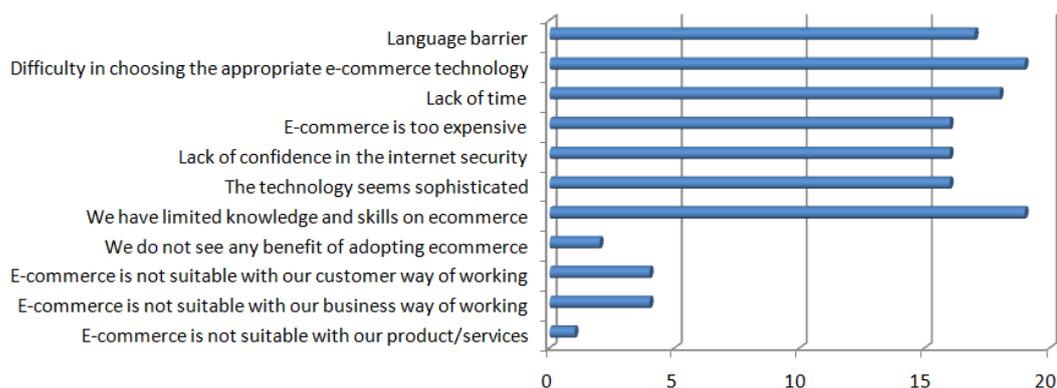
The comparison of the results from the two locations as indicated in Figure 2 shows that there is similar experience on some of the benefits generated from e-commerce adoption. These are: increased our new market/costumer, improved marketing, improved competitiveness, increased sales, and improved customer service. Interestingly, there are two benefits of e-commerce that was rated differently by women entrepreneurs in urban and rural areas, namely improve internal efficiency (urban = 100%, rural = 66.7%) and reduce cost of business operation (urban= 87.5%, rural = 66.7%).

The smaller number of female entrepreneurs in rural areas experienced the 'improved internal efficiency' benefit of e-commerce compared to those in urban area, may be attributable to the nature of the businesses in this area. Generally businesses in rural area are family businesses and many of the decisions are made personally by the entrepreneur, thus make corporate structure simple and did not require a complicated internal mechanism.



**Figure 2** Benefits of E-commerce Experienced by Female-owned SMEs in Urban and Rural Areas

Whereas, the smaller number of female entrepreneurs in rural areas found that e-commerce had helped them to reduce the cost of business operation highlights the development disparity between urban and rural areas in Indonesia. While the urban businesses have the privilege to enjoy a fast connection broadband, many of the rural businesses are connected to the Internet using a dial up connections. This dial up service is often too slow as some area the speed may only be about 20-23 kbps, and yet they still have to pay for an expensive metered call [27, 28].

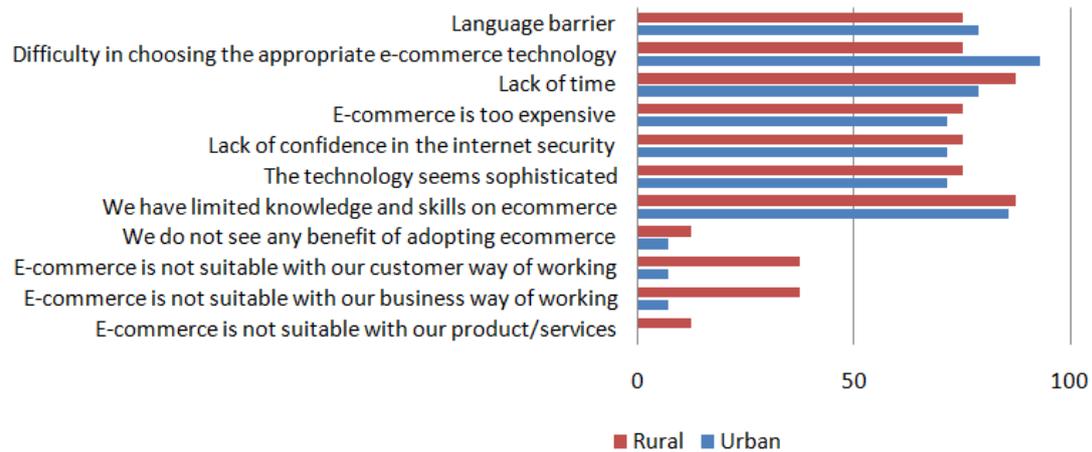


**Figure 3** Barriers to E-commerce Adoption Experienced by Female-owned SMEs

In examining the barriers to e-commerce adoption, Figure 3 shows that, among non-adopter respondents, it is found that most of the inhibiting factors to e-commerce adoption by Indonesian female entrepreneurs were the lack of knowledge and skills on using e-commerce, and difficulty in choosing appropriate e-commerce technology that suitable for them. However, different to expectation, only a very small number of respondents found the inability to perceive the suitability of e-commerce to their product and services as well as other benefits of this technology, to be the inhibiting factors.

Again, the data was then divided according to their business location to enable the comparison between urban and rural areas.

The comparison of the results from the two locations as indicated in Figure 4 shows that there are differences on how barriers were perceived by female entrepreneurs in the two locations. It is found that 92.9% of the e-commerce non-adopters in urban area believe that difficulty in choosing the appropriate e-commerce technology was the most important barriers that led them to forgo the adoption of this technology.



**Figure 4** Barriers to E-commerce Adoption Experienced by Female-owned SMEs in Urban and Rural Areas

Whereas in rural area, as expected, the two key inhibiting factors to e-commerce were the lack of knowledge and skill of using e-commerce and the lack of time to adopt. This results echo previous findings of Minniti et.al [26] and Handy et.al [29] who found that rural women tend to have less access to education and other resources compared to those located in urban area.

Clearly, as the results show in this study, there are different challenges faced by female entrepreneurs in urban and rural area. This highlights the need for a different set of strategy to be implemented in these two location categories. Perhaps, to increase the awareness of e-commerce in rural area, the Government could develop a *telecentre* in the same area as where the local kindergarten or primary school is. This, thus, will enable the local rural women to participate in various training activities provided by the Government by not leaving their main duty to take care of their children.

## 6. Conclusions

This study has shown that e-commerce has successfully level the playing field. With the development of e-commerce, female entrepreneurs will be able to enjoy a convenient access to a greater market improved their business competitiveness. E-commerce has also become an important avenue of the IT-enabled home based working. The e-commerce technology had provided an easier and cost efficient for female entrepreneur, particularly those in urban area, to run a viable business from home. This finding advocates the need to promote the use of e-commerce within women-owned SMEs as suggested by UNCTAD [30]. In the report, UNCTAD [30] considers e-commerce as a “potential gold mine for women in developing countries”, since it opens the opportunities for self-employment for women in the developing world, be they micro-entrepreneurs or women working from home, to earn income and save time and costs while also meeting their family responsibilities. Success stories recorded in that report included the e-marketplace called IndiaShop in India that has eliminated middlemen in the selling of saris and also a nationwide housewives’ network in Peru, Tortasperu, which bakes confectioneries and sells them over the Internet.

The finding of this study also shows that a greater attention is needed to be geared towards increasing the female entrepreneurs’ capabilities particularly in relation to ICT areas by taking considerations of their locations and the responsibilities they have to ensure the work-life balance.

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# Professional education and entrepreneurship challenge for Albania.

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During the last 20 years, the close down and privatization in Albanian economy brought about a surplus in the labour offer for some key specialties and professions. The unemployed professionals changed occupation, or emigrated. A shortage of different professionals is feeling in the everyday life. The new developments have also created a remarked need for some new professions, which are performed by unqualified individuals by now. Meanwhile, there is a boom in higher education, not accompanied by the creation of specialists in these professions on demand; many of which can be created by the high school education. The Government of Albania has now understood that there is an imperative need to strengthen the high education that educates professionals. But in spite of the measures taken, there is still not the expected massivity in this kind of education, and potential high quality students prefer the general education, instead. Although there are reports of economic growth, there is not enough growth in the formal side of the labour market that may allow the employment of high school professionals. Those who choose this kind of education have no clear chances of employment, and the majority reorients their career on further education. The only possible way for them to make use of the profession taken by the high education, and for the country to move out of this crossroad, is to engage in private/individual enterprising.

As an economy in transition and inspiring European inclusion, Albania needs to create a sustained basis of growth. Self-employment sustained by the entrepreneurial learning is an important way for economic efficiency as well as an alternative way to joblessness.

Focused on the role of the Albanian professional education in creating the entrepreneur, the authors of this study analysed the Strategy of Education, the curricula and study programs of the professional education and conducted half structured interviews with school directors and curricula authors. The purpose was to understand how individual traits and behaviours, such as creativity, opportunity identification, risk assessment and risk taking, and resource management which make up the entrepreneurial character are included in the curricula. It came out that entrepreneurship is introduced as a key competence within mainstream curriculum. This is made possible by innovative teaching and learning arrangements that are part of the reform in education. Structured interviews with students of the professional schools were conducted, focused on the motives for choosing this education, the perceived possibility offered by the actual study programs.

## Keywords

Professional High School Education, Entrepreneurship Education, curricula.

## 1. The rationale

Until 1990, the words *mass production* and *massivity* were very familiar in Albanian reality. There was mass production in many industries, mass production in agriculture, massivity in education, etc. During the 5-year Plans of the State, the focus on education changed according to the transformations

in the economic sphere. Increased industrial investments modified the state's demand for educated people, orientating their capacities toward non-agricultural means of production. This demand was reflected in the number of vocational schools that sprang up with programs in technical professions that were designed to support industrial technological development. By 1980 the number of schools and teachers had tripled compared with 1960, clearly demonstrating the state's efforts to increase the quality and the quantity of education programs [1]. At the same time, the number of students had doubled, increasing both the average length of study and the percentage of people who completed primary education. The state's vision about secondary education in Albania was ambitious, and included objectives to increase the number of people with vocational training. (Table 1)

**Table 1**

Years	1950	1960	1970	1980	1990
<b>NUMBER OF SCHOOLS</b>					
Primary	193	557	1374	1559	1726
Secondary,vocational	17	69	131	263	466
Secondary,general	6	43	46	17	47
Tertiary	1	6	5	8	8
<b>NUMBER OF STUDENTS IN THOUSANDS</b>					
Primary	171	274.9	555.3	552.6	557
Secondary,vocational	5	14.1	50.1	133.1	138
Secondary,general	2	15.8	30.4	30.8	68
Tertiary	0.3	6.7	25.5	14.6	27
<b>NUMBER OF TEACHERS</b>					
Primary	4851	8569	18944	25980	28798
Secondary,vocational	171	511	1205	3660	7390
Secondary,general	91	502	1157	1732	2318
Tertiary	13	288	926	1103	1806

Source: Albanian statistical yearbook 1989.

Each year the number of students in vocational training was greater than the number enrolled in general secondary education, vocational schools far outnumbered those offering a general education. The vocational schools were diffused throughout the country, which was consistent with the state objective of increasing equity in educational achievement between urban and rural areas. The huge expansion was in response to the economy's need for professional skills in the labour force, mainly in agriculture and industry. On the other hand, general education was not popular and the state was less involved in expanding the number of such schools. They were nevertheless on the increase in the last years of the regime, from 17 institutions in 1980 to 43 in 1989. The number of students in higher education doubled from 1960 to 1980 and reached at 27,000 in 1990. Even so, the state was parsimonious in the recruitment of the students after completion of secondary education and the selection was made by rigorous vetting procedures [2]. About 40 percent of students finishing secondary school entered at the tertiary level in year 1980.

Education was generally of a high quality and based on strict army-like discipline, uniform programs, uniform methods of teaching and studying, uniform dress and uniform models of behaviour. Education on all levels was centrally controlled and highly bureaucratic, and was particularly influenced by the need for an instrument of ideological indoctrination [3]. The system rested on a triple foundation of theoretical learning, productive work and physical as well as military training. Above all, the educational system was meant to prepare young people for the entry into the centrally planned economy.

In this kind of system, the level of education attained by individuals had less to do with overall economic success than it typically does in a market economy. Many well-educated people during the communist period earned only a little more (and sometimes less) than production workers, although they did enjoy better working conditions, an important "non-wage benefit". Centralized planning artificially controlled the demand for education and employment.

To conclude, the communist regime made real efforts to increase of school attendance. At the end of the communist period in 1990, about 45 % of the population between 35 and 45 years had completed secondary education [4].

But there are years now that this *massivity* is no more a matter of fact. Close down, downsize, privatization, are the words in these last 20 years. This of course, was accompanied by a surplus in the labour offer for some key specialities and professions.

After 1990, the Albanian system of vocational education was abandoned in favour of general secondary schools. The ratio of students undergoing vocational training versus the total in secondary education was much lower in 2003-2004 than in 1990 [5], indicating a dramatic change in the educational system. Before 1990, vocational schools provided agricultural and industrial training, and 70% of the students attended those schools. After 1990, the unemployed and unwanted labour power educated in these professions, changed occupation, or emigrated. Most of schools were subsequently closed, and today vocational education does not play an important role in the context of secondary education [1]. The situation has worsened by the failure of vocational training in the regions.

Not only the state withdrew from financing such an expensive network of schools, but young people themselves are showing more interest in general education as a way to build opportunities in various types of postsecondary or higher education.

The specific nature of vocational training is lagging far behind young people's aspirations. The number of vocational schools in 2003-2004 was only 53 (a mere 4 of which were located in rural areas) compared with 454 schools in 1989. Pupils in vocational education represented about 16 percent of children registered in secondary education in 2004 (21,900 students). Vocational schools are a male domain, enhancing their professional orientation toward technical positions.

However, the type of qualifications, as well as the specific knowledge/skills that young people acquire in the educational system, often does not fit the labour market demands. Albania's market reforms did not create efficient links between schools and enterprises. Examples still exist of narrow vocational training for employment in industries for which demand has now collapsed.

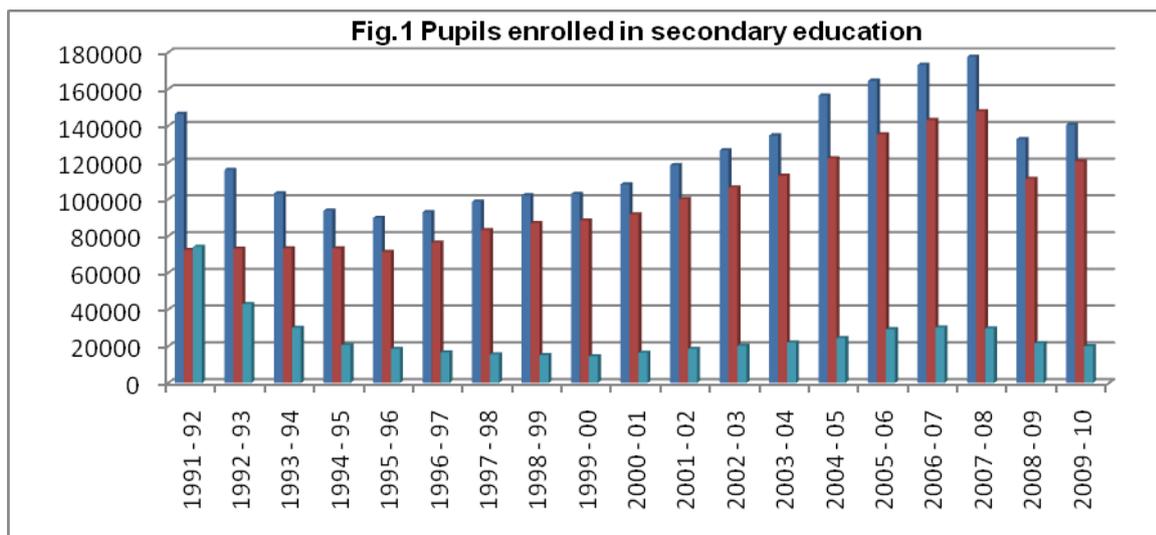
The centrally planned economy's historical emphasis on industry and agriculture at the expense of services had major implications for the education system. Every day now, a shortage of different professionals is feeling in the everyday life. The new developments have also created a remarked need for some new professions, which are performed by unqualified individuals by now. Meanwhile, there is an increase in massivity in higher education, not accompanied by the creation of specialists in these professions on demand; many of which can be created by the high school education.

According to OECD evaluation [6] Albania's young people, like those in other transitioning countries, need to prepare for a world where they will have to make intelligent choices, solve un-anticipated problems, and take responsibility for finding their own paths in a rapidly changing economy. None of these skills was highly prized under the old system—centrally planned economies emphasized the learning of carefully selected facts, because they left little room for uncertainty, and they did not encourage independent thought. By contrast, life in a market economy means that most young people will change jobs and occupations several times during their working lives, and to do this they need independent thinking and learning skills[7]. Pupils are probably still over-tested but under-assessed in terms of flexible skills.

The Government of Albania has now understood that there is an imperative need to strengthen the High Education that educates professionals. Vocational Education follows right after the 9-year basic education track and has as its main goal to enable students to develop vocational skills and practical knowledge. This type of education yields craftsmen with the necessary skills for a specific job, but also allows pupils to carry on with higher education.

During the academic year 2009-2010, a new Vocational Education structure (41 vocational schools in total) is introduced. It consists of three levels (2, 3 and 4 years of education). This structure is in conformity to the International Standard Classification of Education (ISCED), with the Albanian Qualification Framework (AQF) and with the European Qualification Framework (EQF). Commencing with the 2009-2010 academic year, vocational schools apply the new Frame Curricula for Level I (covering 22 educational profiles), which is developed by the National Agency of Vocational Education and Training (NAVET). The level II of VET will comprise two or additional profiles, in order to keep up with labour market needs.

But in spite of the measures taken, there is still not the expected massivity in this kind of education, and potential high quality students prefer the general education, instead (Figure 1).



Source: Developed by the authors over the data from the Ministry of Education.

As we see in the red column, the General Education has its high and low developments in these 20 years of decentralised economy, but the Vocational Education enrolment (the turquoise column) is always comparatively low.

Although there are reports of economic growth, there is not enough growth in the formal side of the labour market that may allow the employment of high school professionals. Those who choose this kind of education have no clear chances of employment, and the majority of them reorient their career on further university education. The only possible way for them to make use of the profession taken by the higher education, and for the country to move out of this crossroad, is to engage in private/individual enterprising. In these grounds, many questions arise: How much is the high education, especially the professional direction helping to develop the entrepreneurial capabilities of the students? How many individuals graduated the professional education have opened their own activities? What is the actual entering cost in the actual market for a certain profession? Is there any state policy in favour of this entrepreneurship?

The individual motives and attitudes of the students themselves are the other very interesting side of the token. Are they conscious that many of them will have to cope with the challenge of creating their own employment? How much do they feel supported from the actual study programs to cope with this immediate future challenge? Is there applied any selection policy by the professional schools, based on the knowledge that the entrepreneur has some special personality characteristics? Some of these questions were in the base of our inquiry and what we discovered is broadly explained in the following parts of this paper.

## 2. Literature review

For the purpose of this study, a literature review was considered, with the main concern on: The role of formal education in developing the entrepreneurs' characteristics; the characteristics of the entrepreneur, and the role of entrepreneurial education in a country's development.

Empirical data shows that the development of enterprise within a country can create wealth for the country by lowering unemployment levels, reducing the dependence on welfare and generate tax revenue for the country [7]. Governments can take direct policies to promote entrepreneurship within their country ranging from financial initiatives to educational training [8]. Carter and Wilton [7] discuss the importance of entrepreneurial education in government policy citing the example that "just making finance available without the training on its proper management is inadequate". It can therefore be seen that there is a growing desire not only for entrepreneurship within a region but also entrepreneurial education.

Entrepreneurial education is continually increasing in developed countries with the level of courses provided at higher educational institutes greater than ever [9]. According to Chell and Allman [10], "over the last two decades there has been an increase in the number of courses and programs aimed at entrepreneurship and enterprise." There has also been an increase of entrepreneurial education in developing nations with focus on using entrepreneurship as a method of economic development in these regions [11]. As Falkäng, Kyro and Ulijn [12], "The past twenty years have witnessed an

enormous growth in the number of entrepreneurship courses at different educational levels" There are many forms of entrepreneurial education ranging from pre-university entrepreneurial education at both a primary and secondary level and also both publically funded and privately funded entrepreneurial programs at both a local and national level [13].

There is an on-going debate as to whether an entrepreneur is born or can be created through entrepreneurial education [14]. Vivarelli and Santarelli [15] state that the entrepreneurial personality can be described as follows: "innovative, flexible, dynamic, risk-taking, creative and growth-oriented". Drucker [16] on the other hand argues that the viewpoint that one is either born with or without an entrepreneurial personality is false. Instead he concludes that all successful entrepreneurs had made a "commitment to the systematic practice of innovation" [16]. The belief that the entrepreneur can be created is furthered with the idea that this systemic approach can be fostered through entrepreneurial education.

Policy makers in Europe have identified education as an instrumental factor in developing entrepreneurship. The European Commission in 2006 published the "Oslo Agenda for Entrepreneurship Education in Europe" to ensure that EU members were focused towards increasing entrepreneurial education. According to the European Commission [17], "Entrepreneurial programs and modules offer students the tools to think creatively, be an effective problem solver, analyse a business idea objectively, and communicate, network, lead, and evaluate any given project." By encouraging entrepreneurship in this manner, there is an underlying assumption that policy makers believe that entrepreneurial skills can be taught.

Government backed entrepreneurial programs are also increasing, which demonstrates that there is a belief at an administrative level that this type of education has positive social and economic results. As Edelman, Manolova and Brush [18] discuss, entrepreneurship is a "major public policy concern because of [its] impact on economic growth, particularly job creation." The society and the business world require and demands entrepreneurial competencies, which place more stress on the individual's attitudes and skills than before [19] and that it is of interest to study how entrepreneurial education affects the attitudes and motivations of those undertaking this types of programs. It is now widely recognized in education that it is important to promote entrepreneurial attitudes and behaviour. Moreover that Europe must stimulate the entrepreneurial mindset and encourage innovative business and new start-ups [20]. Attitude and motivation have an important role as they have been reported as the most critical factors for success in learning [21]. There is also widespread perception that motivation is the most important factor in educational success in general [21].

Entrepreneurial development is a key focus on any government's agenda due to the fact that it has been shown to provide solutions for a country's social and economic problems.

### **3. The role of the Albanian vocational education in creating the entrepreneur**

Education is a long-term investment widely considered as an important basis of growth and competitiveness [22]. This recognition is generating new policy interest in the potential of entrepreneurial learning for improving productivity, innovation and economic growth. There are two broad considerations about the effect of the entrepreneurial education: it contributes to the competitiveness (the efficiency model), and it contributes to socio-economic inclusion (the equity model). Theoretical and empirical support is strong for both models [23] and is included in the EU Lisbon Strategy for Growth and Jobs. Being an economy in transition, and inspiring European inclusion, Albanian economy needs to create a sustained basis of growth. Self-employment sustained by the entrepreneurial learning is an important way for economic efficiency as well as an alternative way to joblessness [24].

#### **3.1 The Curricula**

As education is considered important in shaping the entrepreneurial mind, the notion of entrepreneurship is a competence that needs to be included in education. Professional high education was in focus of this study. Authors of this study are conscious about the conceptual problem created by concentration only on the high education, while conscious that the society's efforts in education of the new generation are very complex, not only through school.

Focused on the role of the Albanian professional education in creating the entrepreneur, the authors of this study analysed the curricula and study programs of the professional education. It comes out that

entrepreneurship is introduced as a key competence within mainstream curriculum. This is made possible by innovative teaching and learning arrangements that are part of the reform in education. Authors of the study analysed the curricula trying to understand how individual traits and behaviours, such as creativity, opportunity identification, risk assessment and risk taking, and resource management which make up the entrepreneurial character are included. It comes out that there are no specific subjects addressing these characteristics in the curriculum of the professional schools, although in The National Strategy of Education [25] there are some provisions focussed on teaching and learning arrangements for entrepreneurial learning (although the term “entrepreneurial learning” can be found nowhere in this Strategy). Although the professional education is now constructed in layers (as mentioned above), there are no specifications in the Strategy about these different levels of education. Curriculum adjustments and teacher training is mentioned in the national Strategy together with compulsory or elected subjects, out-of-the school activities, and cooperation between schools and enterprises, without specifications on levels of the professional education. There can not be found indicators on the built up intelligence on entrepreneurial learning, and nowhere is mentioned how the developed information on this will be reported and broadcasted.

Parallel to that, *half structured interviews with 10 school directors and curricula authors were conducted*, focused on the intended possibility of the study programs on educating entrepreneurs. The first thing to be discovered was that the discussion could be conducted only for the vocational schools on economy. The other professional schools like those in arts, electronics, etc had no orientation on entrepreneurial education as there are no subjects to address opportunity identification, risk assessment, risk taking, resource management, marketing, or business plan included in their curricula [26].

### **3.2 Pupils' selection**

Based on the knowledge that the entrepreneur has some special personality characteristics, the authors of this study interviewed the professional school directors about the selection policy applied by the professional schools. The selection criteria more frequently mentioned by the professional school directors were: the *overall grade* of the previous level of education, the grade taken in *Mathematics* subject in previous levels of education and the grade in *Albanian language* subject.

### **3.3 Professional practice**

80% of professional school directors interviewed answer positively-to moderate to the question: Do you believe that professional practice really helps pupils to have a sense of reality?

But in a scale from 1(not at all) to 5(completely), only 2 of 7 professional school directors choose nr 5 to answer the question: How much do you think your school makes pupils ready to have a private activity of their own after graduation? Five of them give answers ranging from level 3 to 5, giving a total of 70% moderately positive to positive answer to this question.

### **3.4 Pupils perceptions and motives**

With the purpose of understanding if there were individual motives for choosing this education, and the perceived possibility offered by the actual study programs, authors prepared standard questionnaires. The underlying research questions were: Are they conscious that many of them will have to cope with the challenge of creating their own employment? How much do they feel supported from the actual study programs to cope with this immediate future challenge?

Considering the conclusions taken by the curricula analysis explained above, the authors were concentrated on the professional high schools offering education on *economy*. 150 questionnaires (see Anex1) were distributed in pupils of 4<sup>th</sup> and 5<sup>th</sup> grade in Professional School of Economy in Tirana. 146 of them were filled by 61 male and 85 female pupils, 34 of which were 4<sup>th</sup> year and 108 in the 5<sup>th</sup> year of education.

Pupils of the professional schools interviewed do not seem to have much aspiration on entrepreneurship after finishing the studies. Only 8.2% of those interviewed (Tot.146) choose “having my own business” as the possible answer to the question: What do you think you will do after finishing this school? 86.99% of them will follow further education.

Pupils see many factors that keep them away from a possible entrepreneurship, but surprisingly enough, 50% of them believe “lack of capital” is the main reason, followed by the “competition” (15.75%) and “lack of experience” (10.96%). This is almost the same for male and female pupils, with the difference that female pupils are afraid from “lack of experience”, while males are more concerned

about the "high taxes". The reason "lack of capital" tells a lot about the level of information these pupils have, and how helpless they feel although they have subjects that teach them how to make a business plan, etc. Authors have reasons to believe this answer is not only a question of personal perception.

Meanwhile, to the question "Explain in a scale from 1(not at all) to 5(very much)how much this education you are getting helps you have your private activity after finishing this level of schooling", 91.4% answer from a level from 3 to 5, where 54.1% are for a level of 4 and 5.

They mention 18 subjects as a possible answer to the question "What are the subjects that teach you how to open a business of your own?" *Accounting* is the more mentioned subject by 74.66% of the pupils, followed by *Economy of enterprise* (63.7%), *General economy* (27.4%) and *Macro economy* (21.9%).

It is clear that they get a lot of knowledge in the field of economy, but authors are not enthusiastic about the real abilities of these pupils to become entrepreneurs once finished the high school.

#### 4. Main difficulties to perform this study

Authors had planned to include even an evaluation of the actual attitudes of the individuals graduated during last five years, who have their own professional business. Semi-structured questionnaires were constructed to interview individuals fulfilling this criterion. But because some technical problems like: impossibility to identify successful entrepreneurs graduated from the professional high schools and the wide spread of the subjects, this part of research could not be performed. Thus, we are missing important information about the actual value of the professional education on entrepreneurship and self-employment. Authors are also conscious that they are partial by concentrating only on a certain category of education (high professional), while knowing that there is still a strong tendency to pursue the high education way as the safest possible way of life in Albania.

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# Learning through Entrepreneurship: Infusing Immigrant Entrepreneurial Knowledge to Entrepreneurship Education for Students and SMEs

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The present paper discusses the concept of entrepreneurship in relation to emerging challenges of global markets and changing enterprise, and the ability of higher education to adjust to these challenges and deliver high quality learning outcomes for both students and SMEs. Immigrant entrepreneurship is emphasized as a tool to provide the necessary knowledge and real life experiences that may promote entrepreneurial learning in cross-cultural environments. It is believed that learning through the experiences of immigrant entrepreneurs can lead to a better understanding of the obstacles, challenges, and facilitating factors for successful entrepreneurship in times of economic hardship and globalization. This knowledge can later be infused into higher education curricula in order to better reflect the needs of students and SMEs in developing international and cross-cultural capability. Although immigrant entrepreneurship has been mostly studied in relation to ethno-cultural characteristics and processes, we offer a new approach that may potentially lead to culturally-sensitive lifelong learning and training programs, and thus increase access to global markets.

## Keywords

Curriculum, Immigrants, International Entrepreneurship, Internationalisation, SMEs

## 1. Introduction

Immigration is not new to human nature. In fact, it can be surmised that immigration has played a key role to the survival of the human species throughout the centuries. In modern times, immigration can largely be seen as the shifting of people between countries. In most cases, immigrants move from a low-resource country, to a high-resource one, with the prospects of improving their overall quality of life and gain access to more opportunities for development and growth. Nevertheless, the society often views immigrants as low-skilled people intended to be employed in low-level and low-paid jobs [1]. Empirical research, however, points out that immigrants who take on entrepreneurship initiatives in a host country, are likely to outperform locals and lead growth in their area of interest [2-4]. Thus, entrepreneurship seems to play a key role in fulfilling immigrants' dreams for prosperity and improved quality of life, and helping them climb the social status ladder in the host country [5]. Furthermore,

entrepreneurship has the potential to renew existing organizations and increase social capital, develop new business and leverage national economies [6-8].

Embedding entrepreneurial culture within formal education systems is of vital importance as it can lead economic growth and sustainability in the future. Still, transmitting entrepreneurship skills to students or non-student populations (e.g., in SMEs) is not an easy task, and has led scholars to wonder if entrepreneurship can really be taught at all, or whether it reflects personality attribute [9-10]. Following a systematic review of the literature on entrepreneurship teaching in higher education, Pittaway and Cope [11] argued that there are areas for development and gaps in the existing knowledge base, as well as a growing need for cross-fertilization of research themes.

The present paper responds to that need by proposing immigrant entrepreneurship as a potentially new driver in entrepreneurship education. Specifically, it is argued that the knowledge base and teaching of entrepreneurship can be significantly enriched by the careful consideration of immigrant entrepreneurs' experiences in setting up and sustaining their businesses in cross-cultural settings. The development of learning frameworks that can complement and improve the existing knowledge-base and delivery of entrepreneurship education using the knowledge gained from immigrant entrepreneurship experiences that focuses on the lived experiences of immigrant entrepreneurs can provide students with a more realistic view of what it means to be an entrepreneur in a dynamically changing cultural environment, and may potentially highlight the skills needed to achieve this goal more effectively. Furthermore, focusing on the experiences of immigrant entrepreneurs provides a shift in our attention from theoretical perspectives, to more applied and realistic aspects of entrepreneurship that can hardly be conceptualized at a purely theoretical level. Finally, the challenges and prospects experienced by immigrant entrepreneurs can give an insight into the processes that promote (or hinder) entrepreneurship initiatives in the face of an emerging global market.

## **2. Characteristics of Immigrant Entrepreneurship**

Immigrant entrepreneurship has been a topic of special interest, especially in Europe [12]. Several theorists and researchers have argued that immigrant entrepreneurship can have different motives, ranging from labour market disadvantages, to group resources and opportunity structure [13]. In particular, immigrants may start up their own business as a way to overcome discrimination and block mobility in labour markets of the host country, or as means to achieve a higher quality of life [14-15]. Also, immigrant entrepreneurs may initiate small-to-medium enterprises that serve locals (e.g., ethnic restaurants and bars), focus on niche markets [16], or exclusively serve customers of the same ethnic origin and/or immigrant network [17-18]. According to the 'opportunity structure' hypothesis immigrants enter businesses that are of less interest to large-scale markets and require low human capital and financial resources [19-21], and in some cases the traits and attributes of their ethnic origin (e.g., religious beliefs, traditions) may shape their business opportunities and choices [22]. However, there are reported cases where immigrant entrepreneurs have leveraged progress in their field of interest, or successfully led big corporations [23-25]. Overall, it can be surmised that immigrant entrepreneurs have vastly different experiences from local entrepreneurs, both in terms of access to rights and opportunities, and drivers and motives to entrepreneurial culture. The diversity of the immigrant entrepreneur experience has attracted the research interest of anthropologists, sociologists, and even human geographers. We argue that the lived experiences of immigrant entrepreneurs can help researchers and theorists refine old concepts, and accordingly develop new learning frameworks of entrepreneurship that will benefit entrepreneurship teaching in higher education.

## **3. The Potential to Drive a New Model of Entrepreneurship Research and Teaching**

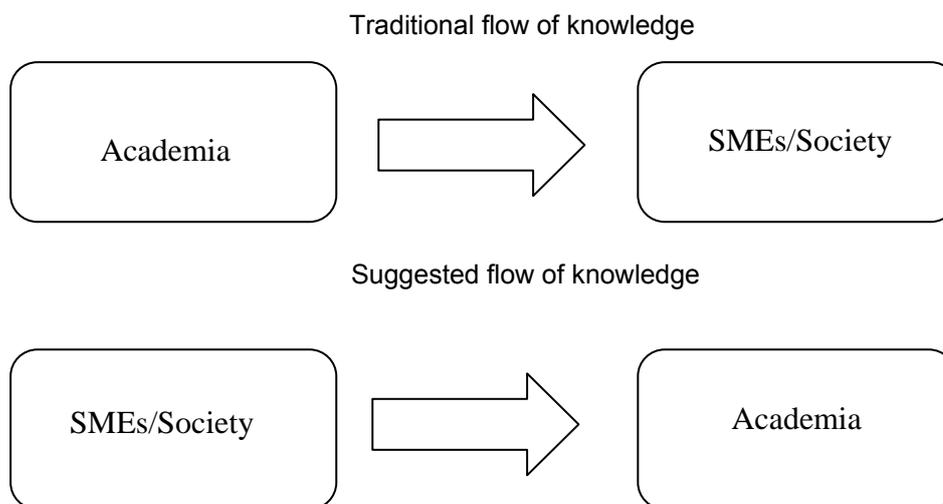
The current approach to entrepreneurship has been largely shaped by concepts that apply to large corporations, and can hardly reflect the dynamics and processes of small enterprises. Furthermore, the business concepts used tend to be culture-specific, and fail to grasp aspects of the globalizing economy. Consequently, the existing theoretical base of entrepreneurship is rather fixed, and relatively inflexible. This may lead to several problems, including a mismatch between theoretical concepts and views and realistic aspects of entrepreneurship, as well as limitations and outdated approaches to entrepreneurship teaching in higher education or in skills-training programs. Focusing on immigrant entrepreneurship can generate the knowledge needed to overcome these limitations,

and provide a more realistic aspect of entrepreneurial culture in an era characterized by global economic challenges and ongoing mobility of people between countries. A few examples can better illustrate this argument.

Firstly, immigrant entrepreneurship is a dynamic process, requiring the acquisition of the necessary skills, overcoming challenges (e.g., discrimination), and identifying potentially successful business opportunities. The arsenal of traits, skills, and behaviours needed to complete this task successfully may vary between ethnic groups of entrepreneurs in a country. Hence it is difficult to distinguish between 'successful' and 'unsuccessful' qualities, unless a tailor-made theoretical model of entrepreneurship is used. Such a model can greatly influence current conceptions and understanding of entrepreneurship, and would only be feasible if we take a closer look at the experiences of immigrant entrepreneurs. This way, the existing evidence and knowledge base of entrepreneurship would significantly widen, and allow for the development of culturally-sensitive models that better describe entrepreneurial cultural in times of global change.

Secondly, whereas large corporations' behaviour does not change very often (as it takes a lot of effort and risk to do this), small businesses must be very flexible and adapt to trends and new paths that might lead to success. It can be argued that the small enterprises of immigrants may represent case studies of business success and development (or failure), and this knowledge is important in at least two respects: a) it may inform governmental policies and plans for immigrant employment opportunities, and b) it may drive lifelong learning and skills acquisition programmes, and thus improve the learning of entrepreneurial skills.

The aforementioned arguments pinpoint that an emerging aspect may be missing from our current understanding and conceptualization of entrepreneurship. Addressing immigrant entrepreneurship also changes the generation and flow of knowledge in rather interesting ways (Figure 1). Instead of using theoretical concepts generated by the academia to inform society and SMEs, it is suggested that academic recognition that the immigrant entrepreneur is expert in their experiences will allow immigrant entrepreneurs to generate knowledge that will inform academia, refining traditional views and terminologies of entrepreneurship, or developing new ones.



**Figure 1** Flow of knowledge between academia and SMEs/Society

#### 4. Bolstering Entrepreneurial Learning

Learning, as a concept, has been defined in numerous ways by many different theorists, researchers and educational practitioners. Although a single definition cannot be given, many common elements can be observed in various definitions. According to Ertmer and Newby [26] learners use past experiences to create new knowledge. In the same direction, Shuell (as interpreted by Schunk [27]) conceives that "Learning is an enduring change in behaviour or in the capacity to behave in a given fashion, which results from practice or other forms of experience". Thus, learning may be conceived as continuous change in the observable behaviour of an individual, which can be acquired by interacting with situations like everyday experiences. However, this continuous change cannot be entirely defined in order to provide a suitable definition for learning and due to this, one can assume that a single

definition for academic learning will be problematic also. According to Laurillard [28] “when asking academics to define learning they come up with ambitious definition. Academics see learning as not simply a product, but as a series of activities, and developing skills and capabilities as much as formal knowledge”. This development of skills and capabilities provides a widely accepted framework for entrepreneurship learning which may be viewed through both concepts: learning and academic learning.

Entrepreneurial learning reflects the process by which entrepreneurs accumulate and use knowledge for future business ventures and entrepreneurial initiatives. Entrepreneurial learning is largely experiential in nature, mainly driven and shaped by past experiences of business failure or success [29-30]. The experiences of entrepreneurs, therefore, play a major role in shaping entrepreneurial knowledge. This knowledge is reflected in the entrepreneur’s abilities to recognize opportunities and cope with the liabilities of newness [31-33]. By this token, the experiences of immigrant entrepreneurs can lead to models of entrepreneurial learning that are more concerned with cross-cultural and human mobility issues, such as the ability to adapt to the host cultural environment, coping with prejudice or discrimination from other ethnic groups or indigenous entrepreneurs or suppliers, and the ability to integrate one’s own cultural views and traditions to the broader social and cultural context of the host country. Basically, the cross-fertilization of the personal skills with the knowledge gained from the experiences faced in the host environment creates a lateral transfer of knowledge that leads to an optimized set of skills/model directed towards a more intuitive character. This model of entrepreneurial learning can create a repository of experiences, which can lead informed decisions of future immigrant entrepreneurs and SMEs vendors.

## **5. The Internationalization of Curricula in HE and Immigrant Entrepreneurship**

Higher education plays a central role in the development and prosperity of local economies, and may offer a competitive advantage to each country in terms of developing and sustaining knowledge economy [34]. A central aspect of competitive higher education is the ability to become internationalized, namely, to widen the participation of students from all over the world [35]. The overall aim of such an approach is to promote equal opportunities for learning, and produce graduates who can work in an increasingly global environment [33-37]. Gaining access and being competitive in a global market, however, requires that graduates are able to adapt to new and unfamiliar cultures, are culturally-sensitive, and can appreciate and cope with the cultural diversity of international businesses and markets [38]. At this point, it is useful to recall that these attributes are also essential and necessary for immigrant entrepreneurs. Besides, university graduates moving between countries with the intent to start up their own ventures or be employed, represent a new wave of immigrant entrepreneurs, albeit with comparably higher academic prospects and skills as compared to low-skilled individuals. Put simply, the necessity to foresee business and employment opportunities in other countries puts pressure on university graduates in terms of increasing their arsenal of attributes needed to successfully adapt to cross-cultural environments. The attributes and skills needed to become competitive in a global market can be effectively delivered through the learning outcomes of carefully designed HE curricula that commit to the new dogma of internationalization. Learning from the experiences of immigrant entrepreneurs can lead the development of such curricula and provide realistic views of what it means to adapt and develop successfully (or unsuccessfully) in a cross-cultural setting.

## **6. Conclusions**

Overall, immigrant entrepreneurship has been traditionally viewed as the business initiative of low-skilled and low-paid immigrants in otherwise economically developed countries. While this topic has attracted the research interest of sociologists and anthropologists, immigrant entrepreneurship might have a lot more to reveal. Firstly, the experiences of immigrant entrepreneurs can benefit existing research and theory in entrepreneurship by allowing for a more realistic view of what it means to start up a new business or foresee self-employment opportunities in a dynamically changing and challenging global market. This approach can change the flow of knowledge from the society and SMEs to the academia, and, hence, strengthen the link between these two entities. Secondly, immigrant entrepreneurship represents a dynamic process of entrepreneurial learning, which can significantly widen the knowledge base of culturally-sensitive entrepreneurial experiences. Finally,

immigrant entrepreneurship can be an important aspect of internationalizing higher education and improving the quality of learning outcomes delivered to students aiming to access global markets with a competitive advantage.

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Education and Culture DG

Lifelong Learning Programme

# Innovation System in a Producing Company

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This paper describes a production company manufacturing electric machinery and its system of innovations. Parallel to this the general legalities and rules related to innovations in the production company are outlined. The elements of the production company are described: personnel, means for production, products and organization. The innovations are presented and described in each of these elements. Other possible divisions of innovations are also given and each division is separately analysed. The most significant divisions are the strategic, tactical and operative innovations.

The necessity of determining the goals of innovations is given and arguments are provided for the harmonization of the goals. The available resources for innovations in a company are limited thus these resources should be spent in such a way as to optimize the entire functioning of the company as much as possible. In practice it is rather difficult to achieve the optimum, but there must be an intention for achieving sufficient efficiency. The paper presents the bases for establishing these sufficient efficiencies.

In order to achieve satisfactory efficiency, it is important to control the system of innovations. The control process implies determining the goals, planning, realization and realization follow-up and the statement of the level of achieving the goals and the undertaking of corrective actions in order to improve the achieving of the goals. It is a continuous, dynamic process requiring constant care and supervision.

The analysis of the system of innovations is performed in a given company, it shows their number on a time scale and lists them according to types and conclusions are made about the trend of the required actions to improve the system of innovations, and thus the production company as a whole.

The scope of this paper does not permit the presentation of the overall analysis in all its details, but the author of this paper has tried to make conclusions that could be useful for guidance in case of similar analyses.

## Keywords

Innovation system, personnel, production means, products, organisation.

## 1. Introduction of the production company

This paper studies an analysis system of innovations in company A. The company mainly produces electric motors and other products which use electric motors such as pumps, gear boxes, grass mowers and some other products which can be produced on request, periodically. Reparation of electric motors and other products is performed in the company, too.

The company has a tradition which has lasted for many decades as well as the necessary international quality certificates for selling the products on the markets all over the world.

Business has become heavier in the last few years because of the world economic crisis which makes markets smaller and exposed to the competitors' actions. It is very difficult to win new markets and find new customers. In spite of the economic difficulties, company A achieved some profit in the last years; however it is at a lower level than planned. In the last year the annual income was 45 million EUR and the profit reached 1.5 million EUR. Besides the profit which expresses total business efficiency, attention has been paid to the accomplishment of value added per employee. The value added in the

last year was 18 million EUR, and the number of employees was 750. The value of the fixed assets, small inventory and material stock, semi-finished goods and finished products was 26 million EUR.

Company efficiency is conditioned with permanent innovations in all its fields. To make bigger review of planning, realization and innovation tracking, it has been agreed to define and track innovations according to the company elements. The elements can be defined in different ways, but here the company elements are: personnel, production means, products and organization.

Personnel include all company employees with all their knowledge and skills. Production means in this sense represent all material and financial business basis: fixed assets, small inventory, all material stock, semi-finished goods and finished products and funds. Products represent all types of products and services which are in production, i.e. which are performed in the company, in all versions, together with designing documentation, as well as work on market research and sale and purchase. The organization is represented by complete know-how of the company, organizational structure, method of market and sale research, job planning and control, functioning of complete quality control system as well as all law and organizational regulations which define certain basis for employees' behaviour, certain acts and mutual relations between employees during the functioning process of the company.

## **2. Types of innovations in the company - Innovation system**

Innovations have to be done permanently in the company but the process of innovation itself is developing through innovation of some concrete company element. If the definition of company elements according to item 1 is accepted, then they are innovations concerning personnel, production means, products and organization.

Innovations can be classified according to the other criteria, for example, according to values of effects, course of accomplishment, and subject of realization, importance to company business or degree of long-term effectiveness.

There are significant differences for company business according to the innovation hierarchy. There are innovations most significant to the company, while some of them are less significant and some are peripheral. According to the hierarchy they can be divided into strategic, tactic and operative innovations.

Each innovation has defined aim which has to be achieved by its realization. In essence, the significance of an innovation depends on the importance of the aim which is set. To have harmonized and rational company development, it is important to have harmonized aims. Aims harmonization means that they have to be observed in mutual connection. Defined aims cannot be placed without taking into consideration the other aims which have been already defined and whose preparation of realization or realization is in progress.

If we follow the above mentioned company elements, it means that aims are set on all four elements. It has to be provided that both the aims inside of innovations for defined company elements and between innovations aims of different company elements are harmonized.

The most important innovations are at the highest level of hierarchy and they have strategic aims. It means that there is the aim to introduce new product into production program. In the field of production means, for example, there is introduction of new technologies at new machines. For personnel, it can be the adaptation of personnel structure to the whole strategy of the company, but for organization it can be the construction of optimal organizational structure within the existing conditions.

For the given company A, the most important strategy decision concerning product development is the introduction of small hydroelectric power plant production where market research showed significant interest because of bigger necessity for alternative source of energy. The aims of the other innovations concerning personnel, production resources and organization have to be adapted to this innovation.

For example, five Masters of Electrical Engineering with energetic major have been employed, the production of new tools in amount of EUR 800.000.00 is prepared and new organization unit for small hydroelectric power plant design has been established.

## **3. Available resources for innovations**

Innovations are necessary and they represent condition for company existence in the future but, it is important to have in mind, during their conception and planning, that they cause some expenses and

that available resources are limited and they cannot be predicted and planned without taking into consideration the whole business dealings. For innovations, only those resources which are earned during regular dealings and which are left after settling of all expenses for usual and necessary activities during current functioning of the company can be spent.

In the given company A, even though there is no precise evidence about all innovations during these years, it has been calculated that during the last ten years, between 8% and 10% of the total income was spent on innovations. Earlier this percentage was higher, but the conditions of doing business decreased the possibilities of financing new innovations.

By reconstruction of the data, it has been tried to clear innovation investments of some company elements.

It has been concluded that during the last few years relatively small investments were made for new machines which provide new technologies but significant innovations and relatively significant investments were made for tools as it was important to develop products which need new tools. Since machines and tools belong to the production resources, entirely observed investments have relatively constant ratio about 3 - 4% of accrued total income.

Investments into products as well as into organization become higher. Research of new selling markets has been made, new software's for product calculation and designing have been bought and testing for bringing new materials into production has been done, too. For these purposes, between 2% and 3% of accrued total income in company A, during last ten years, was spent.

For personnel education, an average of 2, 5% of accrued total income was spent, so it was necessary to provide participation of personnel from company A in training for use of new software in product designing and development tracking at important fields (quality control, designing methods, supply rationalization).

Organization has required some changes such as rationalization of jobs structure, so the number of employees was reduced from 1000 to 750 in the last ten years. In that period, three social compensation programs were done, so performed innovations had the average annual costs between 2% and 3% of accrued total income.

#### 4. Company innovations analysis in the last period

By analysing innovations in the last period, the following data have been concluded (in the table numbers of innovations in the years are given):

O.Nr.	Year	Strategic innovations				Tactical innovations				Operative innovations				Total
		Per	PM	Prod	Org	Per	PM	Prod	Org	Per	PM	Prod	Org	
1	2001	2	2	3	1	5	3	7	2	8	5	8	5	51
2	2002	3	3	5	-	7	5	4	3	9	7	13	5	64
3	2003	5	4	5	2	8	10	10	4	12	15	12	7	94
4	2004	4	4	6	4	8	12	11	5	9	13	16	10	102
5	2005	3	5	4	3	5	7	5	7	7	8	14	13	81
6	2006	6	6	6	5	6	9	8	5	10	11	19	12	103
7	2007	4	4	7	5	10	13	10	6	11	12	15	15	112
8	2008	6	3	9	6	6	8	12	8	12	10	16	17	113
9	2009	7	6	6	7	9	10	8	12	13	13	14	14	119
10	2010	6	4	7	6	10	9	9	11	11	13	15	18	119
Total		46	41	58	39	74	86	84	63	102	107	142	116	958

Per – Personnel innovations, PM – Product means innovations, Prod – Product innovations, Org – Organization innovations

Detailed analysis of trends needs long period of time and it cannot be described within the scope of this paper, but generally speaking an increase in the number of total innovations during the years can

be established. This can especially see at organization. While at perssonel, production means and products innovations number of innovations during that period is increased for about 1.5 to 2.5 times, this increasing at organization is four times higher. It is the result of the wish to come closer to the optimal organization which provides the best business effects, as much as possible. Smaller innovations in organization do not cause higher expenses and they can be realized without higher limits, and probably because of it, these possibilities have been used as much as possible.

All realized innovations had influence on development and functioning of the company, and they represent elements of the innovation system. For this system the following characteristics can be established: it is relatively stable in functioning with trends which are the results of market business condition movements and significant decisions by company management. Their analysis gives the possibility for planning and prognosis of the future in this field and indirectly in company functioning. Following the trend of the number of innovations is only one aspect of the analysis, in a deeper analysis it is possible to make a correlation analysis between the number of innovations and the total income trend, values added and profit the realized.

## 5. Harmonization measuring of the company elements innovations

Harmonization of the company elements innovations is a condition for efficiency of the whole innovations system functioning. The characteristics of the optimal functioning are: complete achievement of the set business aims, stabile market position, provided possibility for further development which is speeded up.

Practice usually retreats from optimality. It is a real aim to achieve satisfied quality of functioning. It is not qualified on strictly defined values but in defined ranges of some characteristic scales, for example, market representativeness of the company, realized income and the most important, realized profit.

These are indirect criteria which are important at the observation level of company functioning in a whole. There can be direct criteria such as number of innovations, or number of innovations per defined company elements, according to realized effects, per terms of planned realization, etc.

To define harmonization degree of the innovations per company elements, a questionnaire filled by company experts can be used. This questionnaire cannot be the integral part of the paper because of the volume, but it is necessary to mention that it has to be very detailed to record condition of some company elements from one side and from the other side to provide comparability of development degree of some elements. With the questionnaire some characteristics can be scored, definition of optimal conditions and deviations from them can be done and in that way conclusion about **harmonization** degree can be made indirectly, i.e. it can be concluded which elements have to be innovated faster and higher to get harmonization degree of high quality.

According to these analyses, action for harmonization degree increase can be defined and certainly it is task definition for development and innovations of some company elements.

With the mentioned way of innovation analysis, it has been concluded in company A that harmonization degree of some company elements promotion is insufficient, that it is necessary to get faster and significant product and organization development with better product characteristics, better marketing appearance and innovation of organization for raw materials supply.

## 6. Managing with innovation system in the company

To get better functioning, it is necessary to set some aims and define actions for them. But to reach the aim it is necessary to get it and in that direction manage with the innovation system. During this process the necessary actions are predicted and it can be developed in details by planning. The given plan must be realized, so some activities have to be done according to the plan. In the end, development validity of the whole process has to be checked by realization control.

The managing of innovations which are followed according to the elements of the production company and the hierarchy of their importance for the company imposes the need to analyse the matrices of innovations in which the strategic, tactical and operative innovations are represented and within each of them the innovations according to the elements of the company. The analysis of this matrix enables creating the necessary grounds for reaching sufficient efficiency for the functioning of the system of innovations as well as the overall company.

In the company A, the performing of innovation plans is continually tracked and reporting about the degree of realization each month. Conclusions are given in which phase the innovations are and if necessary decisions are made (about necessary corrections or necessary new innovations).

In this given case, in company a, it has been established that the degree of efficiency for standard electric motors has to be increased according to the international standards, and new markets with mild requirements concerning the above mentioned motor characteristic have to be discovered. The measurers can be defined with the other company elements as well as their degree of development and predicted innovations from their areas.

## 7. Innovations planning

Innovation plans are necessary to achieve development harmonization at some company elements, as well as in the whole company. However, degree of plan development is very different depending on the strategic, tactical or operative aims which can be achieved by innovations. There can be dilemmas about plan details of some innovations. General instructions cannot be given as there are very different innovations with different needs concerning degree of detailed plan development.

The most detailed plans are made for the most important and strategic innovations by top management. The next level is that tactical innovations are coming from strategic ones, i.e. they represent how to provide achievement of strategic aims. For these innovations plans are made more globally, without lot of details. Tactical innovations may have needs to perform operative innovations where the most global plans can be developed, with the most important parameters (what, who and how far concrete innovation has to be realized).

During the innovation planning process there have to be some stages. There has to be planned completeness of development with all necessary innovations. First strategic innovations are planned then according to them tactical ones and according to these operative ones. General plan for innovation needs has to be the base for plan creation of some innovations. The degree of detailed creation of their plans depends on the degree of innovation importance in the whole innovation system.

In company A, there is innovation plan whose aim is to improve characteristics of some products. There is innovation plan for calculation, designing and scheduling of designing-technical documentation, then innovation plan whose aim is to make technological documentation because of production rationalization and price reduction. Besides this plan there is a plan to provide necessary tools, and plan for employees' knowledge innovation which will be included in production preparation and production of the innovated product.

Like a necessary base for the above mentioned activities it is necessary to plan innovation

For finding new markets with new customers, as the existence of investment possibility presents the base for product innovation with such execution which can be sold on the market.

It is important, in innovation plans, to define the necessary activities as well as the terms and responsible persons for them.

## 8. Realization and control of innovation performance

Innovation plans have to be realized. Special attention has to be paid to the stage of realization, as it is the most important stage of the whole process for innovation conduction. It is not enough to have a high-quality plan if there is an interruption in the process of realization, as the plans do not show their validity. Having this in mind, it is good to know that partial terms in realization have been done by responsible and competent persons. Innovation performance can be related to only with one person, many persons or a team, and there has to be necessary to have synchronized action, collaboration between many departments.

It is significant that realization of some activities is continually traced to be sure that already done actions are acceptable. To be sure that realization is acceptable, it is necessary to prepare reports to the persons responsible for realization control. In that way there is a possibility, that immediately after the problem appearance, they can be discovered and resolved on time in a way not to endanger performing of all necessary activities, and to provide innovation realization according to the plan.

Innovations of some company elements have their specifics, and because of these problems can arise, which have to be seen and solved by specialists for specific business fields. It is very important to coordinate collaboration between some specialists.

In company A, special attention has been paid to these requirements, and because of it, a great number of innovations has plan realization. Problems can appear at some stages but thanks to the prompt reporting, corrective measurers can be applied and plan realization can be obtained.

After performance of all planned activities, it is necessary to define how far innovation plan has been realized and make conclusions how far planned innovation aim has been achieved. If the aim is not achieved sufficiently and if it is possible in the given situation to undertake new measures, they have to be planned again and then it is necessary to perform corrective action which affects the complete achievement of the specified innovation plan.

## 9. Conclusion

Innovations in a production company represent a special system which has to work harmoniously, since only in that case can good and long-term company operation be provided. System elements are individual innovations and they can be specially planned and traced according to the company elements, i.e. according to the personnel, production means, products and organization. Development degree of individual company elements has to be balanced as only in that case can the functioning be satisfied.

At the same time, the available innovation resources are limited and it is important to spend them very rationally and in that way create the great effects in the company.

It is important to define strategic aims, according to them tactical aims and finally operational ones. For each of them it is necessary to plan and perform certain innovations. After accomplishing them, the degree of the attained aim has to be estimated, and then the whole process has to be repeated: the definition of new aims, planning, performance and control.

In company A there is an aspiration for such work but it has to be concluded that substantiation of all innovation stages causes significant expenses and because of it only significant innovations have to be substantiated in details. By their analysis it can be established, that in company A, the innovation system is satisfied but in the future it has to be improved by methods which more efficiently and quickly provide the effects and which gravitate to reducing of realization expenses as well as expenses for tracking of innovation realization.

The scope of this paper does not allow in-depth and detailed analysis of the innovation system in company A, but with the global presentation of methodology with permanent review of the practice in company a, it intends to give global instructions for similar analyses in other companies.

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# Educational Data Mining by Means of a Power Instructor's Tool

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The current state in the *Educational Data Mining (EDM)* have been discussed in an exhaustive review [3], where the following research directions are identified: *data analysis and visualization, providing instructors with feedback, recommendations for students, predicting student's performance, detecting undesirable student behaviours, grouping students, student modelling, constructing courseware, planning and scheduling.*

A power and easy instructor's tool for post-processing the data gathered by task-oriented environments for e-teaching [6] is considered. Besides the well-known *EDM* techniques such as descriptive statistics, correlation, regression, and cluster analysis a parallel table, chart, and script visualization has been embedded in it. The instructor script language is open for more complex techniques as Analytic Hierarchy Process proposed by Saaty [4].

The paper presents Schulman's [5] and Jenny and Moon's [1] pedagogical models on which the tool is based. The tool's architecture, script language, files organization, and user interface is discussed. The technology of using the tool demonstrates some instructor's tasks on two environments data (test and exercise). Some methodological innovations and trends in *EDM*, such as discovery with models and the psychometric modelling is demonstrated too.

## Keywords

Educational data mining, Instructor tool architecture, Pedagogical models, Script language, Technology of using

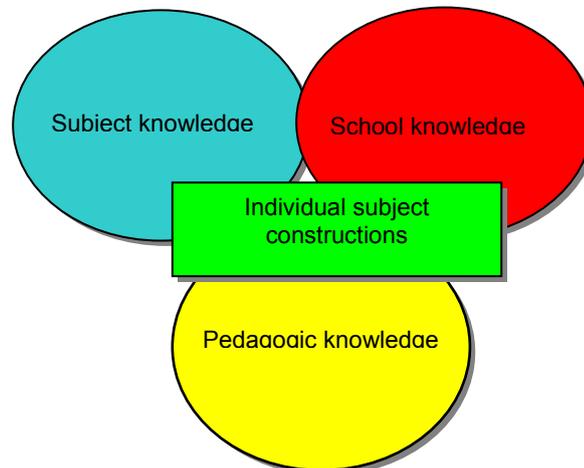
## 1. Introduction

During the last two decades the most substantial contribution in research of the process of teaching and its relationship with the process of learning has *Lee Shulman* [5] (cited about 5000 times). Its model "Pedagogy Reasoning and Action" is remained bellow as a sequence of subprocesses:

- *Comprehension of:* purpose, cognitive structures and ideas within and without the subject;
- *Transformation, e.g. the decisions made by the T, when created the pedagogical requirements.*
- *Instruction: organization and control of the teaching forms, presentation of clear explanations and descriptions, effective interaction with the learners by means of questions and attempts, answers and reactions, praises and critics, as well as forms for monitoring, testing and assessing the group work.*
- *Evaluation: testing for correct and wrong comprehension, that is used by the teacher during his/her interactive instruction, as well as more formal testing and evaluation, that ensure him/her with a feedback and points for decision making, evaluation of his/her own performing.*
- *Reflection: Activities, by means of which the teacher is taught taking into account his/her, accumulated experience.*
- *New comprehension: expectation, those trough reasonable actions the teacher reaches a new comprehension of the taught subject purpose, learners, and the pedagogic processes.*

It becomes clear from Schulman's model, that the traditional teaching process generates a lot of different datasets that could be processed additionally to extract useful information for making the right pedagogical decisions.

In their well-known survey *Leach & Moon, 1999* [1] (cited about 400 times) highlighted Schulman's statement that the key problem of teaching is in creation of the teacher's pedagogy knowledge base. The authors also studied the relationship between knowledge and pedagogy, as well as the purpose of the teaching and learning as its center. They presented graphically the teacher's knowledge as interaction among *subject*, *pedagogic* and *school* knowledge (figure 1).



**Figure 1** The teacher's types of knowledge

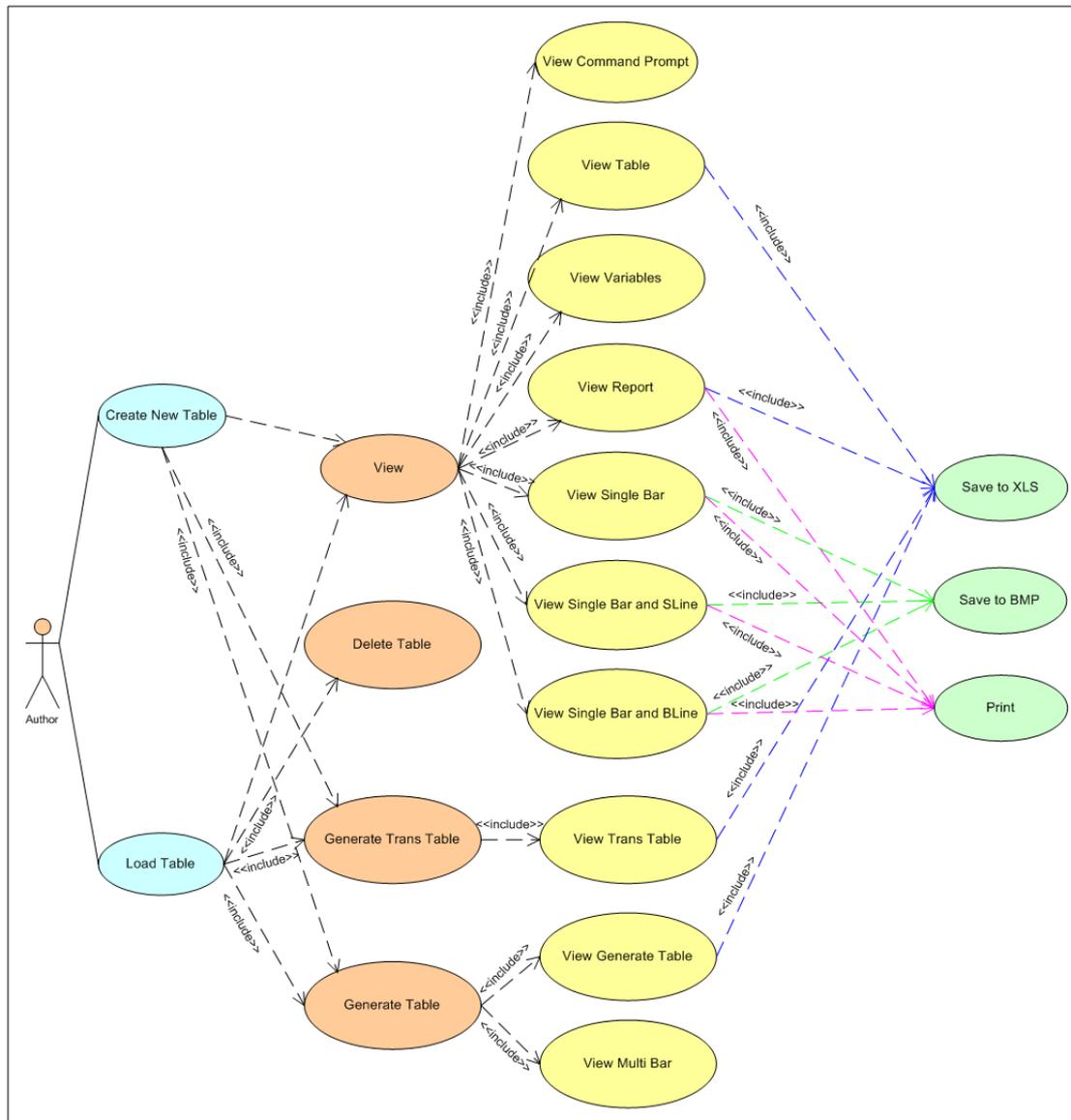
The educational data mining has emerged as a new research area, which current state has been exhaustively discussed by Romero & Ventura [3]. The purpose of this process is to convert the raw data coming from different educational systems (traditional, learning management, virtual laboratories, e-learning and so on) into useful information for the needs of the teaching theory and practice. The authors identified the following research tasks: a) *data analysis and visualization*; b) *providing instructors with feedback*; c) *recommendations for students*, d) *predicting student's performance*, e) *detecting undesirable student behaviours*, f) *grouping students*, g) *student modelling*, h) *constructing courseware*, and k) *planning and scheduling*. The main requirements for the corresponding tools design also are formulated in the same survey and concern: the user interface, visualization task, integration of the tool with an e-learning environment, standardization of data and models, as well as the algorithms for data mining.

When applied to teaching data the corresponding data mining techniques such as descriptive statistics, data visualization, correlation, regression, and cluster analysis must use semantic information, e.g. knowledge. This shows the need for more effective tools integrating domain knowledge into data mining algorithms. Specific techniques for mining in teaching can greatly improve instructional design and pedagogical decisions, and knowledge management in the e-teaching environments.

Data mining problems can be referred to the constructing problems requiring an active mental activity during their formulation and solving by the instructors. This paper presents an easy and power instructor's tool for post-processing the datasets gathered by the task-oriented environments for e-teaching developed and implemented by Zheliazkova's research group [6]. In this context this tool called postprocessor is developed for finding hidden knowledge helpful for the pedagogy knowledge base of the instructor. Different user-aspects of this tool are considered in the following sequence: use case diagram, script language, architecture, and technology of its using on which the paper focuses. The technology is demonstrated step-by-step on several tasks performance with two real datasets (test and exercise).

## 2. Use Case Diagram of the Tool

Nowadays the *UML* is accepted as a standard language for software description due to its platform-, technology-, and program-independence. The most commonly used of its 13 types of diagrams is the use case diagram. At an abstract level it presents the functional features of the tool from the user's view point (figure 2). In stand-alone mode of using the tool the instructor plays his/her own role, performing different use cases.



**Figure 2** Use Case diagram of the tool

This diagram contains six paths (scenarios) from the actor, e.g. instructor, to the terminal use cases (ellipses). A solid line between the actor and an ellipse means that the instructor chooses the corresponding use case through the tool's interface. A dotted line between two cases means that they are performed by the tool. Such a step (instruction) is an element of the interaction between the user and tool. All lines are labelled only with one type of relationship <<include>>, e.g. when to extend its own functionality one case uses a part from the functionality of another. As can be seen on the figure when creates a new table with input dataset the instructor has opportunity to choose between the following alternatives, namely: to see the window with the program script and the window with the active table, to generate a new table, to see a single bar diagram with or without average line, and to see multiple bars diagram. The only difference between these two scenarios is that in the second case the table could be deleted, if the instructor wants.

Both subactivities (for table generation and processing results visualization) could be performed in parallel. The first subactivity consists of two actions respectively for table generation and multiple bars visualization. The second subactivity consists of four windows respectively for: active table, command editor, single bar diagrams with and without the average line (the last two chosen by the instructor). After returning to the main diagram two subactivities are merged in one common action – save the table in: .xls format, .bmp format and print the screen.

### 3. Tool's Script Language

The tool offers the instructor a power and expressive script language called SESSIONSCRIPT. Its open source code enhances the productivity, flexibility, and reusability of the data postprocessing. It can be classified as *visual very high-level mark-up* language. The language is "visual" because it describes graphics and tables as objects. "Very high-level" stresses on the fact that the keywords of the language are the terms of the domain knowledge blocks and atoms. The language is "mark-up" because it does not describe either algorithmic neither logical data processing.

In table 1 the common structure of programs in SESSIONSCRIPT is described in the meta-language of Bascus-Naur, using the following notation: ::= defines a syntactical construction; \_ connects the words in a syntactical construction name; | separates alternative constructions; { } enclose a repeated construction; [ ] enclose an optional construction; < > enclose the title of a syntactical construction, which is still not defined. The operands of <expression> could be numerical constants (integer and real) or the identifications of the preliminary described parameters. In correspondence with the priority of the operations, acceptable in <expression>, are: +, -, \*, /, ^, %. The change of their default priority is possible using brackets ("(", ")"). The embedded functions are three kinds: a) mathematical with an array as a parameter (SUM, AVG, MAX, MIN), b) mathematical with a variable as a parameter (ABS, LOG2, LOG10, and SQRT) and geometrical with an angle in radians as a parameter (SIN, COS, TAN, and COT).

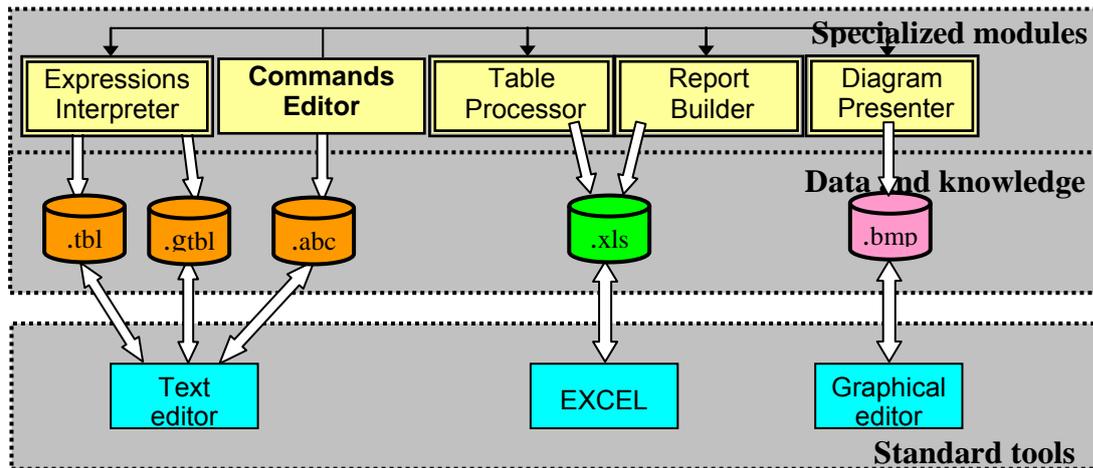
**Table 1** Common structure of programs in SESSIONSCRIPT

<pre> &lt;common_program&gt; ::= SESSION TABLE "&lt;string&gt;" DESCRIPTION "&lt;string&gt;" {&lt;col_description&gt;} {&lt;row_description&gt;} {&lt;chart_description&gt;} {&lt; expression_description &gt;} SET SCALE (&lt;integer&gt; {[,&lt;integer&gt;]} ; &lt;real&gt; {[&lt;real&gt;]}) GEN TABLE ("&lt;string&gt;",&lt;string&gt;{[,&lt;string&gt;]}) CORREL (&lt;string&gt;{[,&lt;string&gt;]}) TRANS ("&lt;string&gt;") DIGITS &lt;integer&gt; CTYPE &lt;constant&gt; &lt;col_description&gt; ::= ACOL "&lt;string&gt;" [=&lt;string&gt;] ACOLS ("&lt;string&gt;{[,&lt;string&gt;]}) ICOL "&lt;string&gt;" AFTER "&lt;string&gt;" DEL COL [&lt;string&gt;]   "&lt;string&gt;"   ALL SCOL "&lt;string&gt;",&lt;string&gt;" SORT "&lt;string&gt;" "&lt;string&gt;" ::= &lt;string&gt;   &lt; expression &gt;   &lt;embedded_function&gt;   SCALE("&lt;string&gt;",&lt;string&gt;) &lt;row_description&gt; ::= AROW ("&lt;string&gt;   &lt;real&gt;" {[, "&lt;string&gt;   &lt;real&gt;"]}) </pre>	<pre> IROW AFTER [&lt;integer&gt;] [{"&lt;string&gt;   &lt;real&gt;"} [, "&lt;string&gt;   &lt;real&gt;" {[, "&lt;string&gt;   &lt;real&gt;"}]]) DEL ROW [&lt;integer&gt;]   ALL &lt;chart_description&gt; ::= YAXIS "&lt;string&gt;" ADD XAXIS "&lt;string &gt;   &lt;real&gt;" ADD SLINE &lt; string &gt; ADD BLINE ("&lt;string &gt;" {[, "&lt; string &gt;"}]) BARSTYLE &lt;integer&gt; DEL BLINE ALL DEL XAXIS ALL VIEW SINGLE BAR   SINGLE BAR AND SLINE   SINGLE BAR AND BLINE   MULTI BAR &lt;expression_description&gt; ::= &lt; string &gt;=&lt; expression &gt; &lt;string&gt; ::= &lt;letter&gt;{[&lt;letter&gt; &lt;digit&gt;]} &lt;integer&gt; ::= &lt;digit&gt;{[&lt;digit&gt;]} &lt;real&gt; ::= &lt;integer&gt;   &lt;integer&gt;.&lt;integer&gt;{[&lt;integer&gt;]} &lt;constant&gt; ::= BAR   PIE   AREA   POINT &lt; embedded_function &gt; ::= SUM   AVG   MAX   MIN   SQRT   ABS   LOG2   LOG10 (&lt;string&gt; {[,   .. &lt;string&gt;]}) SIN   COS   TAN   COT (&lt;string&gt; &lt; expression &gt;) </pre>
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### 4. Tool's Architecture

The architecture of the postprocessor is shown on figure 3 as connected program modules and their relationships with the data files. The purpose of the program modules is as follows: *Commands Editor* – the main program, supporting the window with the program in SESSIONSCRIPT and invoking the rest modules; *Commands Interpreter* – interprets the commands with arithmetic and other processing; *Table Processor* – supports the window with datasets in the table form; *Diagram Presenter* – interprets the commands for different types of diagrams, e.g. bar, pie, line, and point; *Report Builder* – creates the instructor's report with a set of indicators measured by the tool.

The specific data files contain respectively: *.tbl* - table and single bar diagram data; *.gtbl* - generated table and multi bars diagram data; *.abc* - program commands in SESSIONSCRIPT language.



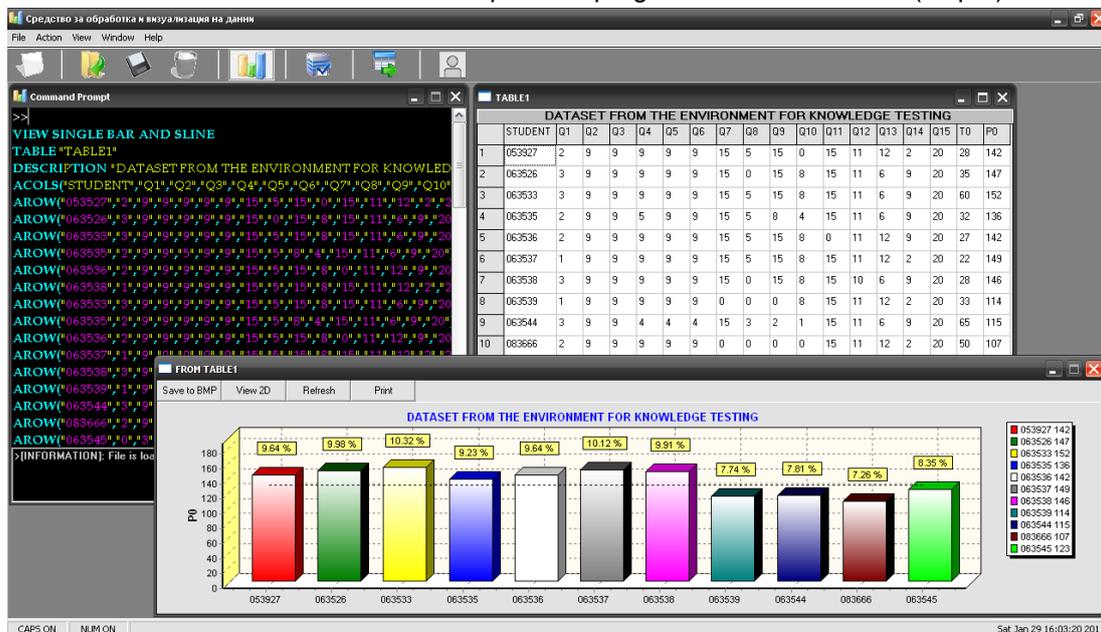
**Figure 3** The postprocessor architecture

The tool is implemented in the *Borland C++ Builder 6* with the object-oriented style of programming and data files organization. Information about the embedded algorithms can be found in [2].

## 5. Technology of Using

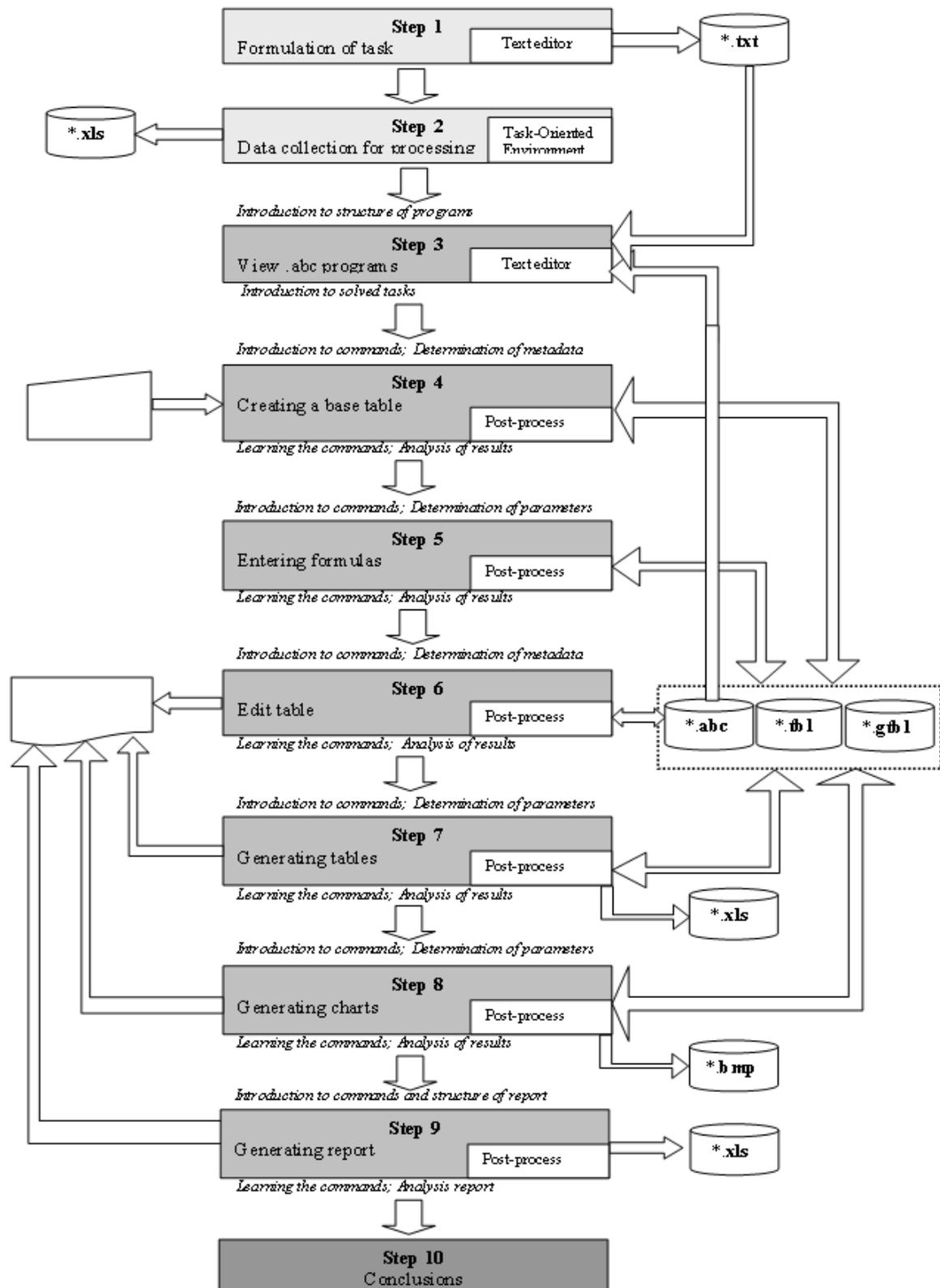
The technological scheme of the instructor operating the presented tool is shown on figure 5. Although the pedagogic problem solving is presented as a sequence of steps in teaching practice some steps can be omitted others to be repeated or to present a subproblem solving. A new pedagogy free-text formulated task has to be clear, precise and compact (step 1). The instructor is also recommended to save it in a standard text file serving as a common catalogue of the problems already solved by the members of a course team. Each one of the task-oriented environments saves a standardized dataset in .xls format after each session, e.g. test, lecture or exercise (step 2).

In order to solve a new task a new user has to familiar with the tasks classification, data mining techniques, as well as the structure of the programs in SESSIONSCRIPT language. By means of a standard text editor he/she can review the script of the programs for related tasks (step 3).



**Figure 4** The windows for the command editor, table processor and diagram presenter

That's why the user is required to be familiar with the user interface as a whole and the groups of commands for the table description, including its metadata, e.g. the names of the rows and columns



**Figure 5** Technological scheme

and the input table name, e.g. with the input dataset. For example, the input table on figure 4 contains the following questions parameters: weight of a subanswer ( $L$ ), degree of system prompt ( $C_p$ ), degree of difficulty ( $D$ ), coefficient of proximity ( $PNORM$ ), time for test performance ( $T0$ ), as well as the total test scores ( $P0$ ). This table could be extended with additional rows and/or columns. Usually their values are received as a result of computation of some arithmetical expressions with some intermediate

program variables (step 4). Therefore, this activity requires the instructor to know the syntax and semantic of the corresponding group of commands.

In order to enhance the SESSIONSCRIPT language learning the following color coding scheme has been accepted: the correct commands names and symbols for operations are highlighted in *Agua* color; table, row and column names in *Yellow*; values in *Pink*; unknown keywords and current values of program variable in *Dark grey*; and messages in *Grey*. The current value of a program variable can be seen simply pressing <Enter> after the symbol “=” (figure 4). The instructor can choose also the menu-command *Window|Variables* to view the names and values of the system variables (figure 6) and the program variables (figure 7).

Variable	Value
NAME	TABLE1
DESCRIPTION	DATASET FROM THE ENVIRONMENT F
CTYPE	BAR
YAXIS	142
XAXIS	[053927, 063526, 063533, 063535, 06353]
SLINES	[SF1]
BLINES	NULL
DIGITS	3
SCALES	[2->0.44, 3->0.59, 4->0.75, 5->0.84, 6->1]

Figure 6 The list of the system variables

Variable	Value
PMAx	(158)
TMAx	(120)
X	(SUMA*6/158)
M0	(SUMA/158)
M1	[(2*SUMA-158)/158]
M2	(SUMA/158*120/T0)
M3	(SUMA/158*5)
MINIMUM	(107)
SF1	(133.909)
SF2	(107)
X_LOG	(LOG10((SUMA*6/158)))
Y	(ABS((LOG10((SUMA*6/158))))%SIN(23))^3)

Figure 7 The list of the program variables

The visualization allows choosing different kinds of diagrams, such as bar, pie, line, and point (step 6) viewed in separated windows. To perform this step the instructor again has to know the syntax and semantics of the corresponding group of commands. In order to view the corresponding diagram (for example, single and multi bars) the table name has to be chosen from the menu-item *View|Bars*.

For the needs of histogram visualization of the test questions and exercise tasks datasets five categories were chosen as in the Likert's psychometric scale and six-based assessment scale in Bulgaria: very easy (*VE*) from 0 to 0.29, easy (*E*) from 0.30 to 0.39, moderate from 0.40 to 0.59, difficult (*D*) from 0.60 to 0.69, and very difficult over 0.70. The histogram of the test questions difficulty is shown on figure 8 and that of the exercise tasks difficulty on the figure 9. The final step, e.g. the interpretation of the problem solution in the pedagogy terms, is obligatory for the instructor. For the example of histograms as it is expected an exercise task difficulty is higher than a test question difficulty. Also the distribution of the test questions difficulty and the exercise tasks difficulty is closer to linear as it is recommended in the pedagogy science.

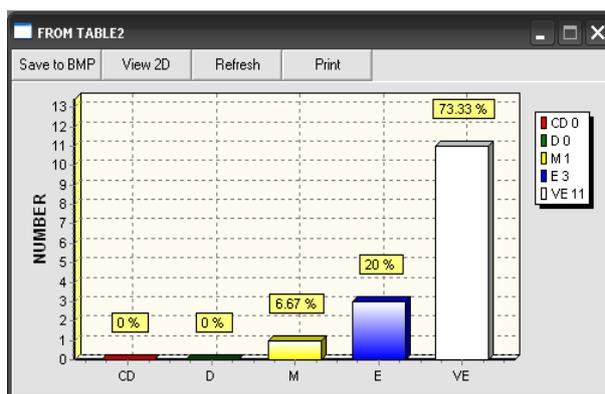


Figure 8 The histogram of the questions difficulty

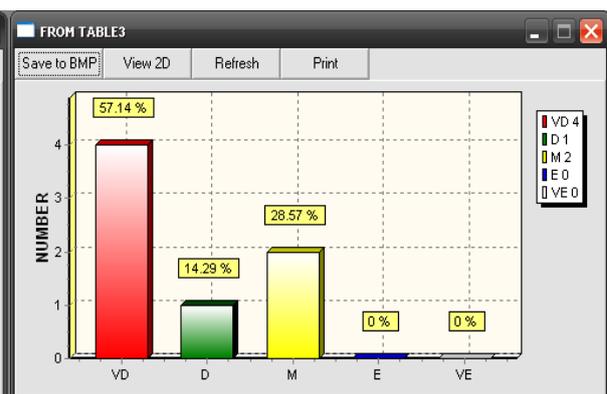


Figure 9 The histogram of the tasks difficulty

To open a triple of files, e.g. script, table, and diagram, connected with a program, the menu command *File|Open* has to be chosen, and then to choose the \*.tbl file name in the standard dialog window. Analogically, for saving a triple of files the menu command *File|Save* is chosen and then in the standard dialog window the name of the table has to be chosen.

The post-processor also allows the instructor to generate a new table, e.g. only with computed rows and columns (step 5). This possibility is illustrated on the power command CORREL for constructing

table with the correlation coefficients  $r(i, j)$  between all couples of the above-listed questions parameters. In order to view an existing or generated table visualised in separated windows the corresponding table name has to be chosen from the menu-item *View|Tables*. Under the assumption  $0 < |r(i, j)| < 0.4$  (weak);  $0.4 \leq |r(i, j)| < 0.8$  (mediate), and  $0.8 \leq |r(i, j)| \leq 1.0$  (strong correlation) the negative value of  $r(L, Cp)$  means that the increase of the questions weight ( $L$ ) is likely to decrease their system prompt ( $Cp$ ), and the positive value of  $r(L, PNORM)$  means that increases the L's assessment relatively to the instructor's one ( $PNORM$ ). In both relations the coefficient values are interpreted as mediate that are reasonable conclusions.

	CP	L	D	PNORM	T0	P0
CP	1	-0.412	-0.12	-0.478	-0.216	0.248
L	-0.412	1	-0.597	0.537	0.023	0.083
D	-0.12	-0.597	1	-0.467	0.163	-0.755
PNORM	-0.478	0.537	-0.467	1	0.306	0.003
T0	-0.216	0.023	0.163	0.306	1	-0.412
P0	0.248	0.083	-0.755	0.003	-0.412	1

Figure 10 An example generated table

STARTING TIME OF THE SESSION	11:07:30
TABLE NAME	TABLE1
TABLE DESCRIPTION	T FROM THE ENVIRONMENT FOR KNOWLEDGE T
NUMBER OF CORRECT LINES	7 lines
NUMBER OF INCORRECT LINES	3 lines
ERROR FREQUENCY	0.3
NUMBER OF KEYWORDS	31 keywords
FINISHING TIME OF THE SESSION	11:09:10
DURATION OF THE SESSION	0h 1m 40s
RATE	18 keys/min
DATE	Wednesday February 02 2011

Figure 11 The instructor's report

During all steps of a task performance the tool checks the current command line and if it is incorrect a message (information or diagnostics) in the status line is displayed (figure 4). An information message (their number is 6) has the format: `[INFORMATION]: <text of the message><parameter><text> | [INFORMATION]: <text of the message>`. A diagnostics message (their number is 22) has the format: `[ERROR]: <text of the message> | [ERROR]: <parameter>`.

Before to exit the instructor can choose the menu-command *Window|Report* to see a detail report, print and/or save it in .xls format (figure 11). The extracted parameters: number of the program variables, rate of problem solving, invalid commands frequency, and so on can be used for comparison of one and the same task performance by different instructors.

## 6. Conclusions

A power instructor's tool for data mining is presented from the user's point of view. This tool is verified with two input datasets respectively by task-oriented environments respectively for knowledge testing and simulation tasks [6]. The main tool's difference is in its parallel script, table, and diagram processing and visualization. The tool offers the instructor a power, easy, and flexible script language demonstrated of the techniques of descriptive statistics, correlation analysis, and diagram visualization. It is not limited to implementation of other known data mining techniques as prediction, regression, and cluster analysis and even so complex as *Analytic Hierarchy Process technique* [4].

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# Organizational Change Management in Enterprises in Bosnia And Herzegovina

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Modern company conducts business in the complex, heterogeneous and uncertain environment, and the change has become the essential part of organizational life and performance. Change has definitely become the condition for the company's development, but considering the dynamics and the complexity of the changes in the environment, it has also taken the status of the requirement for its survival.

Changes can be planned and scheduled, and their initiator or mover and the carrier is the company management, but they can also be unscheduled, happening as a reaction to an unexpected occurrence. A change that is planned is shaped and implemented in a manner so it anticipates future events, whilst the unplanned change is a response to occurrences that already took place. Change management has become one of the most significant manager skills and manager activity.

The aim of this research is to realize the extent to which the changes are conducted in a planned manner; how are the activities related to recognition of need for change and change management conducted; what are the targets of change; identification of change resistance and the ways to overcome them. Besides this, the aim is set to investigate if there is a difference in change management between enterprises in relation to their size.

The research was conducted in 2010, using the original questionnaire with the sample of 150 to 200 enterprises at the territory of the Federation of Bosnia and Herzegovina. The results are expected to demonstrate the significant difference in change management in relation to the size of the enterprise.

## Keywords

Organizational change, small and medium enterprises

## 1. Introduction

Changes have always been a distinguishing feature and true meaning of existence of the human society and therefore have always been the centre of interest for individuals as well for the general public. The reason for this is found in the fact that, in a strong manner, changes influence the present and the future of the individual person, different organizations, companies, countries, entire nations and the society in whole.

Modern company conducts business in the complex, heterogeneous and uncertain environment, and the change has become the essential part of organizational life and performance. Change has definitely become the condition for the company's development, but considering the dynamics and the complexity of the changes in the environment, it has also taken the status of the requirement for its survival.

The company's general environment is the source of numerous changes throughout all of its components. Political changes are in perpetual motion and they have put an important stamp on the world's global level over the last 20 years to this day, causing various crises in the world. These changes affect the economies and business in whole as well as single companies having to deal with them in the business environment. Great changes are present in the technological environment and they have great impact on business possibilities of the company. Therefore the monitoring, application and proper deployment of the change is a necessity for the development and existence of the

company. Socio-cultural environment along with different demographic indicators are the source of numerous changes in the social trends, available human resources, general level of human education etc. Economic environment, with all of its segments, has always been a great source of all kind of major changes and the proof for that is evident in the present having a global crises influencing all of the world's economy and its companies including the ones in Bosnia and Herzegovina.

Business environment comprises many changes that have raised the level of the uncertainty and the great speed of these changes has amplified the dynamics of the business environment. Also, the number of present business subjects in this kind of environment is increasing which is making it more complex, and in addition activities of these subjects are even more diverse and more innovative which is giving the environment greater level of heterogeneity [1].

Internal business environment is also changing rapidly which is evident in all of the organizational structure shifts, organizational culture changes (which are happening in somewhat slower pace) and changes concerning organizational resources, material, human, financial and information ones.

Mankind is enriching the knowledge about itself and the surrounding world every day, it's trying to understand new work processes, it's applying more efficient techniques and technology and accordingly changing the comprehension of itself and its environment [2].

The speed and the significance of the changes that are happening in all of the environment segments are growing bigger and the ramifications are extremely high for the company in whole as well for the every individual within the company and the society in total.

Changes that are happening in one area of the environment may and often do cause and determine some other changes and the whole process is entrapped in the continuity with no evident ending.

Authors have different definitions of organizational change and according to R.L. Dafta [3] organizational change represents the acceptance of new ideas or behavior of individuals. The process of change is representing the fact that organization or some of its parts is transforming from current state to a new one.

Changes can be planned and scheduled, and their initiator or mover and the carrier is the company management, but they can also be unscheduled, happening as a reaction to an unexpected occurrence in the internal or external environment. A change that is planned is shaped and implemented in a manner so it anticipates future events, whilst the unplanned change is a response to occurrences that already took place. Considering the fact that this kind of situations demands a prompt respond, the lack of time, quality analysis of the problem and possible solutions, quality preparation and implementation of the change is often leading to a fact that, in the end, the change gets poorly understood and managed. Change management has become one of the most significant manager skills and manager activity.

Change is undoubtedly a key element of business and, if there is such possibility, it should be conducted before it becomes a necessity [4]. Managers are obligated to initiate and implement necessary activities concerning the adaptation of the organization for the change requirements which is implying the initiating and managing organizational change [2].

The goal of planned organizational changes is to enhance the organization by helping it cross from current state to some better, future, more quality state (which is more efficient and effective). The goal of unplanned changes, which are caused by the crisis within or outside the organization, is to reduce and diminish the caused damage and to help the organization to come out of the crisis with minimal harm.

Changes can occur in part of the organization or business process, but they can also take place in all of the organization, and the consequences of the changes are the source for different resistance.

## 2. Objectives of Research

The aim of this research is to realize the extent to which the changes are conducted in a planned manner; how are the activities, related to recognition of need for change and change management, conducted; what are the targets of change; identification of change resistance and the ways to overcome them. Besides this, the aim is set to investigate if there is a difference in change management between enterprises in relation to their size.

## 3. Methodology

The empirical research has been conducted in 2010 at the territory of the Federation of Bosnia and Herzegovina with the sample of 158 enterprises. The original questionnaire with 36 questions was

used as an instrument for conducting research. It contained questions related to characteristics of enterprise and questions related to organizational change management. Questions were formulated as closed-type questions and questions with offered answers in order of intensity (Likert scale type of five intensities where 1 indicates strongly disagree and 5 indicates strongly agree). Collected data were analyzed using the methods of descriptive statistics (absolute and relative frequencies, mean - M and standard deviation – s) and inference statistics (t test,  $\chi^2$  test, ANOVA). Level of significance was 0.050. SPSS 12.0 was used for data analyzing.

## 4. Research Results

### 4.1. Characteristic of surveyed enterprises

The analysis of research results of fundamental characteristics of observed enterprises has revealed the following:

- 46.8% enterprises were established between 1990 and 2000, 30.4% of them were established before 1990 and 22.8% after 2000,
- 24.1% enterprises have less than 10 employees, 27.8% of them have between 10 and 49 employees, 22.8% of them have between 50 and 249 employees and 25.3% of them have 250 and more employees,
- 71.5% enterprises are private owned, 15.8% enterprises are state owned, 12% enterprises are with mixed ownership and 0.6% enterprises are in cooperative ownership,
- 50.6% enterprises are organized as a limited liability company, 22.8% as stock companies and 26.6% have some other form of ownership (general partnership, sole trade, individual merchant companies etc.),
- Two types of characteristics (number of employees and revenue) have been combined to determine the size of the enterprise and following results have been obtained: 16.5% of the enterprises are micro enterprises, 31.6% of them are small, 27.8% are medium and 24.1% of them are large enterprises.

### 4.2. Management of organizational change

#### 4.2.1 The recognition of need for change, diagnoses and planning of change

After every crisis, and also during its resolution, a change is present in company's processes as well as in people, and this change is necessary to prevent and avoid crises.

The dynamics at the enterprise and the extent to which it is open to different changes is rated by the respondents in the Bosnia and Herzegovina and has mean of 3.84. The rating for openness toward changes is different for different sizes of enterprises. Mean for dynamics of the enterprise and the extent to which it is open to different changes is the highest for micro enterprises (M=4.2, s=0.8), then for small enterprises (M=3.9, s=0.8). Middle and large enterprises which are bigger and thus slower and inert and have more complex organizational structure are somewhat less open to changes and less dynamic. Large enterprises have mean of 3.8 (s=1.1) and medium have mean of 3.7 (s=0.8). Although micro and small enterprises have bigger means comparing to medium and large ones, there is no significant statistical difference between them (F=1.981; p=0.119).

The changes in the organization can be planned and unplanned, and the number of unplanned or ad hoc changes should be reduced to minimum and these organizational changes [2] shouldn't be left to chance or arbitrariness, but they should be, in order to be successful, carefully planned and conducted.

How the surveyed enterprises approach implementation of changes is shown by Table 1. It is noticeable that ad hoc approach is not very present (10% and under) no matter what the size of the enterprise is. When it comes to micro enterprises there are a dominant number of enterprises (50%) that use mostly planned approach. Combined approach, that is partly ad hoc and partly planned, is preferred by small enterprises, 32% of them apply it, and middle enterprises where 43.2% of them apply it. Looking at large enterprises, 42.2% of them use planned and system approach which is understandable. There is no significant statistical difference when it comes to ways of implementing the changes in relation to the size of the enterprise ( $\chi^2=19.542$ ; p=0.076)

**Table 1** Distribution of enterprises according to ways of implementing the changes

Ways of implementing the changes	% of enterprises				
	micro	small	middle	large	total
Ad hoc approach	7.7	10.0	4.5	7.9	7.6
Mostly ad hoc approach	11.5	8.0	11.4	5.3	8.9
Partly ad hoc, partly planned approach	19.2	32.0	43.2	26.3	31.6
Mostly planned approach	50.0	26.0	25.0	18.4	27.8
Planned and system approach	11.5	24.0	15.9	42.1	24.1
Total	100	100	100	100	100

$\chi^2=19.542$ ;  $p=0.076$

The need for change is always a consequence of the dissatisfaction with the current condition, and the greater the gap between the present and wanted state is, the bigger the need for change is. Sometimes, this need is evident, but most of the times, it isn't. This is exactly the reason for the management to keep track of the happenings in the external and internal environment in an organized and continuous manner so it could be able to anticipate and identify the changes that can affect their company [1].

In order to manage well organizational change in a quality manner before its implementation it is necessary to follow up and analyze elements of general (political and legal, economic, socio-cultural, technological) and business environment (customers, suppliers, creditors, trade unions, shareholders and so forth). General environment is least monitored and analyzed at micro enterprises ( $3.6 \pm 1.0$ ), middle enterprises follow ( $3.7 \pm 0.9$ ) and then large enterprises with mean of 3.8 ( $s=1.0$ ). General environment is mostly monitored at small enterprises with mean of 3.9 ( $s=1.0$ ) ( $F=0.606$ ;  $p=0.612$ ). Business environment, according to gained results, is also most monitored and analyzed at small enterprises ( $4.3 \pm 0.9$ ), followed by micro enterprises ( $4.2 \pm 0.9$ ), middle have the mean of 4.1 ( $s=0.9$ ), while the lowest mean is for large enterprises and it is 3.8 ( $s=1.1$ ) ( $F=1.773$ ;  $p=0.155$ ).

In addition to the analysis of environmental elements it is necessary to follow up and analyze the organizational culture, structure and resources that is the elements of internal environment of the enterprises.

The activities related to analysis of organizational culture, structure and resources is rated by mean of 3.7 ( $s=1.0$ ), which is a relatively low and further research has shown that there is a significant statistical difference between enterprises in relation to their size. Micro enterprises have the lowest mean when it comes to analysis of internal environment elements ( $M=3.6$ ,  $s=0.8$ ), followed by middle enterprises ( $3.6 \pm 0.9$ ). The highest mean is calculated for small enterprises ( $3.9 \pm 1.0$ ) and for large enterprises it is 3.7 ( $s=1.1$ ) ( $F=1.004$ ;  $p=0.393$ ).

The changes are not and should not be self purposed and prior to implementation of changes, objective/s that want to be achieved by those changes, should be clearly and realistically defined. When it comes to setting goals that want to be achieved by change, the mean is 4.2 ( $s=1.0$ ) which is a good score, but it is surprisingly to find that the lowest mean was found at large enterprises:  $M=4.0$  ( $s=0.9$ ). Micro enterprises have mean of 4.3 ( $s=0.8$ ), small enterprises of 4.4 ( $s=0.9$ ) and these means are greater than those at middle and large enterprises ( $F=1.966$ ;  $p=0.121$ ).

Also, the identification of all the stakeholders which will be affected by the change (customers, suppliers, employees, managers, owners GOs and NGOs etc.) is needed before the change takes place so the planned change could be successfully conducted.

The research results indicate that the large enterprises have highest mean when it comes to identifying needs prior to change conduction ( $4.1 \pm 0.9$ ), followed by micro enterprises ( $4.0 \pm 0.9$ ). Small enterprises have mean of 3.8 ( $s=1.0$ ), and middle have mean of 3.6 ( $s=0.8$ ), which is the lowest score. There was no significant statistical difference between enterprises concerning their size ( $F=2.020$ ;  $p=0.113$ ). The mean for this group of activities at enterprises in Bosnia and Herzegovina is somewhat lower than previously mentioned activities ( $3.8 \pm 0.9$ ).

One of the significant activities in the process of need diagnosis and change planning is also the examination of positive and negative forces, and this research tried to answer the question how often do the companies, before implementing the change, try to identify individuals and groups that could have positive effect on one side, and on the other side, all of those that could have negative impact to the implementation of planned change.

According to obtained results, there is more effort invested in the process of identifying strengths (individual and groups) that should and could be moving force for the change implementation ( $3.9 \pm 1.0$ )

than in the process of identifying forces that could be potential obstacles and setback to change implementation (3.7±1.0)

Small enterprises are most active in the process of identifying moving forces with mean of 3.9 (s=1.0), followed by middle enterprises with mean of 3.8 (s=1.0), than large with mean of 3.8 (s=1.1). The lowest mean is calculated for micro enterprises and it is 3.8 (s=0.8) (F=0.073; p=0.974).

When it comes to analysis of strengths that could be potential obstacles for change implementation, micro enterprises are most active (4.0±0.7), followed by small enterprises (3.8±1.1), then large enterprises (3.6±1.2) and middle enterprises (3.5±1.0) (F=1.672; p=0.175).

The research results also showed that, when it comes to the question of the extent in which the priorities and time and organizational capacities are taken into consideration in the process of change planning and implementation, mean is 3.9 (s=0.9). The highest mean is calculated for large enterprises (4.1±0.9), middle enterprises have mean of 4.0 (s=1.0), followed by small enterprises (3.9±0.8) and finally micro enterprises (3.8±1.0) (F=0.402; p=0.752).

#### 4.2.2 Reasons for change resistance

Changes can be and often are the source of employee and manager, but also environmental resistance. Some of the resistances are easy to anticipate and recognize because they are explicitly manifested (strikes, intentional slower work or complaints), while others are not so visible and they are implicitly manifested (lack of motivation, errors, fallouts, absence etc.). The understanding about why some individuals and groups are fighting change is very important, because it allows the removal and reduction of resistance so the change process could be normally implemented.

The Table 2 is showing if individual resistance to changes in examined enterprises exist and in what measure.

**Table 2** Distribution of enterprises according to reasons of resistance among individuals

Representation of certain reasons of resistance among individuals	Enterprises (M±SD)				F	p
	micro	small	middle	large		
They see things only personally not considering benefits for the whole enterprise	2.7±1.2	2.7±1.1	2.9±1.2	3.0±1.1	0.593	0.621
They are not disposing with sufficient information about changes	2.8±1.0	2.4±1.0	2.9±1.0	2.0±1.0	2.077	0.105
The fear that change will affect an individual personally	3.1±0.8	3.1±1.2	3.3±1.0	3.4±1.1	0.732	0.534
They do not wish to change existing habits	3.0±1.1	3.4±1.1	3.3±1.3	3.3±1.1	0.606	0.612
They do not like the initiator of the change	2.4±1.1	2.7±1.2	2.9±1.1	2.9±1.1	1.203	0.311
They want to maintain privileges, power and status	3.0±1.1	3.3±1.2	3.4±1.2	3.5±1.2	0.816	0.487

Destructive and irrational resistance is encouraging dysfunctional conflict which can endanger, not only change implementation, but also the prosperity and existence of the company, while in certain cases, change resistance [1] is a constructive and useful because it induces functional conflict and debates which can contribute to thorough analysis of the alternatives and their ramifications.

According to obtained results, the most common reason for change resistance in Bosnia and Herzegovina is desire to maintain privileges, power and status (3.3±1.2), followed by the desire not to change existing habits (3.3±1.2), then the fear that the change will affect an individual personally (3.2±1.0). The lower means are calculated for following potential reason for change resistance: not disposing with sufficient information about changes (2.9±1.0), they don't like the change initiator (2.7±1.1) and they see things only personally not considering benefits for the whole enterprise (2.8±1.1).

The resistance to change is greater in bigger enterprises comparing to smaller ones and this is the case at any given change resistance reason.

This is confirming the conclusion deducted within issue about openness and willingness of the enterprise for change where the significant difference regarding the size was indicated. Smaller enterprises are more opened to change and thus the resistance to change in bigger enterprises is larger which is partly the reason why they are less implemented.

### 4.2.3 Overcoming change resistance

Change resistance can be reduced or removed in a great deal if the necessary actions are conducted and employees and environment are prepared to the necessity and implementation of change. In order that resistance to changes would be less, employees should be informed about possible changes, draw their attention to the necessity of their implementation and ensure the participation of employees, especially those whom these changes concern directly, in their planning and implementation.

The results of the conducted research related to the ways that enterprises use to reduce change resistance are shown in Table 3. Enterprises mostly use "drawing attention to the necessity of changes" as a way to reduce change resistance (3.7±1.1) followed by "education of and communication with the employees" (3.6±1.1) and "willingness to help the employees in solving the problems caused by the changes" (3.6±1.0). The least used ways to reduce change resistance are the use of force by the superiors (1.9±1.1), manipulation of information in order to reduce the resistance of the employees (2.6±1.2) and offering different benefits to the employees (2.6±1.1).

The results indicate that smaller enterprises combine many ways (except the use of force) to reduce change resistance, which clearly demonstrates their willingness for change implementation and recognition that only changes can lead to survival and development of the enterprise.

There is significant statistical difference when it comes to "education of and communication with the employees" between micro and middle and also between small and middle enterprises. Statistical difference was discovered between small and middle enterprises in the area of "willingness to help the employees in solving the problems caused by the changes". There is significant statistical difference between micro and middle and also between micro and large when it comes to the way that superiors use force.

**Table 3** Distribution of enterprises according to the ways of reducing change resistance

The ways to reduce change resistance	Enterprises (M±SD)				F	p
	micro	small	middle	large		
Education of and communication with the employees	3.9±0.8	3.8±1.1	3.2±1.0	3.3±1.2	<b>3.416</b>	<b>0.019*</b>
Drawing attention to the necessity of changes	4.0±0.9	3.8±1.0	3.6±1.1	3.4±1.2	2.444	0.066
Participation of subordinates	3.4±0.9	3.5±1.1	3.0±1.0	3.2±1.1	2.239	0.086
Willingness to help the employees in solving the problems caused by the changes	3.8±0.9	3.9±0.9	3.3±1.0	3.3±1.2	<b>3.789</b>	<b>0.012**</b>
Encouragement to employees to express their opinions and initiation of change	3.7±1.0	3.5±1.0	3.3±1.1	3.0±1.2	2.440	0.067
Manipulation of information in order to reduce the resistance of the employees is present	2.6±1.1	2.3±1.0	2.8±1.2	2.7±1.3	1.641	0.182
Different benefits are offered to the employees	3.2±1.0	2.8±1.2	2.5±0.9	2.2±1.1	<b>4.859</b>	<b>0.003***</b>
The superiors are using force	1.9±1.1	1.8±0.9	2.1±1.3	2.0±1.3	0.676	0.568

\* micro-middle, small-middle; \*\*small-middle; \*\*\*micro-middle, micro-large

### 4.2.4 The target of organizational changes

The targets of organizational change can be various, depending whether they are the result of the incurring crisis in the company, that is the organization or some part of it, depending on the source of the crisis, but also in the cases of planned changes about causes of organizational dysfunction.

According to the results of the conducted research, the most common target of organizational change is technology (23.4%) then products and services (20.3%), human resources (14.7%), organizational structure (14.2%), enterprise strategy (10.7%), organizational culture (5.6%) and management style (3%) as least targeted issue for organizational change. The results related to the targets of organizational change are shown in Table 4.

**Table 4** Distribution of enterprises according to targets of organizational change

The targets of organizational change	% of enterprises				
	micro	small	middle	large	total
organizational structure	12.5	19.3	8.6	16.0	14.2
enterprise strategy	3.1	17.5	12.1	6.0	10.7
management style	0.0	3.5	1.7	6.0	3.0
organizational culture	0.0	8.8	6.9	4.0	5.6
human resource	6.3	12.3	20.7	16.0	14.7
technology	34.4	15.8	25.9	22.0	23.4
products and services	31.3	12.3	17.2	26.0	20.3
other	12.5	10.5	6.9	4.0	8.1
total	100	100	100	100	100

$\chi^2=27.448$ ;  $p=0.157$

When it comes to micro enterprises, most common targets for organizational change are technology (34.4%) and products and services (31.3). Small enterprises aim their efforts to organizational structure (19.3%) and also technology (15.8%). Middle enterprises also target technology (25.9%) and human resources (20.7%). Large enterprises change their technology (22%) and products and services (26%). There is no significant statistical difference in relation to the size of the enterprise when it comes to possible targets of organizational change ( $\chi^2=27.448$ ;  $p=0.157$ )

## 5. Conclusion

Introducing changes is necessary so that an enterprise would refocus, reposition, reorganize and conceive its business operation and development what would ultimately guarantee it the survival in increasingly turbulent environment. Also, the changes are also indicators of certain crises that enterprise falls into.

At the process of recognizing the need for change, diagnosing and planning the change, certain differences between enterprises have been perceived. Some of them are open to changes, they conducted and manage them in planned manner and some of them don't pay attention to changes in advance and don't know how to manage them. More than half of the surveyed enterprises use planned manner in conducting the changes. On the other hand, around 15% of them use ad hoc approach which is a noticeable number of enterprises.

The research revealed that the most common reason for change resistance in Bosnia and Herzegovina is desire to maintain privileges, power and status and the desire not to change existing habits.

Enterprises also use different activities to reduce the level of resistance to changes in order to have them efficiently implemented. Mostly used activities are drawing attention to the necessity of changes and educating of and communicating with the employees. For these activities there is also significant statistical difference among enterprises in relation to their size between micro and middle and also between small and middle enterprises when it comes to education of and communication with the employees. Also between small and middle enterprises in the area of willingness to help the employees in solving the problems caused by the changes and between micro and middle and also between micro and large when it comes to the way that superiors use force.

Changes in the enterprise usually target technology (23.4%) and then products and services (20.3%), rarely style of management (3.0%) and organization culture (5.6%).

It can be concluded that education about the importance and necessity of change is very important and should be brought to a higher level. Education is desirable not only for managers and leaders but also for all of those who will be involved in the process of change.

It is important to emphasize that the research involved employees who work at different workplaces and thus have different experiences related to changes and that can significantly affect the results of research.

For further research it would be advisable to identify general characteristics of enterprises like ownership, income, form of organization, number of employees etc. and the impact they have on identifying and overcoming problems. Also, whether changes come from internal or external

environment and whether they are the result of unplanned situations or on the other hand systematically designed by the superiors.

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# Performance analysis of the logistics processes within the supply chain management

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As competition and complexity has increased, supply chain management has emerged as an increasingly important issue for the companies. The main challenge of the supply chain management is to identify and implement strategies that minimize costs and maximize flexibility, competitiveness and profit [1].

In the 21st century, changes in the business environment have contributed to the development of supply chain networks. First, as an outcome of globalization and the proliferation of multinational companies, joint ventures, strategic alliances and business partnerships, significant success factors were identified, complementing the earlier "Just-In-Time", "Lean Manufacturing" and "Agile Manufacturing" practices. Second, technological changes, particularly the dramatic fall in information communication costs, which are a significant component of transaction costs, have led to changes in coordination among the members of the supply chain network.

One of the biggest challenges today is to explore if there is the right way of supply chain management, if there is a possibility to create the optimal one, where is it positioned in the business strategy of the big companies, are there any risks, if yes, which ones, etc.

If we start our "journey" from the statistics promoted by the Institute for supply chain management, which says that, every 1% saved at the supply side is equal to 5% earned at the sales side, will realize the great importance of the supply chain management. In the last year-two, since we are facing the economy crises, even in the companies where the profit is reduced, or at least on a same level as the previous year, the top management will evaluate it as a successful year. This is all due to better organized supply chain management and cost cuttings.

## Keywords

Supply chain management, Pharmacy, AlkaSAP, Organic tea, Acerola

## 1. Introduction

If we extract from the literature, there are few well known and accepted definitions of the supply chain management (SCM), that is considered as a management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996) [2]. Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption.

Supply chain management is the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole (Mentzer et al., 2001) [3].

A customer focused definition is given by Hines (2004:p76) "Supply chain strategies require a total systems view of the linkages in the chain that work together efficiently to create customer satisfaction

at the end point of delivery to the consumer. As a consequence costs must be lowered throughout the chain by driving out unnecessary costs and focusing attention on adding value. Throughput efficiency must be increased, bottlenecks removed and performance measurement must focus on total systems efficiency and equitable reward distribution to those in the supply chain adding value. The supply chain system must be responsive to customer requirements”[4].

Global supply chain forum - supply chain management is the integration of key business processes across the supply chain for the purpose of creating value for customers and stakeholders (Lambert, 2008) [5].

According to the Council of Supply Chain Management Professionals (CSCMP), supply chain management encompasses the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management. It also includes the crucial components of coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies. More recently, the loosely coupled, self-organizing network of businesses that cooperate to provide product and service offerings has been called the Extended Enterprise.

Not such a long time ago we were talking about supply chain management, which term is nowadays used always in plural, due to the globalization. Every supplier and every customer is a part of some supply chain, domestic or international. If the top management is observing the supply chain in this manner, it will definitely put the procurement department and the logistics as a pillar of the company.

According to the World's Bank study, logistics and the supply chain management are the key elements for development of a country. Countries with well developed logistics have better chances for economic growth. Thus the significance of this area globally, even more in local frames like Macedonian. According to the same study, these areas are neglected in our country due to the slow-going reforms, underdeveloped local market, low-grade human resources etc.

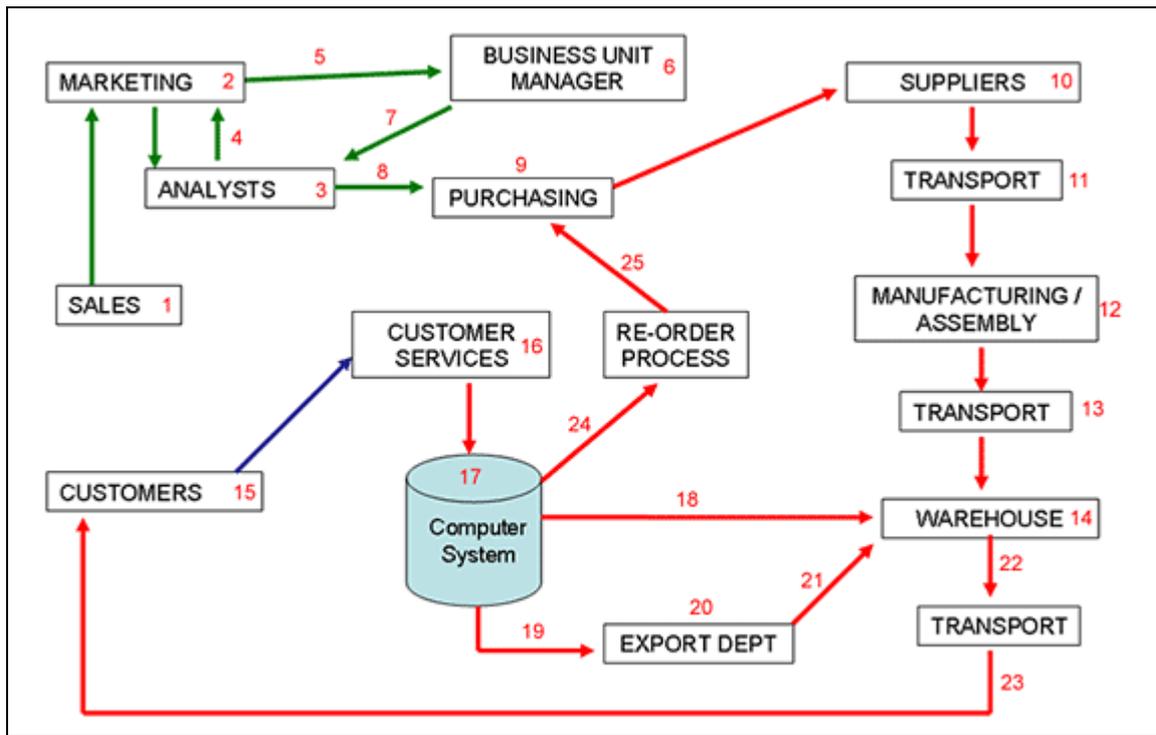
Macedonian companies everyday more and more understand the need of the quality supply chain management, even more when they realise that successfully organised supply chain could bring even 15% bigger profit for the company, lower prices and more quality services for the end user.

The accent of this article is to focus on the supply chain management in the field of pharmaceuticals in Republic of Macedonia, in order to compare it to the global trends, challenges and results. For this purpose one of the most successful companies in Republic of Macedonia, Alkaloid, joint stock company from Skopje is used. Supply chain management in the pharmaceutical industry has its own specifics, aiming towards the unique needs of the end users, to deliver the goods at the right time and place, in the cold chain system, by acceptable prices. The biggest challenges this industry is facing are shortening the delivery time and inventory.

Alkaloid's supply chain management is definitely one of the best organised in the country, from the supplier of the supplier, to the buyer of the buyer. It is supported with SAP [6] software package. The information system *my SAP ERP* (Enterprise Resource Planning), branded as AlkaSAP, is an integrated system performing complete data base management in Alkaloid, processing and monitoring data necessary for unimpeded and efficient functioning of the business processes.

## **2. Performance analysis of the logistics processes within the supply chain management in pharmaceuticals**

Knowing the complexity of the pharmaceutical supply chain, given bellow as Figure 1, after many years using different software tools to organise the supply chain, and the logistics management in general, there was a clear need of finding improved solution.



**Figure 1.** Pharmaceuticals supply chain with explanation of every phase

Source: DBC Logistics consultant UK

1. This flow chart shows a typical manufacturing supply chain work flow detailing which areas of the business are involved.
2. The sales department identifies a need for a product. The sales department tells the marketing department about their idea and provides any supporting information / data.
3. The marketing department use business analysts to support the project and to complete the research.
4. Data and supporting evidence is passed back to the marketing department for completion of a business plan.
5. A fully detailed business plan is forwarded to the Business Unit Manager / Directors.
6. This unit comprises of the senior business directors or managers who make a decision on the project.
7. After approval the plan is passed back to the analysts to prepare and implement the manufacturing process.
8. Details of raw materials and components passed to purchasing.
9. Purchasing work with logistics and transport to plan the purchase and delivery of the materials to the manufacturing plant.
10. Suppliers receive orders for product and then dispatch on agreed transport on agreed dates.
11. Carriers approved by the business transport the raw materials and components to the manufacturing site.
12. Products are received into the warehouse and then moved to manufacturing.

13. Finished products are moved from manufacturing to the finished goods warehouse which might be situated locally or in a remote location.
14. Finished goods are put into inventory awaiting orders. The company computer system is updated. Product is now available to sales.
15. Customers place orders through customer services.
16. Customer Services take orders and input them to the company computer system.
17. The central computer system maintains transaction records and provided visibility of product for sale.
18. An order is completed and a pick list sent to the warehouse.
19. A copy of the order is sent to the export department for completion of export documentation.
20. Export department manages the final dispatch of the product and produces any export documents.
21. Documents are sent to the warehouse to meet up with the finished order.
22. The order is dispatched by the warehouse.
23. The transport company collects the consignment and delivers it to the customer based upon the INCO terms of carriage.
24. As stock has now been used the computer system generates a request for new stock.
25. The re-order process generates a request to the purchasing department to place new orders with the suppliers.

Facing its 70th anniversary, Alkaloid started implementing SAP, a data transfer system worth over 2 million euro, a system that by its modules integrates completely all the business segments of the company. This also strengthens Alkaloid's position of a leader in one more field, as this is the first registered SAP that a company in our country installs.

The system has been functioning efficiently and continuously since its implementation and is consisted of six modules:

- FI (Finance) – Finances and Book-keeping
- CO (Controlling) – Business Planning and Controlling
- MM/WM (Material Management / Warehouse Management) – Material Management and Warehouse Management
- SD (Sales & Distribution) – Sale and Distribution
- PP (Planning Production) – Production Planning
- QM (Quality Management) – Quality Management

There are 197 users actively participating in the system's daily operations, having various level of authorization and scopes of work. The users continuously support not only the modules, but also the System Support, Program Support and Validation process [7].

While working on this study, main accent was put on SAP as a software solution: useful tool or huge extra cost? The result came even after comparing few figures since the first SAP was introduced in the company. It is definitely a solution for one fast growing competition market, as pharmaceutical is. It is clear that many factors contributed this growth, but AlkaSAP is definitely one of them.

**Table1- 4** Growth figures in some areas since 2006

In *000 EUR	2006	2007	2008	2009	2010	Δ%
Sales pharmacy	57.797	69.293	77.216	89.174	100.521	174%
Sales tea department	1.450	1.500	1.600	1.770	1.800	124%
Investments	8.187	3.682	6.379	8.278		
Equipment			10.713	15.165		

In *000 EUR	Sales			Share	
	Macedonia	Export sales	Total	%MKD	%Export
2006	24.92	32.877	57.797	43,12	56,88
2007	28.464	40.829	69.293	41,08	58,92
2008	29.058	48.158	77.216	37,63	62,37
2009	36.505	52.669	89.174	40,94	59,06
2010	39.061	61.46	100.521	38,86	61,14

Registration of the new products	2006	2007	2008	2009	2010	Δ%
Macedonia	18	20	15	16	26	144%
Export	67	70	60	102	198	296%

Registration of the new products (tea dept.)	2006	2007	2008	2009	2010
Macedonian market and export	11	9	9	3	5

In order to show growing figures as a result of AlkaSAP use, two supply chains were monitored, one of the organic tea, that starts in Macedonia, and ends on the European markets, and the other of the food supplement, natural vitamin C, Acerola, that starts from international raw-materials supplier, and ends again on the European markets. The main points that were observed, parallel to SAP usage were:

- How the supply chain of a Macedonian pharmaceutical company works
- If the GMP norms and ISO standardizations are obeyed
- Is the material resource planning crucial for the process in general
- Is the procurement management used as a tool
- Is there warehouse management
- If AlkaSAP is good enough for the company of this size
- Is outsourcing of certain services as transport justified

After the study was performed and the figures compared it can be clearly seen that Alkaloid is a company where the logistics department and the supply chains are organized on a highly professional level, and both have a strategic role in the development of the company. Throughout the whole chain, GMP norms are fully followed. It was definitely shown through the figures presented by the company that AlkaSAP as a MRP tool is added value to the company which obliges using of the recourses in the most cost saving manner.

It is also proved that for the size of a company like Alkaloid, in this moment outsourcing of the transport services is economically most justified solution. From this, another conclusion is drawn, at this moment; the company is focused on its production and research and development, rather than transport department. In the years to come, maybe after five years, it will be useful to make new calculation, based on future year's figures.

### 3. Conclusions

As a result of the complete way of operating, Alkaloid definitely is a market leader, not only by market share, but also in building the supplier-customer from one side, and manufacturer-end user relationships, from the other. With AlkaSAP the company has obtained its optimum business potential, and is recognized as a superior company in the society. This was not done only by increasing the market share and the profit, but also building a sustainable manufacturing.

Probably, not very different from the global concept, the future definitely lays in the transformation of the supply chain management systems. It is certainly difficult to predict the future of the supply chains, but one is definitely a must: supply chains of a serious company should change, grow, expand and, again, change. It should be guided by the market and the customer, not by the marketing department, there should be development of the products that create demand and make profitable inventories, keeping in stock products that are constantly demanded.

This will definitely help any company in the world, even more in a country like Macedonia for better global positioning and bigger profit.

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# How micro lending practices affect entrepreneurial activity

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Micro entrepreneurs are often considered as a risky client group for banks, because they lack collateral or the capacity to convince banks that they are able to get and repay a business loan. The most important barrier to new business formation is the inability of entrepreneurs to acquire the capital necessary to start a business. Micro entrepreneurs usually have no track record and lack financial reporting that the bank sector requires. The costs of processing small loans and the risks involved in lending to micro businesses make financial institutions hesitant to develop services for micro entrepreneurs.

Few entrepreneurs have or can rise from family and friends, the finance that they need to start in business. But even established businesses often need to raise more finance than can be provided by retained earnings.

This paper aims to bring facts and figures to analyze how and to what the process of micro lending practices in Albania has affected the entrepreneurial activity and how this category of small entrepreneurial firms can benefit by using it. In order to do so, we focus on different aspects of micro financial practices in Albania.

The methodology combined the application of both quantitative and qualitative tools including questionnaire on different indicators addressed to beneficiaries. Qualitative information was collected through Focus Group Interviews, Case Studies and Semi-structured interviews to understand the situations that people face, how they use and perceive micro finance, especially enterprises served by microfinance sector in Albania.

The paper will be organized in two parts, the first part will bring the data regarding the micro lending process in Albania, its challenges, the developments, the contribution on developing business skills, and the second part will analyze the perspective of increasing number of new small entrepreneurship practices as supposed to be supported by micro credit institutions in Albania.

## Keywords

Micro lending, entrepreneurship, job creation, business skills

## 1. Introduction

In recent years, micro finance has gained growing recognition as an effective tool in improving the quality of life and living standards of very poor people. This recognition has given rise to a movement that now has a global outreach and has penetrated in the remote rural areas, besides slums and towns.

Micro Finance projects extend small loans to poor people for their varied needs such as consumption, shelter, income generation and self-employment, etc.

In some cases, micro finance programmes offer a combination of several services to their clients, in addition to credit. These include linkages with savings and insurance avenues, skill development training and marketing network.

Micro credit programmes, thus, assume significance since they facilitate poverty reduction through promotion of sustainable livelihoods and bring about women empowerment through social and collective action at the grassroots. In addition, micro finance interventions lead to increased social interaction for poor women within their households and in the community, besides, greater mobility that increases their self-worth and self-assertion in the social circle.

## 2. Methodology

This study has been done in 2011 in order to assess, on a national scale, the development impact of MFI programmes in relation to different product designs and delivery systems in various parts of the country aiming to measure the affect of micro credit in entrepreneurial activities. Keeping in view the anticipated socio-economic impact of its micro finance programme, the study has been focused on how the micro lending practices has affected entrepreneurial activities, to assess also the impact at the beneficiary level specifically the impact on enterprise level.

**Research Questions.** The primary objective of this study was to find out how micro lending practices affect entrepreneurial activity in Albania taking into consideration many business activities and measuring to them some attributes before and after taking the loan from any microfinance institution in Albania.

The key research questions addressed during the study include:

- Who is being served through micro finance?
- Does micro finance lead to poverty alleviation?
- Does micro finance contribute to enterprise growth and income?
- How does it affect rural women, particularly regarding empowerment?
- What effect does it have on other systems or sources of finance – both formal (*local banks*) and informal (*moneylenders*)?

These basic questions were translated into hypothesis linking input variables (MFI services) and moderating variables (enterprise client characteristics, programme characteristics and others) to ascertain the impact on entrepreneurial activity in Albania.

**Sampling Design.** The sample was composed of the *treatment group* and the *control group*. The target population for the treatment group was “two-year clients”, and included both *current and ex-clients*. The distribution of current to ex-clients in the treatment group was roughly proportional to the percentage of clients who dropped out of the program over the relevant time period. The control group consisted of pipeline clients, or new program clients, who either have not received their first loan or have received their first loan but have yet finished their first loan cycle.

Following best practice for conducting surveys, the selection of the survey sample was done by first geographically clustering the clients. It is revealed that geographical differentiation (rural, urban and peri-urban) was the most appropriate form of clustering for this survey. The final sampled numbers closely approximated the proportions of clients in terms of gender and percentage of borrowers and savers.

A total of 288 members of the Microfinance Institutions clients in Albania were interviewed for this survey which was conducted during January, 2011.

The small group interview sessions were conducted with clients who were stratified and segmented only along gender lines to identify any differences in outcome by gender.

**Data Collection and Analysis.** The study combined the application of both quantitative and qualitative tools including questionnaire on different indicators addressed to beneficiaries and other stakeholders. Qualitative information was collected through *Focus Group Interviews*, *Case Studies* and *Semi-structured interviews* to understand the situations that people face, how they use and perceive micro finance, especially enterprises served by microfinance sector in Albania.

The quantitative data of sample enterprises were analyzed to find out percentages, averages and frequencies for various indicators. The results were subjected to longitudinal analysis for two types the *treatment group* and the *control group*, and the same were tested for statistical significance. The results of comparisons were studied/super-imposed to find out whether the behavior of a particular indicator supports the micro finance intervention as the cause of change.

The quantitative results were supplemented by qualitative observations obtained from *Case Studies*, *Focus Group Interviews* and *Semi-structured interviews*.

### 3. Outreach

*Hypothesis:* Micro Finance is an effective solution for extending financial services to the poor and other disadvantaged groups not reached by formal sector finance.

MFI movement is predominantly taking place in better developed districts and in rural areas.

- MFIs generally serve poor clientele, but 'very poor' clients are still un-reached.
- Majority of clientele is from socially disadvantaged rural districts.
- Coverage of male clients is still predominant.

**Table 1** Location of MFIs customers

	Total	Mature Clients	Ex-Clients	Treat. Group	Control Group
<b>Location</b>					
Rural	59 47.20	28 44.44	13 48.15	41 45.56	18 51.43
Peri-urban	39 31.20	18 28.57	8 29.63	26 28.89	13 37.14
Urban	27 21.60	17 26.98	6 22.22	23 25.56	4 11.43

MFIs in Albania generally serve rural clients (45.56 percent of clients). The proportion of urban clients is 25.56 percent and the peri-urban clients consist of 28.89% (Table 1). Female clients constituted 39.53 per cent of the total clientele and male clients were 60.47 per cent of the sample clientele.

**Table 2** Gender of MFIs customers

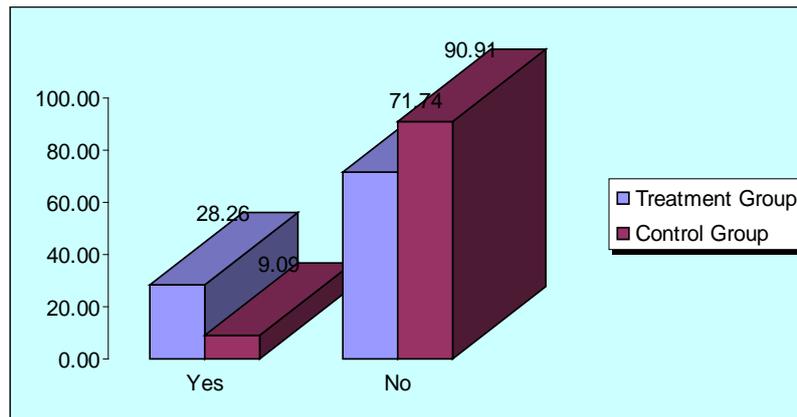
	Total	Mature Clients	Ex-Clients	Treat. Group	Control Group
<b>Gender</b>					
Female	47 37.60	24 40.68	10 37.04	34 39.53	13 33.33
Male	78 62.40	35 59.32	17 62.96	52 60.47	26 66.67

### 4. Access to Micro Finance, Contribution and Use

*Hypothesis:* There is an overall improvement in access and use of MFI loans but not of other services. Access to micro credit has improved for clients

- Savings, under MFI programme has experienced a setback
- Micro Credit has been utilized for investment in productive activities and income generating business activities, besides other household requirements

**Access to Micro Savings.** Though after crediting, savings was the most popular micro finance service among the clients, the data show us that 71.74% of clients did not save before joining the microfinance programme, until only 28.26% of them save before (Chart 1).



**Figure 1** Savings before joining MFIs

Provision of opening micro savings account in the group under the programme had proved to be a boon for the clients, especially for the vulnerable ones. The reasons for preference of the savings scheme were their ability to:

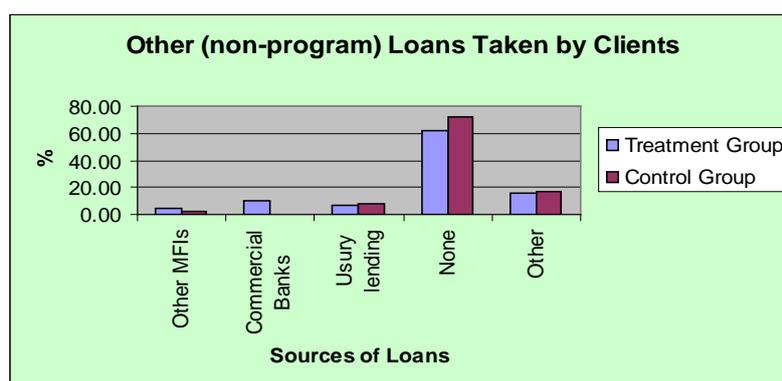
- *maintain savings account at their doorstep*
- *save small amounts on regular basis which was not possible in any formal financial institution*
- *create emergency fund to give them a kind of security against the odds*
- *contribute to their family or near and dear ones during distress*
- *pay monthly installments in case of paucity of funds*
- *exercise control over the expenditure decision*
- *create fellow feelings/bondage among the members of the group*

Members felt that savings was a solution as it helped in emergency situation including releasing of mortgaged land or house, medical purposes, children’s education and social and religious functions.

**Access to Micro Credit.** Micro credit has made an appreciable impact on the lives of many client households through provision of small loans with easy repayment terms, which, in turn, has helped them in starting new enterprises or expanding their existing ones.

Taking of the loan from MFIs went up across all wealth rank categories but the increase was more visible for the ‘very poor’ category and all of them opted for it at the expense of the loan.

Micro credit has been utilized for various purposes by the client households. The future investment in business occupied the major share (35.37 per cent) in MFI loan-use pattern for all wealth ranks, both in the baseline and end line.



**Figure 2** Crediting of MFIs clients

**Use of Non-financial Services.** While some MFIs were providing non-financial services like specialized training pertaining to the clients’ occupation and/or enterprise development programme, a number of them had not taken adequate initiative in skill development of their clients in spite of the demand for such services.

There was unanimous demand from many members in all villages that skill development / training was required for undertaking any income generating activity and they felt that MFI loan alone would not help in improving the livelihood.

Most of the members felt that MFIs could have encouraged them in improving their skills. They also felt that had there been a proper venue for training, they could have extended their skills to others in the village. The non-clients had also shown interest in this regard.

## 5. Micro Finance and Enterprises

*Hypothesis:* Micro Finance increases enterprise activities

With micro credit support, clients have either started new or expanded existing enterprises which not only provided better employment opportunities but also increased enterprise income.

### 5.1 The average salary of employees

It is widely accepted that for an enterprise being microfinance client leads to higher employee salaries, job creation, increase enterprise assets, and many other improvements. Let's see the impact of lending practices of MFIs in average salary of employees using hypothesis testing for comparing two related samples;

Paired *t*-test is a way to test for comparing two related samples, involving small values of *n* that does not require the variances of the two populations to be equal, but the assumption that the two populations are normal must continue to apply.

For a paired *t*-test, it is necessary that the observations in the two samples be collected in the form of what is called matched pairs i.e., "each observation in the one sample must be paired with an observation in the other sample in such a manner that these observations are somehow "matched" or related, in an attempt to eliminate extraneous factors which are not of interest in test. Such a test is generally considered appropriate in a before-and-after-loan study.

Average salary of employees before and after the loan has been recorded for 10 enterprise activities as they are shown in the table below; Using the Paired *t*-test calculations made with STATA we can conclude if there is a difference between average salary of employees before and after the loan, or if the lending practice has been efficient or not in increasing employee salaries.

**Table 3** Hypotheses testing for comparing two related samples of employee salary

Business activities	1	2	3	4	5	6	7	8	9	10
Before loan	25000	15000	21000	15000	25000	27500	30000	20000	23000	20000
After loan	27000	27000	32000	30000	30000	32000	32000	22000	28000	24000

*Two-Sample Paired t Test*

Paired T-Test of mean difference = 0 versus not = 0									
Alternative hypothesis: true mean of differences is not equal to 0									
N	Mean	StDev	SE Mean	Corr	95% Conf Interval	t	df	p-value	Alt Hypothesis
10	-6250	4685.9	1481.83	0.4235	[-9602.1; -2897.8]	-4.2177	9	0.0022	Accept

As shown in the table above, we have to reject the null hypotheses, concluding that there is a difference in average salary of employees before and after the loan or that the lending practice has been efficient for enterprises served leading to increase employee salaries.

### 5.2 The number of employees

It has been recorded the number of employees before and after the loan for 10 enterprise activities as they are shown in the table below; Using the Paired *t*-test calculations made with STATA we can confirm if there is a difference between number of employees before and after the loan, or if the lending practice has been efficient or not in job creation or increasing employment.

**Table 4** Hypotheses testing for comparing two related samples of employee number

Business activities	1	2	3	4	5	6	7	8	9	10
Before loan	1	2	12	0	1	2	2	2	4	1
After loan	3	5	19	2	2	5	4	5	7	2

*Two-Sample Paired t Test*

Paired T-Test of mean difference = 0 versus not = 0									
Alternative hypothesis: true mean of differences is not equal to 0									
N	Mean	StDev	SE Mean	Corr	95% Conf Interval	t	df	p-value	Alt Hypothesis
10	-2.70	1.7029	0.5385	0.9926	[-3.91; -1.48]	-5.0138	9	0.007	Accept

As shown in the table above, we have to reject the null hypotheses, concluding that there is a difference in the number of employees before and after the loan or that the lending practice has been efficient for enterprises served in job creation leading to increased employment.

### 5.3 The profit margin and enterprise assets

For the purpose of this study It has been recorded also the profit margin before and after the loan for 10 business activities as they are shown in the table below; Using the Paired *t*-test calculations made with STATA we can test the hypotheses for comparing two related samples of profit margin before and after the loan, or if the lending practice has been efficient or not in increasing profit margin.

**Table 5** Hypotheses testing for comparing two related samples of profit margin

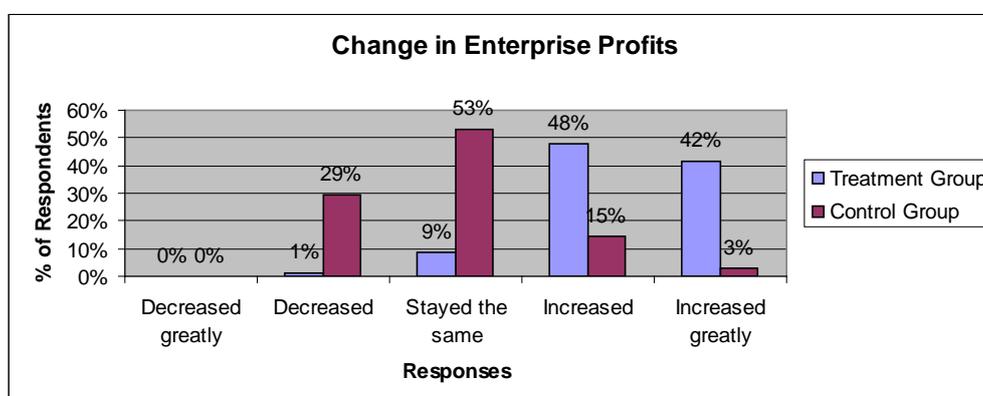
Business activities	1	2	3	4	5	6	7	8	9	10
Before loan	14.8	14.5	10.3	9.7	20.1	15	28	37	18	21
After loan	15	18	16.4	12.5	25	21	35	41	20	27

*Two-Sample Paired t Test*

Paired T-Test of mean difference = 0 versus not = 0									
Alternative hypothesis: true mean of differences is not equal to 0									
N	Mean	StDev	SE Mean	Corr	95% Conf Interval	t	df	p-value	Alt Hypothesis
10	-4.25	2.1532	0.6809	0.9731	[-5.790; -2.709]	-6.2418	9	0.0002	Accept

As shown in the table above, we have to reject the null hypotheses, concluding that there is a difference in the profit margin before and after the loan or that the lending practice has been efficient in increasing profit margin of enterprises served.

**Increasing profits of Enterprises.** Many clients have used micro credit for developing their existing activities or diversifying into new activities with a view to increasing their sources of income. Between the treatment group and the control group, 48% of Treatment group reported an increase in enterprise profits compared to only 15% of the control group, and 42% of the enterprises from treatment group reported that their profits has increased greatly compared to only 3% of the control group as it is shown in the chart below;



**Figure 3** Enterprise profits

A 35 years old female, found it difficult to make ends meet. She had studied up to the primary level. She and her family had no savings and stayed in a medium sized house. Her husband ran a small floriculture business, earning 2-3 Euro daily. Two of her sons were employed – one ran a barber shop,

which was on rental basis and the other a lotto-sport worker. She joined the microfinance program two years ago and availed of loan twice.

With the help of the loan received from the MFI, she was able to assist her eldest son in purchasing the barber shop. Her son's present income was 10 Euro daily, amounting to 300 Euro per month. Though the income did not increase much, this lady and her son were proud that they owned the shop and would be able to increase their business. The MFI credit had smoothed the income cycle of the family by way of ensuring regular income and helped the financially backward in developing their own enterprise and standing on their own feet, thus improving their standard of living to a large extent.

**Change in Enterprise Assets.** Clients reported increase in income from majority of business activities supported by microfinance institutions. The activities which accounted for higher investments in major tools were 23.24% of treatment group compared to 2.94% of control group. Also in means of transportation invested 16.2% of treatment group compared to only 2.94% from the control group as shown in table 6, proving the affect of micro credit on increasing enterprise assets;

**Table 6** Investment in Enterprise Assets

Asset	Total	Mature Clients	Ex-Clients	Treat. Group	Control Group
Small accessories	33 18.75	18 19.15	9 18.75	27 19.01	6 17.65
Major tools	34 19.32	22 23.40	11 22.92	33 23.24	1 2.94
Means of transportation	24 13.64	16 17.02	7 14.58	23 16.20	1 2.94
Storage structure	22 12.50	11 11.70	9 18.75	20 14.08	2 5.88
Minor investment in marketing site	29 16.48	12 12.77	6 12.50	18 12.68	11 32.35
Structure for marketing site	34 19.32	15 15.96	6 12.50	21 14.79	13 38.24

## 6. Conclusions

Based on the survey and observation results we can conclude that lending practices have a positive affect on entrepreneurial activities in increasing employee salaries, in job creation or generating employment, in increasing profit margin of enterprises served as shown by the cases and models analyzed in the above text.

Besides credit, the poor need savings services to bridge income fluctuations and meet emergency needs. MFIs are not permitted to mobilize deposits, hence, are unable to offer savings services to their clients, so it is strongly recommended that MFIs may be permitted to mobilize savings at least from their own clients/members on the condition that they will follow prudential accounting norms. MFIs should offer interest on savings and savings be made withdraw able.

MFIs are often pressurized to bring down interest rates to unreasonable levels in the name of service to the poor without provision of any support. MFIs have to charge interest rates on loans to fully cover cost of funds, operational costs, loan loss provisions and reasonable margin of profit for servicing equity and building sustainability.

MFIs should follow a rational and transparent interest policy to avoid suspicions and encourage professionalism in the sector. MFIs may take steps like rationalizing the cost of funds by accessing various sources of funds, increasing operational efficiency, involving local small NGOs, etc.

Borrowers are often unaware of the effective cost of borrowing and complain about the high cost of loan and lack of transparency. MFIs should be transparent with respect to interest rate and other costs charged and effective cost of credit to the borrowers.

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# Regional competitiveness and development with the reference to the situation in Serbia

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The main goal of the paper is to analyse methodical and practical aspects of region competitiveness and its impact on the development, with reference to the situation in Serbia. In this case the definition of competitiveness, as well as the definition of development requires adequate interpretation and quantitative assessment. Unfortunately, there is no single, all-encompassing economic theory that provides a generally accepted definition and explanation of regional competitiveness. As the same time, obvious is that for a successful integration of a country's economy into the global markets, its competitiveness is crucial. In this paper, we focused on Serbia's current competitiveness context and the challenges for its improving. Serbia, even though involved in the transition process as early as 1990, due to wars and economic sanctions, is very much in delay with its implementation. Indeed, a new competitive strategy is needed based on efficient macroeconomic management and micro-economic management, on fully privatised and transformed enterprises. In order to evaluate Serbia's strengths and weaknesses, this paper analyzes the most relevant studies dealing with international competitiveness. This paper also analysed the main tendencies in the industrial development of Serbia, and the key factors in the decision-making regarding allocation of foreign investments. Finally, we presented some recommendations for improving Serbia's competitiveness.

## Keywords:

International Competitiveness of Serbia, Measurement of Regional Competitiveness, Regional Competitiveness

## 1. Introduction

In different economic encyclopedias, *competition* is described as a contention of producers and traders for better farming and goods' realisation conditions as well as for the entrench in the market, noting that competition stimulates culture development of economics and management. [1] International Institute for Management Development has defined competitiveness as a capability of national economy to create added value and increase national benefit, and has retained it till present. For countries, where resident business does not dispose higher technologies, or countries which do not have strategically important natural resources and which have just soaked up fundamentals of market economics, it is necessary to insure that every business unit, every decision of government, every feet of its territory would become competitive and completely responsible for their survival and value. [2]

Territorial economic policy aims to enhance *regional competitiveness* and attract new investments of various sizes in order to exploit more fully regional comparative advantages and generate significant growth in regional employment and income. Regional integration can be a powerful policy tool. [3] It can function as a dynamic catalytic interface that buffers local actors' exposure to global contexts. It can also provide a framework that helps to eliminate incentives for welfare-reducing fiscal wars among local districts that compete over foreign investment. Regional competitiveness is probably best seen

as an evolving complex self-reinforcing process, in which outputs themselves become inputs, and thus influence future outputs. [4] Outcomes feed back to influence drivers, fundamentals and externalities: all coevolved, in this instance in a virtuous circle.

## 2. Regional Competitiveness and Sustainability of Competitiveness

The competitiveness of a country depends upon its ability to make market participants efficiently use available resources, as well as upon its ability to introduce innovations and positively change environment to guarantee the development sustainability. [5] As the competition in the world is increasing, the role of country becomes more and more important. There are three *country's attributes*, that each of them and altogether constitutes the base of country's competitive advantages: (a) environment adequacy for training competitiveness; (b) technological and organisational perfection of the fields of activity; and (c) utility and efficiency of the international relations.

These factors along with the regional features most often guarantee regional resources, labor qualifications for the selected field of activity. The apex of each triangle illustrates the key point of competitive success achievement on the international scale: accessibility of resources and qualified labor force, information that forms good opportunities, and experienced pressure upon the company, making it introduce and realise innovations. In general, the presumption of competitiveness of a separate country and the whole of factors can be shown in Figure 1. [6]



Figure 1 Presumptions of regional sustainable competitiveness

## 3. Measurement of Regional Competitiveness

The *World Economic Forum* has been measuring competitiveness of national economies. Each economic forum measures competitiveness by the *Growth Competitiveness Index (GCI)*, *Business Competitiveness Index (BCI)*, and *Global Competitiveness Index (GCI)*.

The *GCI* includes ratings of: the quality of macroeconomic environment; the state of public institutions and technological development. The global technology development phases as a base for building the national competitiveness strategy are: the factor based development; the investment based development and innovation based development.

The *BCI* is based on the assumption that macroeconomic and institutional stability are necessary, but not sufficient, because they provide the setting for the generation of wealth. According to *Porter's diamond of business clusters*, there are four interrelated factors of the business environment: strategic context; supply; consumption; and connected business. An inadequate level of entrepreneurial capacity is of special importance for developing countries and countries in transition because it continually leads to the cancellation of the positive effects of different stabilisation and monitoring programs, demanded by international financial institutions. [7]

The *Global Competitiveness Index*, which synthesises and expands the above-mentioned aspects of competitiveness, was introduced as the measurement of competitiveness. According to this approach, there are twelve pillars of competitiveness which is shown in Figure 2. Division to sub-components was performed based on the assumption that countries pass through three stages in their development. Economic growth at the first stage relies on the basic production factors. Economies at the second stage base their economic growth primarily on efficiency enhancement. Most relevant for the countries belonging to this group are the competitiveness pillars contained in the subgroup Efficiency Enhancers. Serbia is in the second stage of development. Finally, economic growth of the

countries at the last stage of development, depends to a large extent on innovation and sophistication of business processes.

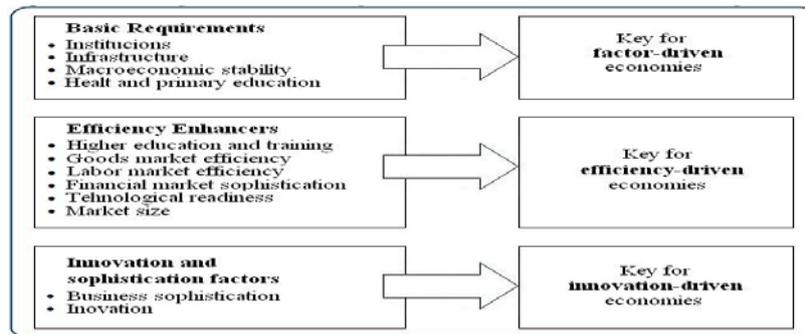


Figure 2 The 12 pillars of competitiveness

Generally speaking, productivity and the employment rate are measures of what might be termed *revealed competitiveness*, and both are central components of a region's economic performance and its prosperity. Figure 3. [8] suggests that productivity may differ between regions for a host of different reasons. But equally important is how such differences are predicted to evolve over time. Regional differences in productivity growth are explained by regional differences in the rate of technical progress and by regional differences in the growth of the capital labor ratio. [9] Martin adds two more measures of revealed competitiveness: wages and GDP per head.

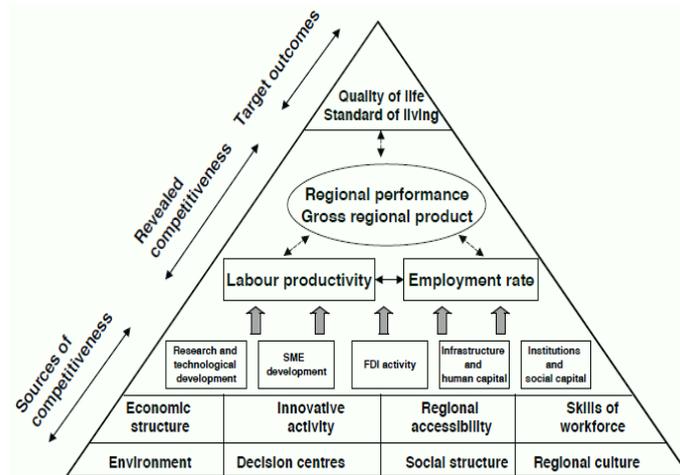


Figure 3 The Pyramid Model of Regional Competitiveness

Aiming to measure the regional competitiveness within the country by the *Regional Competitiveness Index*, Snieška and Bruneckienė have formed a Regional Diamond model. [10] The model was a means to evaluate the ability of regions to use factors of competitiveness for the formation of a competitive position and for its retention among other regions as well. It is presented in Figure 4.

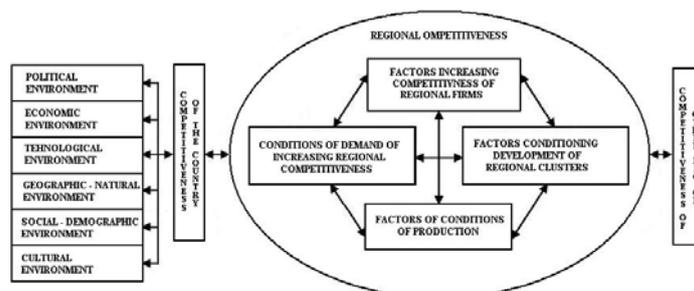


Figure 4 Regional Diamond model

With regard to the fact that a region is an open system, factors of competitiveness must be analysed in inner and outer aspects of a region. A reciprocal effect on regional competitiveness made by both external environments and general competitiveness within the country and other regions is also distinguished in the model of Regional Diamond. Despite the fact that these aspects are not included in the measurement of regional competitiveness by RCI, their influence is estimated indirectly via factors of regional competitiveness and its capability to use opportunities provided by these factors to strengthen its own competitiveness.

#### 4. Analysis of Studies on International Competitiveness of Serbia

Serbia belongs to a category of small open economies, with an average level of national income. The long-term sustainable economic growth depends to a large extent on integration into international markets and increase in exports. [11] The adoption of appropriate measures in agreement with the IMF was key in re-establishing macroeconomic stability. [12] Serbia's external position improved. The pickup in economic activity led to a widening of the current account deficit which was limited on the back of strong export and subdued import growth. Foreign exchange reserves remained relatively high despite interventions by the central bank to buffer volatility of the exchange rate. Inflation was broadly maintained within the target.

In order to obtain objective insight into international competitiveness of Serbia, we have conducted analysis of the relevant studies dealing with comparative competitiveness analyses of a larger number of countries. Two studies we will focus are The Global Competitiveness Report of the World Economic Forum and the World Bank's Doing Business report, because they are widely accepted as reference studies and they take into account broad and complementary set of factors affecting international competitiveness of a country. The Doing Business report is focused on issues pertaining to the quality of business environment. On the other hand, The Global Competitiveness Report covers in more detail the factors directly influencing doing business and international competitiveness of a country.

##### 4.1 The World Economic Forum Global Competitiveness Report

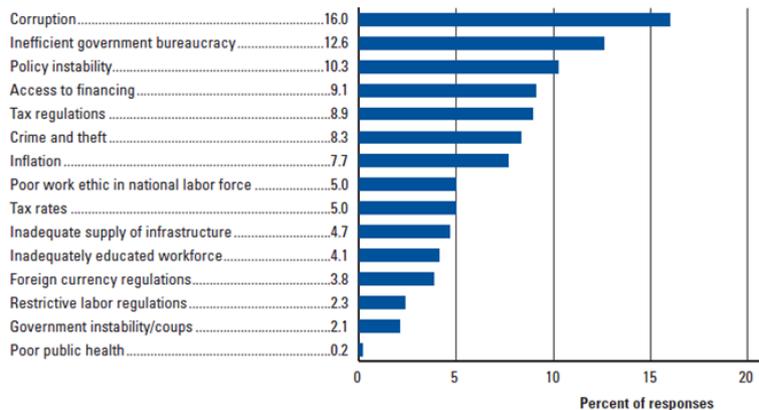
The Global Competitiveness Report of the World Economic Forum (WEF) is used in the same format in all 139 countries it covered. Executive managers provide answers to a wide set of questions about business environment. Most of the questions require scoring on a scale 1-7, with 1 being the worst, and 7 the best score. Apart from the survey questions, calculation of international competitiveness index includes quantitative data from secondary sources such as: gross domestic product, population size, inflation rate, tax rates, budget deficit, public debt, exports and imports, customs dues and tariffs, interest rates, data on mortality and morbidity, education costs, data on population education level, number of telephone connections, number of the Internet connections, etc. This approach enables precise identification of specific advantages and disadvantages of specific countries in a wider context. Since 2005, the WEF has based its competitiveness analysis on the Global Competitiveness Index. In 2010 Serbia is ranked 96th as regards competitiveness, out of 139 countries covered by the survey. [13] This represents a fall compared to the previous year, when Serbia was ranked 93rd of 133 countries. Serbia's ranks and scores considering overall index and sub-indexes are shown in Table 1.

**Table 1:** The Global Competitiveness Index 2010–2011

<b>Serbia</b>	<b>Rank</b>	<b>Score</b>
<b>Overall index</b>	<b>96</b>	<b>3.84</b>
Basic requirements	93	4.15
Efficiency enhancers	93	3.75
Innovation and sophistication factors	107	3.04

Figure 5 demonstrate the factors which have listed as the most problematic ones for doing business in the 2010 survey. The survey shows that corruption was identified as the biggest problem for the companies. Inefficiency of the public administration was listed second, followed by political instability. Obviously, the three problematic factors are closely interlinked and directly related to inefficiency of public administration agencies. The previous year's reports mentioned once again the same three factors as the most problematic ones, pointing out to the fact that significant progress has not been

made in improving business climate from the aspect of services provided to the companies by the state. Replies to this question clearly demonstrate that, despite certain progress achieved, there is still much left to be done by the public administration in terms of creating favorable business environment.



**Figure 5** The most problematic factors for doing business

Figure 6 depicts value comparison of all 12 competitiveness pillars for Serbia and average of the countries at the second stage of development. What can be seen in the majority of indicators, Serbia is slightly below the average, that is, less favorable compared to the group of countries from the same group. Health care system and system of primary education in Serbia were ranked above the average of the group of countries being at the second stage of development. On the other hand, the area in which Serbia is most lagging behind this group is infrastructure. Additionally, it is noticeable that Serbia is also lagging in the goods market efficiency. Several items are included in computing of this competitiveness pillar ranking, in relation to which, low score of Serbia primarily represents a consequence of the poor ranking of competition in domestic market.



**Figure 6** Serbia and average of countries at the second stage of development

Taking into account the overall rankings for this subgroup of factors, Serbia was rated somewhat better compared to the Western Balkans countries, but lower than the CEE countries. Business sophistication in Serbia was ranked in line with the regional average, but scored lower compared to the CEE countries. Innovations were scored above the average of the Western Balkans countries, but below the CEE countries. Extremely low rankings of Serbia in respect to availability of most modern technologies in general, specially in companies – are the result of particularly low import of technologies, serious crisis that hit metallurgy and machine industry of Serbia, and extremely bad condition of science in general, namely almost completely paralyzed research and development work in the Serbian companies. [14]

## 4.2 The World Bank's "Doing Business" Report

The basic assumption underlying this study is that the private sector is the leader of further economic growth. The World Bank used indicators or stages in development of the respective list covering the

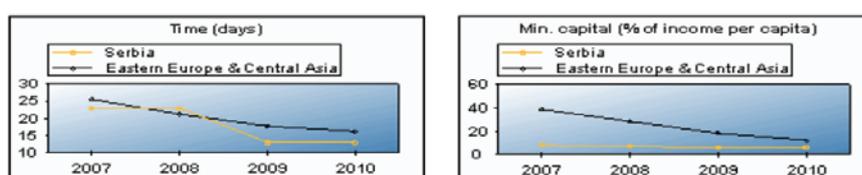
ease of doing business. These indicators have been utilized for the analysis of business environment in context of administrative regulations which burden operation of businesses. Serbia is ranked 89 out of 183 economies, which is present in Table 2. [15] Countries of the Western Balkans have on average achieved the same results. The neighboring countries which have already joined the EU were ranked higher, which confirms positive impacts of the EU accession.

**Table 2** Serbia's ranking in Doing Business 2011

Rank	Doing Business 2011.
Ease of doing business	89
Starting a business	83
Dealing with construction permits	176
Registering property	100
Getting credit	15
Protecting investors	74
Paying taxes	138
Trading across borders	74
Enforcing contract	94
Closing a business	86

We can see that only in relation to certain criteria Serbia is ranked in an acceptable position. Serbia was awarded good score as regards to the ease of getting credit for legal entities. This fact testifies about the high level reforms undertaken in domestic financial sector. Acceptable results were achieved in the category Trade across borders and in category Protecting investors. As per other categories such as: Paying taxes, Registering property, and especially the category Dealing with construction permits, Serbia is positioned at the bottom of the table, after all OECD countries. This should be a signal for the policy makers in Serbia that there is plenty left to be done in relation to further enabling of and incentives for the private sector development. It is also clear that exactly the category in which we are ranked lowest represents the administration bottlenecks and areas requiring urgent steps and measures oriented towards further reforms.

In the category *Starting a business* Serbia was ranked 83rd, given that in order to set up a business 7 procedures need to be completed, whereas the total period of starting a business takes 13 days. Certain progress has been made through establishment of the Business Registers Agency and reducing of the minimum paid-in capital requirement for the limited liability companies. The following figure illustrate the Starting a Business sub indicators in Serbia, which proved some improvement over the past 4 years, comparing to Eastern Europe and Central Asia.

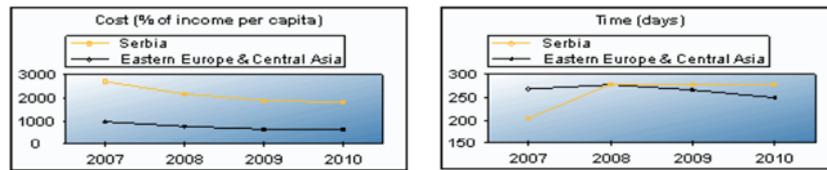


**Figure 7** Starting a Business sub-indicators 2007-2010.

The World Bank offers general reform-oriented recommendations, of which most relevant for Serbia would be introduction of *one-stop-shop* where all procedures underlying registration of a business, document standardization and abolishment of obsolete formalities, would be integrated.

According to the *Dealing with construction permits* criterion Serbia was ranked 176th, as regards the time and procedures required for issuing permits and licenses. This fact indeed speaks unfavorably about the quality of the Serbian public administration, whether at the state or local level. Inadequate municipal procedures were listed as a major problem for many of the investors. In comparison to the previous year, costs of procedures for issuing of approvals and permits have been reduced in Serbia, while the required duration has been extended. Significant changes did not occur in Serbia during the last two years. Moreover, it should be stressed that in terms of methodology, this analysis refers exclusively to the City of Belgrade. The World Bank recommendations refer to reducing the number of envisaged permits, availability of information on the required permits, introducing electronic filing of licensing applications, reducing the number of inspections and integration of procedures. The following

figure illustrate the above mentioned Dealing with Construction Permits sub indicators in Serbia over the past 4 years comparing to Eastern Europe and Central Asia.



**Figure 8** Dealing with Construction Permits sub-indicators 2007-2010.

According to the *Registering Property* criterion, Serbia has made significant progress and was now ranked 100th, compared to 105th in the previous Doing Business analysis. This progress was realized primarily due to reduction of the property registration costs. On the other hand, this process is extremely slow in Serbia. In order to register a property, one needs to complete 6 procedures, but wait to realize them for 91 days. In the OECD countries, registering property is completed within 30 days. Such a low ranking demonstrates obsolescence and lack of reforms in state administration. The World Bank offers recommendations which takes strong reform-oriented political commitment in order for the reforms to be implemented given the ever present resistance. They imply simplification and reduction in dues and compensations, introduction of urgent procedures, establishing of electronic register, transfer of registration from judiciary to administrative domain and introduction of notary public.

*Paying taxes* is another category in which Serbia was extremely poorly ranked, even 138th. In Serbia it is necessary to execute payments 66 times annually, consuming thereby 279 working hours. Paying of various taxes in the regional countries is executed 47,2 times a year, whereas in the OECD countries, taxes are paid only 13,4 times at annual basis. Such rigid and demanding tax system in Serbia is rooted in extremely high tax evasion during the 90's, and necessity of the Tax Administration to fight such evasive trends. However, nowadays, when major part of economy is legal, and aiming at improving business climate and facilitating doing business, it is a must to continue efforts on simplification of tax procedures. On the other hand, the rest of the countries Eastern Europe and Central Asia also scored poorly in this category.

Procedures related to employment of workers significantly burden business activities of companies in Serbia. Besides poor ranking on the Doing Business list, initial results of survey conducted by *the National Alliance for Local Economic Development* show that procedures related to registration of workers represent a big problem for functioning of the economy. Along with the complicated registration procedures, labor legislation is likewise regarded as problem, since due to its rigidity it makes employment more difficult, thus leading to lower employment rate. Recommendations of the World Bank are as follows: flexible working hours, introducing special categories of wages for beginners, reducing costs of firing and increase age limits for retirement.

## 5. Conclusions and Recommendations

Serbia's economy is not highly competitive at the moment. All above stated reflects in very low level of production and export of highly sophisticated products and services, thus inopportune structure of export and therefore low level of comparative advantages of the country. Privatisation of the state-owned companies has been further delayed. The business environment continues to be constrained by red tape and weak legal predictability, in particular with respect to effective enforcement of property rights, which hamper market entry and exit. Furthermore, deficiencies in competition and infrastructure bottlenecks remain barriers to doing business. Besides extremely overvalued currency, other important reason for low Serbian economy competitiveness and sinking on the ranking list of countries in respect to their economy competitiveness results from growing social crisis.

Reforms aimed at creating a more favorable and predictable business environment have to be undertaken to boost the competitiveness of Serbian economy i.e. create conditions for the stronger growth of productivity of the real sector. Herewith recommendations on the possible directions these reforms could take: [16]

- Ensure a much more vigorous and effective implementation of the anti-monopoly policy.
- Simplify and ensure the greater transparency of numerous administrative procedures.
- Reform public administration and improve the efficiency of state administration.
- Establish medium-term macroeconomic stability.

The implementation of the above recommendations would help create a better business environment and improve the competitiveness of Serbia's economy in a relatively short period of time. There are two more recommendations on how to enhance economic competitiveness in the medium and longer term. The first regards the improvement of infrastructure, above all the road and rail networks, which are in relatively poor shape. The second recommendation concerns education reform. According to most economic growth theories, the education and technological progress levels of a country are the best predictors of its growth rate in the long term.

The new competitive strategy should be based on four pillars. [17] The first pillar must be efficient macroeconomic management, i.e. efficient strategy of the strong national currency, strategy of the prices of goods and services, strategy of trade, as well as development strategy. The second pillar must be efficient micro-economic management, i.e. building efficient business strategies, exercising good corporate governance, introducing new management practices, educating and training managers and the workforce, etc. The third pillar should cover legislation and institution efficiency. The fourth pillar has to be connected to the business ethics and the system of values. The main strategy in this area must be orienting Serbia to European ethics and values for business and eliminating corruption.

However, Serbia made some progress in meeting European standards in the area of *competition*. Implementing legislation of the competition law was adopted. Moreover Serbia should continue to work on its enforcement records. Knowledge of competition law and economics in the judiciary remains weak. Some progress has been made in the area of *state aid*. A State aid authority was established. The administrative capacity of the State aid Authority has to be strengthened. Effective implementation of the law needs to be ensured.

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# Microcredit as a source of future micro and small entrepreneurs' growth

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The year 2005 was declared the International Year of Microcredit. Since this year microcredit development has accelerated to provide better access to credit, savings and other financial services to families with low incomes and small businesses all over the world.

Sector of micro and small entrepreneurs has a great social, economic and political significance as it covers virtually all types of activities in small towns. Small business contributes to the solution of such problems as: improvement of employment rate and increase in wealth of the population; enhancement of market economy competitiveness through the development of the consumer goods and services market; formation of the middle class which is the main guarantor of social and political stability in society; increasing investment attractiveness of the regions.

Limited access to external financing is one of the main reasons hampering the development of micro and small entrepreneurs. The ability to get financial resources is a fundamental need of every citizen. Moreover debt financing is crucial for originating and developing the business. Today, development of micro-entrepreneurship is the cutting-edge issue of the developing economies. Therefore, increasing financing of micro and small entrepreneurs is the basis for improving the efficiency and sustained economic growth. Moreover, the history, practice, economic theory suggests that small business is the most mobile and viable part of the economy in the crisis environment. Despite of the fact that small business is more vulnerable, it is able to restore quickly as its structure is quite flexible and responsive to macroeconomic changes.

International practice analysis has shown that microcredit program has a great opportunity for small business, individual entrepreneurs and so-called «poor active social group» to get access to financial resources. Microcredit has become increasingly widespread throughout the world. Historical facts and current situation justify the fact that small businesses and households (which have problems with settlement their debts) extremely need financial services segment supplementing the banking sector. Ability to quickly get financing would allow small businesses to smooth out the current problems and to be more confident about their business plans. This is also an opportunity for population to originate their own business.

## Keywords

Informal financing, formal financing, microcredit, microcredit organization, micro and small entrepreneurs.

## 1. Introduction

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Sector of micro and small entrepreneurs has a great social, economic and political significance as it covers virtually all types of activities in small towns. Small business contributes to the solution of such

problems as: improvement of employment rate and increase in wealth of the population; enhancement of market economy competitiveness through the development of the consumer goods and services market; formation of the middle class which is the main guarantor of social and political stability in society; increasing investment attractiveness of the regions.

Limited access to external financing is one of the main reasons hampering the development of micro and small entrepreneurs. The ability to get financial resources is a fundamental need of every citizen. Moreover debt financing is crucial for originating and developing the business. Today, development of micro-entrepreneurship is the cutting-edge issue of the developing economies. Therefore, increasing financing of micro and small entrepreneurs is the basis for improving the efficiency and sustained economic growth. Moreover, the history, practice, economic theory suggests that small business is the most mobile and viable part of the economy in the crisis environment. Despite of the fact that small business is more vulnerable, it is able to restore quickly as its structure is quite flexible and responsive to macroeconomic changes.

## 2. Literature background

Small entrepreneur' activity is the most relevant topic for today that is discussed in a lot of economic papers. In a growing stream of academic literature on the topic of small business activity and financial resources attraction the concern about entrepreneurial contribution to the growth and competitiveness is evident [1]. Small business development depends on its financing. The financial strategy of a starting entrepreneur leaves an imprint on the future business development and its impact on the overall development [2]. This statement is true not only for the starting entrepreneur, but also for the sector of micro and small entrepreneurs.

For an entrepreneur as for a single economic unit two ways of financing are available: own funds and a debt. As far as the equity financing (IPO or own funding) is concerned it does not cause negative effects in any case if we consider instability from the credit risk aspect (risk, initiated by the creditor-borrower relationships). The side of debt financing is rather multifaceted and includes a wide range of options which are not discussed in corporate finance theories: venture capital, business angels and informal capital [3].

The side of formal financial support is thoroughly investigated in the literature and taken into consideration by policy makers. Until recently it has been considered that the small business financing through banking facilities is the most convenient and effective source. Nevertheless, the study of Thorsten Beck reflected upon the contentious issue about the positive role of banking sector «in enhancing economic growth through more efficient resource allocation» [4]. Additionally, small firms are often out of the credit institutions' target customer base at their early stage of development because of the lack of credit and trading history, collateral [5]. Vice versa, credits are not attractive for entrepreneurs either: high rates and complicated conditions come as insuperable barriers [6].

Informal capital (as well as bootstrapping) investigations are in tune with the drive towards the growing demand for alternative financial sources due to the lack of available loan products [7]. The prevailing form of informal investments is venture capital which is the subject of an acute interest for both researchers and policy makers. Such an investment source fills in the financial gap during the growth of a new firm. Anyway, classic venture capital implies the allocation of financial funds among young entrepreneurial firms with a high growth potential [8], in other words, among technologically innovative small businesses.

In respect to business angels – private investors who provide capital to new and growing businesses in which they had no prior connection and excludes investments in their own firms or in family businesses [9] – it is also a formalized financial source in terms economic reasoning. Investors are seeking for the gain and returns whereas borrowers are interested in the essential resources based on rational risk assessment [10].

In this sense the informal financing (in the form of funds from family and friends) lacks such an inevitable economic grounding as rationality because of the biased perception.

Today, we can note the following trends in the financing of small entrepreneurs. Formal financing is of high demand in Europe: Greece, Netherlands, Belgium, Norway, Finland, Ireland, Italy and some others. The same pattern is observed in Canada and Russia with the exception of the dominant position of informal capital in the second country. Formal funds are not attracted and substituted by own capital and funds of close people in Brazil, Mexico, Peru, China, Jamaica and others. As far as US, UK, Australia are concerned the formal sources are suppressed by own financing. Business-angels' support is disseminated in Northern Europe: Denmark, Sweden, Norway, Iceland, and Finland [3].

Thus, there is a need for an alternative method of financing small entrepreneurs, which on the one hand is formalized, on the other hand is more available. Microcredit perspective is considered as an instrument for the risk mitigating along with preserving the cash flow intensity.

### 3. The content of microcredit phenomena

Microcredit is the extension of small loans (microloans) and other financial services (such as savings accounts) to those in poverty designed to entrepreneurship. These individuals have no sufficient collateral, steady employment and verifiable credit history and therefore cannot meet even the most minimal qualifications to gain access to traditional credit.

Microcredit is the system of economic relations between actors, who provide and receive microcredit. There is a whole infrastructure that serves the process of microcrediting. This infrastructure consists of a various microcredit organizations (MCO), whose main function is to mediate between consumers of microcredit services and their suppliers.

MCOs include nongovernment organizations, credit cooperatives, savings and loan associations, credit unions, various microcredit's funds, government and commercial banks, quasi-banks and others. The main activity of MCOs is the provision of microcredit services to target groups.

Microcredit is provided in the form of microcredit programs. Microcredit programs are the complex financial and consulting services provided by microcredit organizations to target groups of borrowers. Microcredit programs must satisfy the specific needs of selected groups (for example, increase women entrepreneurs' income, support for low-income families, creating new workplaces etc.).

The typical microcredit clients are low-income persons who do not have access to formal financial institutions. Microcrediting clients are typically self-employed, often household-based entrepreneurs. In rural areas, they are usually small farmers and others who are engaged in small income-generating activities such as food processing and petty trade. In urban areas, microcredit activities are more diverse and include shopkeepers, service providers, artisans, street vendors, etc. Microcredit clients are poor and vulnerable non-poor who have a relatively stable source of income.

The basic distinctive characteristics of microcredit organization:

- A database of clients. The target group of micro credit organizations: people with low income who have unofficial businesses or those who are on the lowest level of official businesses.
- A methodology of micro credits. Microcredit organizations use these methodologies which are based on information or reputation and also use systems of mutual protection of members from the same group.
- Administrative costs. Operational costs of micro credit organizations are higher than of commercial banks, therefore to defrayal such costs micro credit organizations have to use high rate which is higher than commercial banks usually use.
- Characteristics of a portfolio. Micro credit organizations can also give credits for a short period of time. The volume of such operations gives them an economy of scale.
- Management. Most of the microcredit organizations have similar organizational structures. Most of them have several small offices which directly interact with clients and back offices which ensure financial, managerial and technical support.

### 4. The motivation of a new mechanism for financing micro and small entrepreneurs' sector

As noted earlier, during the financial crisis access to finance for small enterprises was largely limited. The situation began to improve for the better by the end of 2009. So, according to the Russian public organization "Support of Russia" only 15% of entrepreneurs hadn't problems with financing (January 2009 - for 8%). Number of entrepreneurs, for which it was difficult or impossible to attract funds, decreased (56% in November and 75% in January, 2009). However this problem for small business is still very acute [11].

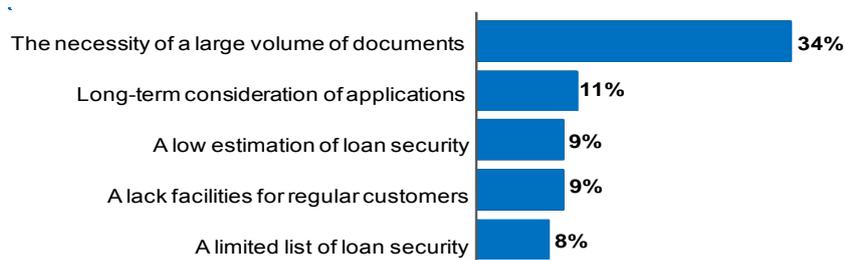
But the need for enterprises in debt financing has not disappeared. According to the NISIPP survey in May 2009 [12] 48,3% of the enterprises needed to attract financial resources. At the same time, the availability of these resources is still restricted: about 36,9% of respondents stated that they have some problems with access to debt financing, 16,1% - have significant problems, and only 9,4% of respondents characterized availability of credit funds as high or very high. Moreover, a significant

proportion of respondents evaluated the financial and economic situation of their enterprises as sustainable - 31,3% and as relatively stable- 53,7%.

The data of "TRUST Index SMEs" studies confirmed a significant necessity in financing to micro and small entrepreneurs. Results of survey conducted at the end of 2009 revealed that 24% of respondents were going to increase investments over the next year, whereas at the beginning of 2009 only 15% of respondents expressed the same opinion. About 13% of respondents said that at the end of 2009 they were going to attract loans for business development, but at the beginning of 2009 only 10% of respondents planned to attract loans for business development. Positive entrepreneurs' mood is a good indicator, of course. However, it should be mentioned that the willingness of micro and small entrepreneurs to get loans does not change the structure of demand for debt financing. According to various surveys, in recent years from 20% to 25% of micro and small entrepreneurs used credit and the most popular type of credit is a short-term lending program.

Thus, there is necessity of a new mechanism, which could formalize the informal cash flows. One should remember that it is an alternative source which has been "invented" by entrepreneurs themselves as the alternative to expensive banking credits, burdensome government procedures to get special grants and transfers, tough and demanding selection processes of venture capitalists and business angels. To replace it without provoking a negative response it is necessary to preserve main features which are attractive to micro and small entrepreneurs: easy access, quickness of getting finance, indifference to the internal characteristics of the business (industry, skills, experience, welfare, status, position and so on), low price, no binding obligations to return the debt (the terms of recovery and profit gain), no collateral [3].

The analysis of the main barriers to lending in according entrepreneurs' views showed that credit policy of banks is the greatest p of entrepreneurs. The main problem associated with credit process is the enormous number of documents which should be prepared and long consideration of applications. Since short-term lending is of highest demand among micro and small entrepreneurs, these factors are critical to the success of their business. The main factors which make bank services less attractive are shown in Figure 2 (according to entrepreneurs' views).



**Figure 2** Reasons of dissatisfaction for the provision of credit services among small businesses, % of respondents [11]

However, if all the conditions are satisfied the problem of the downgrading quality will not be mitigated. The challenge is to find a balance between formal issues and marked informal advantages.

Keeping in mind, that the inability of entrepreneurs to access necessary financial services in an appropriate form is a key barrier for the business development, it is the first item that should be kept in mind when formalizing informal funds. 15% of the UK population does not have an opportunity to get banking credit, 15% - in Sweden, 11% - in Denmark, 13% - in Slovenia [13], 16% - in Russia [12].

The most plausible ways to resolve the problem is microcredit. The most crucial features of this institute have much in common with the attractive points of informal capital: alleviated accesses, lower prices, simplified procedures of getting finance and others.

Moreover one of the most fundamental missions of microcredit organizations is to curtail the share of informal credit markets (on a par with aiding the entrepreneurial activity, stimulating the savings among population and so on) [14].

Let's turn to the next part of our research to consider microcredit in detail.

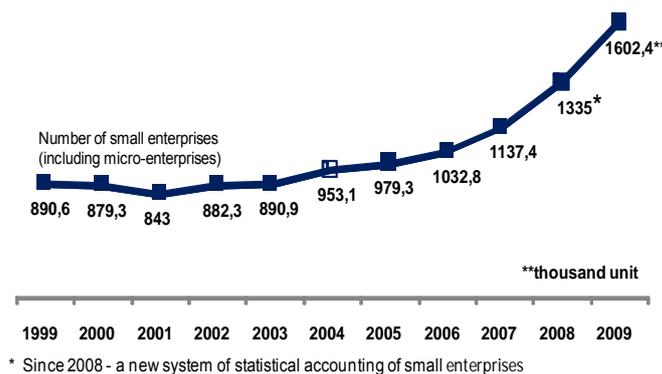
## 5. The evidence of micro and small entrepreneurs' sector in Russia

According to official statistic data on the small entrepreneurs sector, the main indicators of this segment of the economy revealed positive dynamics in the years 2000-2009. During this period the small entrepreneurs sector was one of the most dynamic in the Russian economy.

Currently, in accordance with the data of the Federal State Statistics Service and the Federal Tax Service 1 602 521 small businesses of micro and small entrepreneurs operate in Russia, including:

- 1 374 777 microenterprises (in accordance with Federal law № 209-FL "On the development of small and medium enterprises" statistical survey of micro enterprises is carried out once a year) with the number of employees up to 15 people and an annual turnover of up to 60 million rubles,
- 227 744 small businesses with the number of employees from 16 to 100 employees and an annual turnover up to 400 million rubles.

It should be noted that the principles of statistical observation of small and medium entrepreneurs sector have changed since 2008. Until 2008, the criteria for small businesses (depending on the number of employees) were different for various industries. Since 2008, there is no such a differentiation; this led to improvement of all indicators of the sector (due to the inclusion of additional segments of the business). Figure 1 specifically highlights the point of changing the system of statistical observation [15].



**Figure 1** Number of small enterprises (including micro-enterprises) in 1999-2009 [15]

Sector breakdown of small enterprises is characterized by a high proportion of whole- and retail sale. The number of such enterprises was 662.5 thousand in 2009 or 41% of all legal entities (in 2008 - 42%). These companies provide 29% of workplaces in small businesses (3,5 million people) – by data The Ministry of Economy and Development Russia. The second largest of the small business activity is the provision of services, in this sector 290 thousand companies (18% of the total number of SMEs) involved. This sector provided 16% of workplaces (about 2 million people). The third sector, which represents a significant number of small businesses, is a construction: 195 thousand enterprises (12%), which provide workplaces for 1.8 million people (15% of total employment in the SME sector). Such industry structure of small enterprises has remained largely unchanged over the past ten years. It should be noted that the number of sale's companies is gradually reduced (in 2005 whole- and retail sale enterprises were 46%) [15].

Dynamics of the turnover of small enterprises in 2006-2008 was positive. However, in 2008 due to financial crisis growth rate decreased and in 2009 the sales turnover of small businesses declined [15].

The dynamics of the small businesses' development in recent years reflected the growing contribution of small enterprises in key economic aggregates. Thus, the share of GDP produced by small enterprises in 2008 was 21%, and in 2009 – 22,5% (by data The Ministry of Economy and Development Russia). Share of small enterprises' turnover in total turnover in 2008 was 25,6%. At the same time, the contribution of small business in Russia's GDP remains at a considerably lower level than in the European Union, USA and Japan.

Small business sector suffered a lot in 2009. So, the number of employees in small enterprises decreased by 1,1% (compared to 2008), turnover of small businesses for the year declined by 17%.

Main problems of small enterprises in crisis environment were associated with the financing. The main characteristics of financial position were the next:

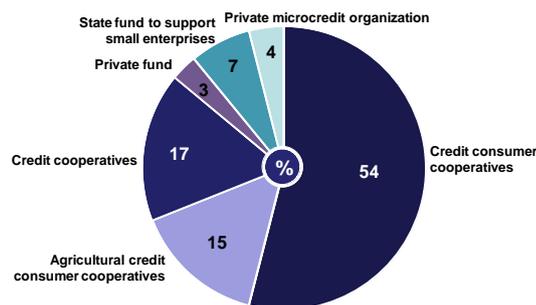
- the lack of working capital due to a significant reduction in small enterprises' turnover;
- the growth of the fail accounts payable to banks, leasing companies and counteragents;
- the lack of access to bank lending (in conjunction with stricter requirements for borrowers and rising interest rates on loans);
- the reduction in effective demand for products of small enterprises;
- the lack of free access to financial resources provided by the government.

Despite of the fact that the dependence of small enterprises from the banking sector and bank financing as opposed to large and medium-sized enterprises is not strongly pronounced, liquidity crunch in the banking sector reduced the banks' ability to allocate credit to small businesses. Small businesses use credit primarily for working capital, purchase of goods from large manufacturers, wholesalers. In other words, a small business has great demand for short and medium term loans. Banks were limited in their resources due to the crisis and could not satisfy the small businesses' demand. According to the Ministry of Economic Development and Trade in Russia during the first half of 2008 growth rate of lending to small businesses was about 31%, while in the second half of 2008 this figure dropped to 2,7%. Small businesses that work with small regional banks and which experienced considerable difficulties with liquidity, felt the impact of the banking crisis to a greater extent.

The financial crisis led to sharp deterioration of the typical problems that exist in small business. There was a significant reduction of access to additional financial resources.

In period from 2003 to 2007 microcredit market in Russia had positive dynamics. Number of microcredit organizations (including separate divisions) increased by 42% in 2007 compared with 2003 [16]. It should be noted that the number of structural units in 2003-2007 practically unchanged, while the number of separate divisions increased. This suggests that during 5 year new players hardly appeared, but existing players expanded their branch network. 2008 year and 2009 year were rather difficult for the microcredit market in Russia due to the financial crisis and slowing economic growth. The highest peak of the crisis in the microcredit sector occurred at the end of 2008 and early of 2009, but the situation began to stabilize by the 2<sup>nd</sup> quarter of 2009.

Credit cooperatives occupy the leading positions in the microcredit market: their share increased from 69% in 2003 to 86% in 2008. The structure of cooperatives is as follows: credit consumer cooperatives (54%), credit cooperatives (17%) and agricultural credit consumer cooperatives (15%). The structure of microcredit organizations (according to 2008 year) is shown in Figure 3.



**Figure 3** Structure of microcredit organization in 2008 [16], [17]

The main users of microcredit services in 2003 were sole traders (according to the structure of the client base of Russian microcredit organizations), but by 2008 the situation changed and the main users were individuals (see Figure 4). The same situation was observed in the banking sector - the active operations of credit institutions in 2008 were characterized primarily by credit growth (although growth rates of credit lending to non-financial organizations and the population was markedly lower than in 2007).



**Figure 4** The structure of the client base of Russian microcredit organizations, % of respondents [16], [17]

The structure of the customer base is largely determined by the type of organization that provides microcredit services. This is due to legislative restrictions imposed on certain legal forms and goals of microcredit organizations themselves, their specialty, financing sources and the location.

Over the past 7 years the structure of the loan portfolio has changed significantly for all types of microcredit organizations. The share of loans for business purposes is reduced year by year and by 2008 amounted to only 28% (2003 - 62%). The share of loans to consumers, to the contrary, increased from 30% in 2003 to 61% in 2008 [16]. Aggregate demand for loans declined due to decrease in business activity and consumer demand in 2009, because during the crisis the population shifted from consumption to savings. Therefore the loan portfolio in microcredit organizations decreased.

## 6. Policy implications

Despite of slowdown in the microcredit sector's development, it is expected that in the condition of post-crisis growth micro-credit sector will play a key role, especially in regions where the underdevelopment of banking infrastructure is mostly noticeable. Moreover, it is expected that in favourable economic environment the loan portfolio and the number of borrowers will grow in microcredit organizations faster than in the banking sector.

Among different forms of the microcrediting (banks: cooperative, commercial, microfinance, savings; non-banks: financial cooperatives, non-profit companies, non-governmental organisations), credit cooperatives (both in the form of banking and non-banking organisations) can fulfill financial gap in the micro and small entrepreneurship. Such a form of financial institution has unique possibilities in the accumulating of non-operating savings of the population with the aim of the entrepreneurial activity crediting (as a particular case).

Financial cooperatives which are organized to serve small business support should meet minimum regulatory requirements in order to achieve a full-fledged displacement of informal cash flows. From the other point, it is essential to ensure that such a kind of transformed investments would not cause the same negative effect as in the case of informal capital. Due to the minimum regulatory control and taking into the account the findings that cooperative financial organisations are more stable than commercial banks micro-credit cooperatives ensure reasonable resources allocation. These institutions are more resilient to stress as their funds are not diversified in the open market and concentrated in the real sector.

In all European countries the long-term strategies concerning the microcredit stimulation are approved (for example Europe 2020). Moreover, in Russia the concept of the microcredit organization development is elaborated by the Russian Microfinance Centre. However, each policy should specialize in a concrete problem. In the scope of the research, informal capital sources should be formalized by means of financial cooperatives involving these investors to combine their resources and put them under control. And microcredit is alternative mechanism for financing micro and small entrepreneurs that allows doing it.

## 7. Conclusions

Informal capital in the small business financing can trigger off various effects. Firstly, it is an irreplaceable source for the early entrepreneurial activity at the addressed point of time. The lack of other sources due to the immature financial system, the absence of trust among investors and unstable environment encourage the choice in favour of this financial strategy in order to make good career or to enhance social status or to improve the well-being. Such an outcome is typical for the countries with low social and economic development.

Secondly, informal capital is a generator of potential instability in terms of the downgrading the quality of entrepreneurial activity. People are more likely to attract this source if they feel unconfident about their business activity, or they need moderate amount of money to start some typical activity: trading, transport and so on. This leaves an imprint on the profitability and solvency of such firms. They neither provide sufficient jobs nor enhance economic growth due to the low value added. The described course of event is appropriate to any nation: both with high and low values of macroeconomic indicators. It is especially dangerous for the developed countries because it can overwhelm the positive effect from the entrepreneurial activity substantially. However, it is worth considering in regard to less wealthier nations in order to ease the recovery process.

Thirdly, informal investments can exist as some additional and minor source, because it is an inevitable and uncontrolled element of any society: personal relationships. Notwithstanding this fact, other financial sources are affordable enough to be attracted by the most part of successful businesses. That is the balance which should be found to insure consistency in the economic growth.

To achieve this balance, micro-finance institutions should be spreaded around. More specifically, credit cooperatives are able to replace informal cash flows being the formalized analogue of them. The legal structure of such institutions preserves the most attractive features of informal capital: easy access, low prices and close relationships (an opportunity to resolve all the disputes inside the organisation).

This analysis shows that microcredit should be used as an alternative mechanism for financing micro and small entrepreneurs' sector. Therefore promotion of microcredit services is an important strategic objective for the development of any country; it is an important source of future growth of micro and small entrepreneurs which is the foundation of economic hierarchy. So it is an issue both economic and social importance.

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# Significance of quality and TQM in the process of local and regional development on the territory of Vojvodina

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Quality is a significant factor of success and prosperity and an important part of the overall management system. With fast and swift changes brought on by the process of EU accession, success is achieved only by those who are able to anticipate and adjust to it. The interest in establishing a quality system, improving quality and quality management, is shown not only by organizations dealing with production or service provision, but also by governmental agencies, local self-governments, educational and scientific institutions, economic, professional and expert associations, and even informal partnerships of the aforementioned entities which have local and regional development as their objectives.

Purpose of this work is to underline key aspects of Total Quality Management (TQM) implementation and its impact on the organization or organizational changes instigated by TQM with special emphasis on changes in TQM philosophy in organizations which are oriented to local and regional development.

In contrast to manufacturing, service organisations produce a product that is intangible, rather experienced and perceptions can be highly subjective. Implementation of TQM is therefore even more challenging in the service sector where local and regional levels organisations are striving for individual success rather than to develop and implement a coherent collaborative quality system that would have a positive effect on results and impact but also on the image of a region.

With fast and swift changes brought on by the process of EU accession, success is achieved only by those who are able to anticipate and adjust to it. This paper is a preliminary study for a deeper research on TQM in local and regional development in Vojvodina (Serbia), aiming to motivate and educate relevant development actors on the territory of Vojvodina and the broader region.

## Keywords

Human resource development, Local and regional development and Total quality management

## 1. Introduction

No man is a prophet in his own land, and this is particularly true of the work of Edward W. Deming. Deming's work and his original recommendations on quality were ignored in his homeland before Japanese business imported his ideas and made them work in Japan. Deming encouraged the Japanese to adopt a systematic approach to problem solving. He also encouraged senior managers to become actively involved in their company's quality improvement programs. His greatest contribution was the concept that the consumers are the most important part of a production line. Meeting and exceeding the customers' needs and requirements is the task that everyone within an organization has to accomplish. Quality means satisfying customers' requirements continually. In addition, the

management system has to enable everyone to be responsible for the quality of his output to his internal customers (Okada 2008)[1].

TQM functions on the premise that the quality of the products and processes is the responsibility of everyone who is involved with the creation or consumption of the products or services offered by the organization. In other words, TQM capitalizes on the involvement of management, workforce, suppliers, and even customers, in order to meet or exceed customer expectations. Considering the practices of TQM as discussed in six empirical studies, Cua, McKone, and Schroeder (2001) identified the nine common TQM practices as cross-functional product design, process management, supplier quality management, customer involvement, information and feedback, committed leadership, strategic planning, cross-functional training, and employee involvement. TQM is an integrative philosophy of management for continuously improving the quality of products and processes.[2]

The goal of TQM is for all operations to be of quality the first time; quality is built into any operation, which reduces the need for control and, consequently, expenses (Sthal, 1997). According to Costin (1999) and Dahlgaard (1998), TQM encompasses the following key principles: TQM management's commitment-leadership, a focus on the customer, employee involvement, training and empowerment; the design of quality management processes, continuing improvements – KEIZEN, suppliers quality management, international sensitivity to continue benchmarking, team problem-solving, stakeholders' common vision and an ever changing culture.

TQM as a management technique for improving a company's performance covers different quality systems. Of these, the most widely used is the ISO 9000 standard which is a useful first step on the journey to total quality (Porter, 1996), respectively it is also a component and complementary part of TQM. ISO 9000 standards can be an excellent starting point and are very appropriate for the standardisation of organisational systems and processes due to the documented procedures regarding a customer's requirements (Dahlgaard, 1998). [2]

In the past decade, much has been written about TQM in manufacturing; however, less attention has been paid to the service sector. The degree of TQM development in the service sector has certainly not kept pace with that of TQM in the manufacturing industries.

## 2. Local and regional development

The local development system is a term which we use here to describe the network of public, business and nongovernmental sector partners which work collaboratively within a defined area to create better conditions for economic growth, social cohesion and employment generation. Local development system might be tightly or loosely organized, precisely orchestrated to deliver a local development strategy, or rather imprecisely oriented (OECD 2009) [3].

A key feature of many reviews of local development is the prevalence of „co-ordination failures” where opportunities to better calibrate and integrative inputs to local economic performance are not taken for a variety of reasons and resulting in underperformance. Local and regional development agencies (as some of the actors in local and regional development) are a global phenomenon, and the experience of them is richly diverse. There is no 'blueprint' or 'template' for a development agency, choices has to be confronted and made locally. Most development agencies are now created to fulfil several rationales simultaneously. In the context of reviews of the contribution of development agencies (DA) to local economic performance we can observe that the chief issue are:

- Development agencies are part of the local development system and the relationship between the development agency and other parts of the system is of critical interest.
- DAs sometimes have explicit roles in co-ordinating or shaping local development systems
- DAs cannot succeed unless local development system are effective , unless they seek to internalise many of the aspects of the system itself
- Many of the challenges that DAs face can be seen as system failures, as much as agency failures.

Observe that sometimes there are multiple agencies competing for roles and resources in which we create duplicate, gaps, or waste. Occasionally, there is limited co-operation between the DA and other local bodies, especially if the DA is established by regional or national government. Equally, at certain times there is limited co-ordination between DAs and other parts of the local municipal government.

Local development systems tend to be relatively complex, as they require effective co-ordination between many different types of organisations or stakeholder groups. This potential constraint is also the local development system's most significant strength. It is often the task of local government to construct a system which holds together all its various component parts (public and private sector organizations; citizen and business; knowledge-based institutions and DAs) in a positive tension which makes maximum use of all available resources, expertise and experience. In a review of the literature

there is consensus around local development as the process of building the capacity of a local area to improve its economic future and the quality of the life for all. The local development system, therefore, involves both the structure within which development-oriented organisations are organized and the key relationships between them. At best, these systems involve high levels of vertical and horizontal co-ordination across a multitude of partners to address a number of key themes which support the holistic and sustainable development of local economy. Relations are pragmatic and constructive and the application of resources broad, deep, but notably efficient. At worst, key relationship break down through a lack of trust and because of competition for work and resources, personality clashes and other such frictions. Gaps may also exist for key work streams necessary to deliver effective local development. Conversely, some systems are so complex contested and convoluted it is not clear who does what and forward momentum dissipates. Despite their significance, there have been few attempts to describe what comprises a local development system. There remains progress to be made on the understanding of relationships between key stakeholders and the underlying principles for success.

Seven of the nine key messages of the Donor Committee for Enterprise Development (DCED 2008) are pointed at development agencies.[4]:

- Business environment reform is complex, operating on many levels and involving a very wide range of stakeholders. Development agencies should therefore ensure a thorough diagnostic analysis and maintain, as far as possible, a systemic approach and an understanding of the broader causal picture.
- Business environment reform is always political and development agencies should therefore take care to analyse the political context. They should have strategies to build coalitions of support and to engage with those who wish to protect the status quo.
- Development agencies should ensure that the inputs and participation of all stakeholders, including politicians, officials, the formal and informal private sector, and civil society, are reflected in the reform process. Reform interventions should be designed to enhance stakeholder capacity for ongoing and future reforms.
- Development agencies should ensure that systems are in place for donor coordination and take responsibility for the quality and consistency of the advice and assistance they provide.
- Development agencies should sequence reforms according to context. “Quick wins” and taking advantage of ad hoc opportunities such as changes of government, may build reform momentum. However, a long-term perspective is essential to ensure sustainability.
- Development agencies should understand and manage the implementation gap typically found between the adoption of regulation or principles, and changing practice and enforcing regulations on the ground.
- Development agencies should ensure the reform process has a strong communication programme so that all stakeholders are engaged and made aware of the benefits of reform.

In Serbia, in the process of defining the NUTS classifications, the bylaw stipulating the criteria for establishment of Development agencies for SMEs was replaced by a bylaw on Regional Development Agencies (RDAs). The former “SME agencies” had a transition period in which they could prepare for and request accreditation as Regional Development Agency. Whereas “old” formations failed to adapt adequately or timely, new RDAs were formed either based on existing municipal or district structures or on a “Greenfield” basis.

### 3. TQM and service quality

Total Quality Management is a process for creating organization-wide participation in planning and implementing continuous improvements in quality. TQM emphasizes the need for all members of a production unit or team to understand the needs and desires of clients or ultimate users of the service or product; use of data-related techniques to assess and improve the quality of the team’s output.

In contrast to manufacturing, service organizations produce a product that is intangible. Usually the complete product cannot be seen or touched. Rather it is experienced. The intangible nature of the product makes defining quality difficult. Also, since a service is experienced, perceptions can be highly subjective. In addition to tangible factors, quality of services is often defined by perceptual factors. These include the responsiveness to customer needs, courtesy and friendliness of staff, promptness in resolving complaints, and atmosphere. Other definitions of quality in service include time; the amount of time a customer has to wait for the service; and consistency, the degree to which the service is of the same quality each time. For these reasons, defining quality in services can be

especially challenging. Dimensions of quality for manufacturing versus service organizations are shown below in Table 1.[5]

Manufacturing organisations	Service organisations
Conformance to specification	Tangible factors
Performance	Consistency
Reliability	Responsiveness to customer needs
Features	Courtesy / friendliness
Durability	Timeliness / promptness
Serviceability	Atmosphere

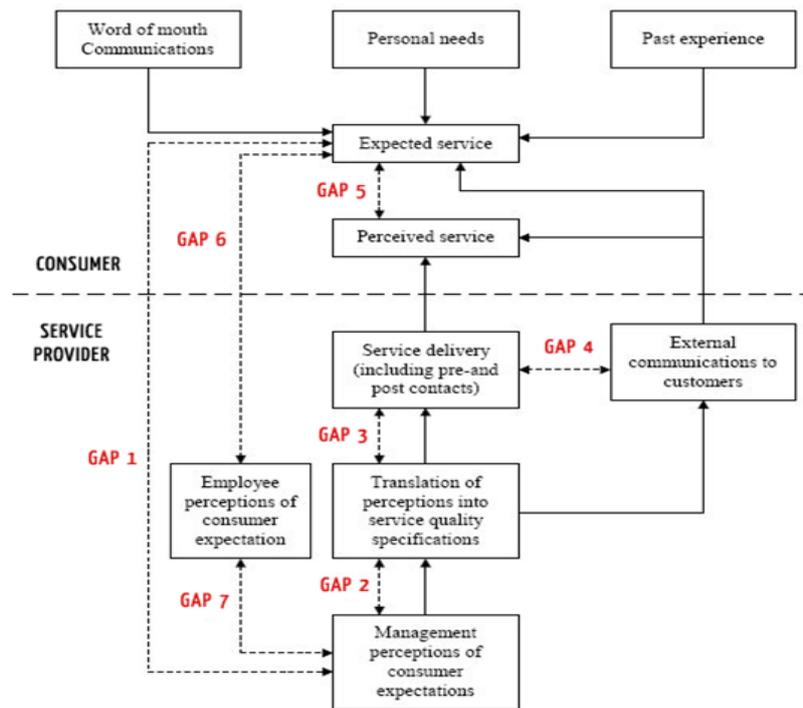
**Table 1** Dimensions of quality: Manufacturing versus Service Organisations

Managers in the service sector are under increasing pressure to demonstrate that their services are customer-focused and that continuous performance improvement is being delivered. Given the financial and resource constraints under which service organizations must manage it is essential that customer expectations are properly understood and measured and that, from the customers' perspective, any gaps in service quality are identified. This information then assists a manager in identifying cost-effective ways of closing service quality gaps and of prioritizing which gaps to focus on – a critical decision given scarce resources.[6]

Service quality is a concept that has aroused considerable interest and debate in the research literature because of the difficulties in both defining it and measuring it with no overall consensus emerging on either (Wisniewski, 2001). There are a number of different "definitions" as to what is meant by service quality. One that is commonly used defines service quality as the extent to which a service meets customers' needs or expectations (Lewis and Mitchell, 1990; Dotchin and Oakland, 1994a; Asubonteng et al., 1996; Wisniewski and Donnelly, 1996). Service quality can thus be defined as the difference between customer expectations of service and perceived service. If expectations are greater than performance, then perceived quality is less than satisfactory and hence customer dissatisfaction occurs (Parasuraman et al., 1985; Lewis and Mitchell, 1990). Always there exists an important question: why should service quality be measured? Measurement allows for comparison before and after changes, for the location of quality related problems and for the establishment of clear standards for service delivery. Edvardsen et al (1994) state that, in their experience, the starting point in developing quality in services is analysis and measurement.

The Servqual approach is the most common method for measuring service quality. Model of Service Quality Gaps There are seven major gaps in the service quality concept, which are shown in Figure 1. The model is an extension of Parasuraman et al. (1985).

According to the following explanation (ASI Quality Systems, 1992; Curry, 1999; Luk and Layton, 2002), the three important gaps, which are more associated with the external customers, are Gap1, Gap5 and Gap6; since they have a direct relationship with customers.[17]



**Figure 1:** Service Quality Assessment (Servqual), Parasuraman, Zeithami & Berry, 1988 [6]

- **Gap1: Customers' expectations versus management perceptions:** As a result of the lack of a marketing research orientation, inadequate upward communication and too many layers of management.
- **Gap2: Management perceptions versus service specifications:** As a result of inadequate commitment to service quality, a perception of unfeasibility, inadequate task standardization and an absence of goal setting.
- **Gap3: Service specifications versus service delivery:** As a result of role ambiguity and conflict, poor employee job fit and poor technology-job fit, inappropriate supervisory control systems, lack of perceived control and lack of teamwork.
- **Gap4: Service delivery versus external communication:** As a result of inadequate horizontal communications and propensity to over-promise.
- **Gap5: The discrepancy between customer expectations and their perceptions of the service delivered:** As a result of the influences exerted from the customer side and the shortfalls (gaps) on the part of the service provider. In this case, customer expectations are influenced by the extent of personal needs, word of mouth recommendation and past service experiences.
- **Gap6: The discrepancy between customer expectations and employees' perceptions:** As a result of the differences in the understanding of customer expectations by front-line service providers.
- **Gap7: The discrepancy between employee's perceptions and management perceptions:** As a result of the differences in the understanding of customer expectations between managers and service providers.

While there have been efforts to study service quality, there has been no general agreement on the measurement of the concept. The majority of the work to date has attempted to use the Servqual (Parasuraman et al., 1985; 1988) methodology in an effort to measure service quality (e.g. Brooks et al., 1999; Chaston, 1994; Edvardsson et al., 1997; Lings and Brooks, 1998; Reynoso and Moore, 1995; Young and Varble, 1997; Sahney et al., 2004).

#### 4. The impact of quality systems on organizations

From a Best Value perspective the measurement of service quality in the service sector should take into account customer expectations of service as well as perceptions of service. However, as Robinson (1999) concludes: "It is apparent that there is little consensus of opinion and much

disagreement about how to measure service quality". One service quality measurement model that has been extensively applied is the Servqual model developed by Parasuraman et al. (1985, 1986, 1988, 1991, 1993, 1994; Zeithaml et al., 1990). Servqual as the most often used approach for measuring service quality has been to compare customers' expectations before a service encounter and their perceptions of the actual service delivered (Gronroos, 1982; Lewis and Booms, 1983; Parasuraman et al., 1985). The Servqual instrument has been the predominant method used to measure consumers' perceptions of service quality. It has five generic dimensions or factors and are stated as follows (van Iwaarden et al., 2003):[7][8]

- Tangibles: Physical facilities, equipment and appearance of personnel.
- Reliability: Ability to perform the promised service dependably and accurately.
- Responsiveness: Willingness to help customers and provide prompt service.
- Assurance :( including competence, courtesy, credibility and security). Knowledge and courtesy of employees and their ability to inspire trust and confidence.
- Empathy :( including access, communication, understanding the customer). Caring and individualized attention that the firm provides to its customers.

Several international studies and papers indicate that TQM implementations have a strong and positive impact on organizational performance (Zakuan 2010); TQM has also a significant and positive effects on organizational learning, and TQM and organizational learning have both significant and positive effects on innovation performance (Richard y 2010)[9][10][13][15]

However, it is very common for organisations to find themselves focusing almost exclusively on the task of completing the quality assurance system, or getting the badge for a particular standard. Although the need for certification is an essential assumption of survival for any business or organization to prevail either from a manufacturing or services point of view this can mean they miss out on the most important benefit, which is embedding a permanent culture of ongoing improvement.

## 5. Sustainable Development of TQM

Evidence from the past has shown that TQM initiatives have failed because the Critical Success Factors (CSFs) were not in place. There have been nonetheless several case examples of successful TQM implementations and sustainability. Such examples show that TQM should not be reinvented at regular intervals but should become part of everyday working life. TQM should not be a fad or a flavor of the month but a durable culture that promotes business improvement over time (Curry *et al.*, 2002) [17]. TQM is only one of many possible means to attain quality. In other words quality is sacred; TQM is not (Harari, 1993).[16]. Sustainability is defined as 'the ability of an organization to adapt to change in the business environment to capture contemporary best practice methods and to achieve and maintain superior competitive performance' (Zairi & Liburd 2001). Quinn (2000) describes sustainability as the development that meets present needs without compromising the ability of future generations to meet their own needs. Without sustainability, there is little benefit to be gained from TQM (Curry *et al.*, 2002). [11]

### 5.1 PDSA cycle for sustainable development of TQM [11]

The Deming's PDSA cycle is a well-known model for continual process improvement. It teaches organizations to plan an action, do it, study to see how it conforms to the plan and act on what has been learned.[12]

#### 5.1.1 Step 1: Plan for TQM

The adoption of TQM in an organization has to start from a strategy for implementation involving the planning and preparation of document detailing the way forward (Yusof & Aspinwall 2000a).

The preparation of such a document may constitute:

- Creation of a co-ordination body;
- Development of a vision, mission and policy statements;
- Education for the top management and coordinating body members on total quality principles and philosophy;
- Selection and trial run of the first improvement project; and

- Appraising the organisation's current level of quality management implementation.

### **5.1.2 Step 2: Implement TQM**

Literature shows several researches on this issue and clearly indicates that every company or organization is implementing TQM based on different theories and models custom adapted to the specific environment of the organization and its constructs to be highly interrelated. In respect to local and regional development organizations and stakeholders we recommended an instrument, with

- Critical success factors,
- Proactive organizational orientation,
- Internal support,
- Competitive assessment and participatory orientation for effective implementation of TQM.

The most interesting point in a Romanian case study refer to the way in which sustainable development indicators become indicators of the quality management system (Seichea 2009) [14].

### **5.1.3 Step 3: Study and measure the level of TQM implementation**

Regardless of which TQM model is adopted, the CSFs must be set in operation for effective TQM implementation. Manifestation of CSFs results in generation of Quality-related Action Programs (QAPs). The measurement of TQM involves selecting a list of QAPs to measure each CSF, providing a measurement scale for the QAPs, and then testing the instrument for reliability and validity. For each CSF the actual level of TQM practice is represented by the average of the QAPs ratings for that CSF.

### **5.1.4 Step 4: Take necessary actions to improve the less developed programmes of TQM**

The evaluations and assessments keep organizations with alert on the gaps between, its internal satisfaction with existing system and the changing external demands in relation to externally defined systems (Van Der Wiele & Brown, 2002). Organizations should monitor the quality of their products and services in order to maintain their strategic and economic position. In addition, they should know with precision when, where, and how-much adjustments are needed in their existing total quality program activities in order to maintain, and possibly enhance, their strategic advantage. In turn, this means that organizations could use a methodology that not only provides reliable information pertaining to the existing state of quality, but also has the capability of identifying specific changes needed to maintain and improve their strategic position and profitability. Furthermore, because of the changing nature of environments and customer preferences, this information should be available quickly, that is, the methodology should be flexible enough to generate this information fast so that the necessary course corrections may be initiated in good time (Kumar *et al.*, 1999, 2004)[18][19].

## **6. Conclusion**

TQM implementation in public service and service organizations is getting more attention in literature in recent years. Total quality management can be defined as a relation between management and the process that can permanently improve and secure the organisational development processes and achieve, enhance and consolidate customers' satisfaction. The basic value of the TQM is to watch over the whole organization as a network of different working processes and procedures where the quality has the most important role but always with satisfaction of the customers' needs on the end. In a TQM organization it is not important to find who is to blame for some mistakes, rather to develop and implement adequate and relevant mitigation measures, meaning that the quality system aims at self-improvement.

It is therefore important to identify all possible problems and sources of resistance inside of the organization and between human resources towards start up and implementation of a TQM philosophy. One has to know in the preparation phase what organizational changes will be caused by the implementation. Mitigation measures should be prepared to tackle sources of resistance among employees towards the new working methodology in order to prevent a hampering implementation process.

Sometimes even more important is that TQM implementation in public administrations, as in local and regional bodies established by them, has to face eventually the political and elitarian network with autocratic, passive and status quo bureaucracy, demonstrating resistance to change in most of the transition countries. The culture of quality, where customers (e.g. citizens) and their satisfaction are focal points is very difficult to be assimilated by the aforementioned stakeholders.

The management's selection of techniques should not be based on a random imitation of successful techniques from other environments, but on a profound knowledge of the techniques which include also strategic positioning along with the organisation's internal and external environments. However considered risky by some, TQM and service quality have proven to be beneficial to their implementing organizations in sustainability, competitiveness and economic success.

This paper is a preliminary study for a deeper research on TQM in local and regional development in Vojvodina (Serbia), aiming to motivate and educate relevant development actors on the territory of Vojvodina and the broader region.

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# Quality management at a training implement

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Here in this paper is presented using of quality management at training implementation in a Training canter. Here are shortly presented EFQM (European Foundation for Quality Management) and self assessment as training quality ensuring tools and a short comparison between those tools. Also is written generally something about 4W (when, where, who, why) + H (how), and our efforts in order to ensure quality management of a training as a process and its phases. Explaining of all parts of 4W (when, where, who, why) + H (how) separately is done later on this paper. Than there are also presented author views about Quality ensuring and quality management. Describing of a Quality management achieved at our Training Centre, which has been done through self assessment also explaining the way it is done. Relationship between training centre (training) and customer (trainees) is also part of this paper.

## Keywords

Implementation, managing, process, quality, training, tools

## 1. Introduction

### 1.1 Quality

Each person has his or her own definition about the term "QUALITY", so we could say that by it self is a subjective term. So, it depends about what we are talking. It means that there are many explanations of "quality". Example if we are talking about a product, quality means ability of this product to fulfill customer requirements and needs at accepted level.

Quality has no specific meaning unless related to a specific function

Mostly, in technical usage, word quality could have two main meanings:

1. The characteristics of a product or service that meet or satisfy stated or implied needs or
2. A product or service without deficiencies.

By other words, nowadays, the word quality is oriented to the customer, so quality in a service or products means the level of product or service what customer is ready to pay for [1].

If we are talking about engineering or manufacturing, the word quality usually is linked with words control and engineering. In this concept the term quality (quality control and quality engineering) is used to ensure products and/or services are designed and all this must be linked with costumer requirements and needs.

So, term quality could be linked with producing parts, it could be linked also with different processes by it self.

Today this term is linked mostly with processes like teaching processes, training processes, producing process and so and so.

The approach to quality management can be applied to any business activity:

- Design work
- Banking
- Insurance
- Computer software
- Transportation etc.

In training area quality means an enough good training which fulfills requirements and needs of costumers. Training must be qualitative at training preparation, training development, training implementation and also at training evaluation. All those training phase must have its qualitative performances.

## **1.2 Management**

One of the so called international words is also management. We say that it is an international word because it is understandable at all languages. There are many words used all around the world but mainly with different meaning, but word management has same meaning.

Humane been has capability to cooperate and ask for assistance about something what is impossible to do alone. So, if there are more than one people there is a need to lead some body. Nowadays most preferred word in this case is word managing. Word managing has a wider meaning [3].

Looking deeper, we have managing also if there is only one person. So, we can say that he is managing his selves. If somebody is managing his time, his job and his things he also is doing a kind of managing.

Mainly word managing we use when we have to do with a group. Groups can be managed in many ways but the best one is managing with group, using all resources contained by group. We could say that a group manager should be a person who is well informed about his group resources [3].

There are many types of managers, it depends on the way how we classify. It is also depending on what are we managing [3].

Training managing means the way on which we try to manage a training process and all phases of training [5]. While we are doing this we must carry out about quality [1].

## **1.3 Quality management**

Earlier the quality was based mainly on product quality, but nowadays it is based on process quality. It means that we are carrying not only about the end of the process (product only) but we are carrying out about process completely (as a process).

The term ISO 9000 refers to training managing standards, where are included ISO 9000:2000, ISO 9001:2000 and ISO 9004:2000 [4].

Let we start with ISO 9001:2000. This is and international standard organization aspect. It means international standard due to quality management. This standard is revised and now it is ISO 9001:2008.

Another quality standard is *EFQM* (European Foundation for Quality Management). It is a framework for organizational management systems and it is designed for helping organizations in their drive towards being more competitive. The EFQM Excellence Model was introduced at the beginning of 1992 as the framework for assessing organizations for the European Quality Award.

The EFQM Excellence Model is a practical tool that can be used in a number of different ways:

- As a tool for Self-Assessment
- As a way to Benchmark with other organizations
- As a guide to identify areas for Improvement
- As the basis for a common Vocabulary and a way of thinking
- As a Structure for the organization's management system

At our training centre we are using the Self-Assessment tool, as a tool which helps us to ensure that we are about our job and its qualities. It means that at all steps we are assessing our training activities and its quality level.

So, we are using a kind of mixed tools to ensure our quality as step forward to other standards like EFQM or ISO standard.

## 2. Quality management at a training area

Under quality management methods are included ISO 9000, EFQM, Self assessment, TQM and Kaizen. Education and training institutions could use as well ISO 9000, EFQM and self assessment.

At our Training centre we are using self assessment as a management quality tool. Ensuring of quality management is done by clear algorithm where is everything defined.

In this algorithm we can clearly see that quality management is a systematic process approach in case to produce a product or offer a service.

In case to develop a quality management we have identified steps than we created a process which has 5 steps (what is same with ISO 9001:2000), those steps are [4]:

1. Process (training) development
2. Process (training) documentation
3. Process (training) Implementation
4. Process (training) Monitoring and
5. Process (training) improvement.

Each of steps can be called as a process. Each of those processes produces some results and those results are information to next process.

After we defined training process then we wrote procedures. Those procedures give us answer at many questions because those procedures are based exactly one those questions as a quality management tool.

Our procedures are derived by answering on 4W (when, what, who, where) and H (how). Sow by giving answer on:

- **What is happening?** It means what is happening in a process stage e.g. in implementation phase, it has to deal with what kind of training, it means it is an internal training or external training. What are we developing, what are we documenting. By answering on question what are we implementing also we answer on that what are we monitoring.
- **When is donning something?** It means time of donning something. So, when are we going to develop a training is there any limited time by customer or by other things, when will we document it during training process or at many phases or when is going to start implementation of training?
- **Who is doing?** This question has to do with who deals with training or saying better that who will implement the training, training centre or another person. By answering this question we get many information about that what kind of training is gone to be. Or, who is going to develop training. This answer we have if we know if training is a result of customer needs and requirements or it is a result of our training needs analyses.
- **Where is doing?** It means that training implementation will happen at training centre or somewhere else like on job training or training at another training institution. By answering on this question an who is going to implement training we differ trainings on internal training and external training.
- **How will be donning something?** If we are going to use again implementation, it means questions about the way of implementation. To explain 4W+H we used the training implementation phase, but we have to answer those questions for all steps or phases of procedures chart at our training centre. So, only after answering at all those questions we are sure that we are at the right way to realize quality management at our training centre.

Here we are presenting to you algorithm of our training procedures:

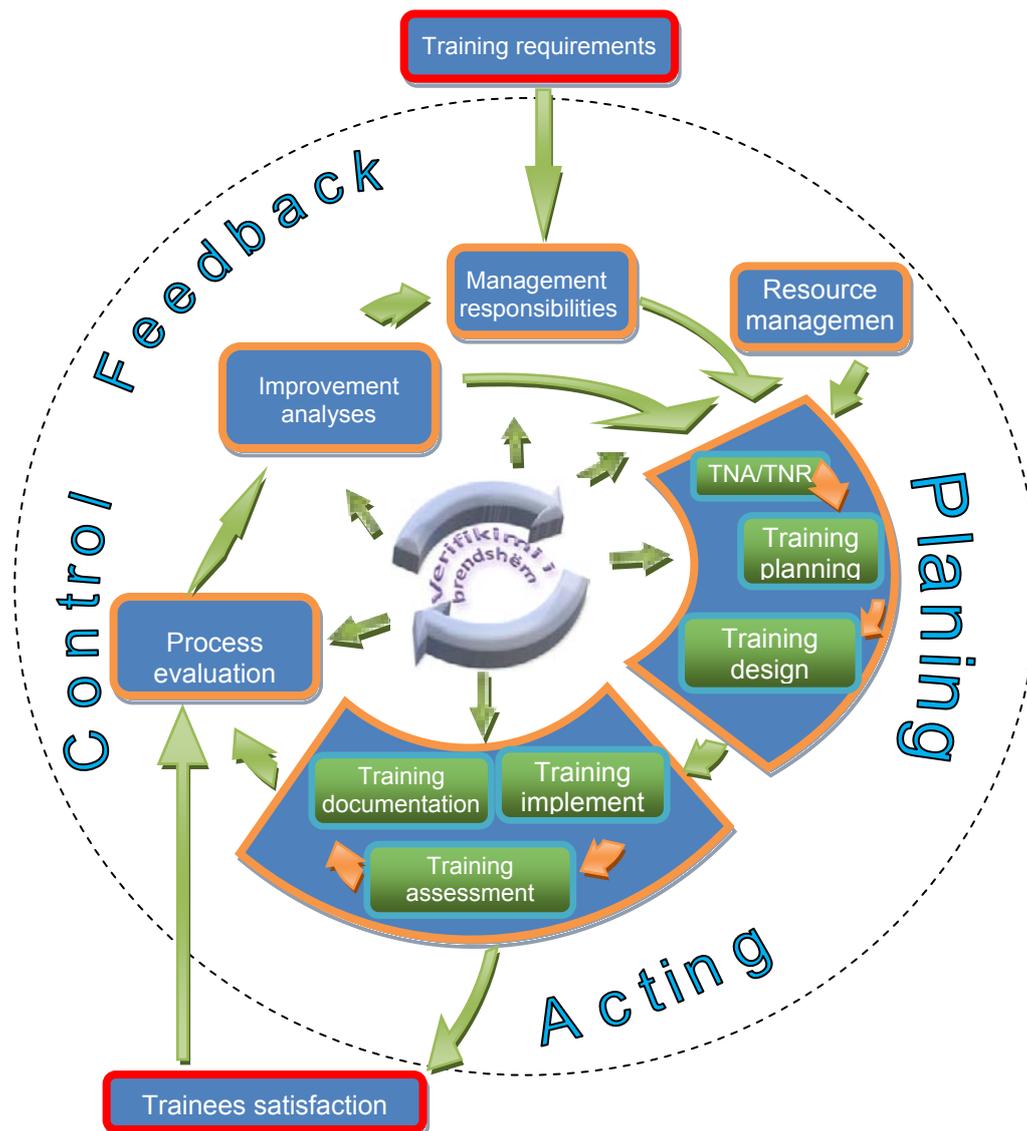


Figure 1 algorithm of training procedures

Ensuring those procedures is done by a well organizing of our training centre. All people are responsible to many steps, than there is a person carrying about that. He is our so called quality ensuring coordinator [4].

### 3. Ensuring quality management through training – costumer relationship

As it is said at the beginning of paper we are focused much more in improvement. The best way to improve our self is contacting our clients (costumers) at all steps of our trainings. So, we have contacts with our costumers at the developing of training. Costumers (mostly the costumers experienced with our trainings) give us information about what is important to their employees. Then we redesign and improve the training content, so we develop again our training.

In the second phase, we use documentation to prove what we have done through training. Than our costumers ask, if we could document them about a problem through training done earlier, and this has an impact in next our documentation.

Many times we consider costumers idea also at implementation of training. So, it happened that idea of our costumers was implementation of a training part at working area. We explained them that it is

very interesting and nowadays it is known as learning by doing. It means, we improved our training implementation.

Mostly, costumers don't have enough idea about training monitoring, so they have a small role on this part. This monitoring means training process monitoring as a whole process, including all phases of a training process.

Main part where are included costumers needs, requirements and demands is improvement of our training. In this phase we consider costumers remarks done through training evaluation and also remarks done through meetings with our clients.

## 4. Conclusions

Working together with customers it has its own benefits. We are there to feel customer's requirements, needs and justifications. We are there to fulfil our self by avoiding no needed things or possible boring things in training process.

Another thing which helps us on quality keeping is doing everything based on our training centre procedures, established by our self but based on those tools mentioned before.

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# Investigating Corporate Entrepreneurship within Banking Sector in Serbia

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Over the last decade, the banking sector in Serbia has witnessed substantial changes. It is evidenced a decrease in the number of banks, the dissolution of small, non-viable banks, and a take-over of the market by foreign banks. In this paper, authors presented main results of empirical study conducted in one regional bank about their activities in domain corporate entrepreneurship. The study had two independent aims. The first aim was to examine the level of centralization in the strategic issues concerning corporate entrepreneurship activities. The second aim of this study was to identify key factors that promote or inhibit corporate entrepreneurship. The research sample consisted of 150 managers and employees from all branches operated in Serbian market. The research findings revealed that corporate entrepreneurship exists in the Bank. The strategy for promote entrepreneurial behaviour has clearly stated. The level of engagement into entrepreneurial projects varied across the work experience in banking sector. The main areas for management improvement are suggested as well as directions for future researches.

## Keywords

Corporate entrepreneurship, bank, strategy, entrepreneurial behaviour, Serbia

## 1. Introduction

Since 2001, till today banking and financial reforms have been conducted in Serbia. From 115 banks, today 33 banks operate at Serbian market. The banks currently operating have been successful in cleaning their balances and there are competent to perform serious change in order to meet all regulatory criteria. This is to significant extent contribution to the competition of foreign banks. They supplemented to the supply of banking services and rendered it more diversified, augmented the overall credit potential and contributed to enhancing the capital position of the banking system.

These changes make it necessary for banks to examine their strategies carefully and to devote great deal of attention to innovation and entrepreneurship. Little empirical research is available in the Serbian context that indicates the successes or failures of corporate entrepreneurship. This study addresses the management dilemma that exists as how to foster and implement corporate entrepreneurship to sustain this competitive advantage.

This empirical research study had two independent aims. The first aim was to examine the level of centralization in the strategic issues concerning corporate entrepreneurship activities. The second aim of this study was to identify key factors that promote or inhibit corporate entrepreneurship in the banking sector. The Corporate Entrepreneurship Assessment Instrument was used to measure corporate entrepreneurship in Eurobank EFG, Belgrade. Data were gathered from 137 participants in all bank's branches in Serbia.

This paper is organized as follows. The next section reviews the extant literature on corporate entrepreneurship. The third section discusses the research context. The section outlines the research methodology used in this study. The final sections discuss the main results and present the main conclusions and implications of this study.

## 2. Theoretical background

Within the literature in organizational theory and strategic management, the corporate entrepreneurship (CE) is a relatively new idea which can be track back to the mid-1970s [1, p306]. Corporate entrepreneurship became a separate research topic in the mid-1980s.

The relevant literature points that CE includes (1) the birth of new businesses within existing organizations, either (2) the transformation of organizations through strategic renewal. CE, like entrepreneurship, may be interpreted in many different ways and studied with many different variables to be measured. Summary of theoretical findings can be found in the studies of Belousova and Gailly [2] as well as Dess et al. [3].

There is no consensus on the definition of CE. Therefore, we present following statement that closely related to the purpose of our research. "CE includes situations where (1) an established organization enters a new business; (2) an individual or individuals champion new corporate ideas within a corporate context; and (3) an entrepreneurial philosophy permeates an entire organization's outlook and operations." [4, p50].

Corporate entrepreneurship refers to the development of new business idea within large and established companies [5, p17].

It is noted that CE can be used to improve competitive positioning and transform corporations [4]. The identification of strategy and structure introduces another wealth of literature that supports strategy for positioning of competitive advantage. The recognition of the importance of entrepreneurial dynamics in corporate context is increasingly acknowledged in both entrepreneurship and strategic management literature [6]. Three variables that underlie a firm's ability to behave in an entrepreneurial manner are opportunity recognition, organizational flexibility and a firm's ability to measure, encourage, and reward innovative and risk-taking behaviour [7].

Most early research focused narrowly on the parent-subsidiary relationship such as centralization, formalization, coordination and control. More recently, from the holistic point of view, the subsidiary is a semiautonomous entity within a differentiated system [8].

Centralization of authority refers to the amount of autonomy individuals have to make decisions regarding the use of organizational resources. Standardization of procedures refers to the extent to which behaviours are routinized within the company. The formalization of processes concerns the degree to which the company has prepared codified and written instructions about how procedures are to be followed.

Entrepreneurial capacity of company appears to be affected by multiple faces of organizational structure, but entrepreneurial capacity is negatively related to a company's level of structural centralization [9].

Other authors argued that centralized structure enables quickly decision making as well as deters potential conflict among separate departments - branches [10]. Although formalized routines constrain creativity, competitive advantages sourced by numerous capabilities rest on use of simple routines.

The five factors identified by Hornsby et al. [11] were rewards, management support, time availability, supportive organizational structure, and risk taken which represent internal organizational factors that influence entrepreneurial activity within established companies. The first dimension is the appropriate use of rewards. An effective reward must consider goals, feedback, emphasis on individual responsibility, and results-based incentives. Innovative organisations are characterised by providing rewards based on performance, offering challenges, increasing responsibilities and promoting the ideas of innovative people throughout the organisation [12].

A second important dimension is management support, which indicates the willingness of managers to facilitate and promote entrepreneurial activity in the company. This support can take many forms (e.g. championing innovative ideas, providing expertise). Managers play a key role in encouraging employees to believe that innovation is expected of all members of the organisation. The third dimension is resources (that includes time) and their availability for entrepreneurial activity. Organisations should be reasonable in assigning the workload of their employees and allow employees to work with others on solving long-term problems. In entrepreneurial work environments, employees are allowed to conduct creative, entrepreneurial experiments in a limited portion of their work time. The fourth dimension is the existence of a supportive organizational structure that provides the administrative mechanisms by which ideas are evaluated, chosen, and implemented. Organisations should avoid having standard operating procedures for all major parts of jobs and should reduce dependence on narrow job descriptions and rigid performance standards [11]. The fifth, and final, dimension is risk taking, which indicates the managers' willingness to take risks and show a tolerance for failure when it occurs. Based on the extensive field research, Hornsby et al. [11]

developed and refined the Corporate Entrepreneurship Assessment Instrument (CEAI) to measure the five internal factors of CE.

To summarise, the key factors of a supportive organisational climate nurturing CE are strategic leadership and support for CE, rewards for CE, empowered employees, resource and time availability for CE, a supportive organisational structure and limited boundaries between departments. There are eight empirical articles in total which study CE using the Corporate Entrepreneurship Assessment Instrument [11, 13, 14, 15, 16, 17, 18, 19]. The literature search was conducted using the following databases-Science Direct, Emerald Fulltext, EBSCO, and WileyInterScience.

There is no study regarding neither banks nor financial institution in which CEAI was used. We find one unpublished study which investigated 150 managers in one large European financial service company [20]. His results revealed that entrepreneurial behaviour has been stimulated by managers' socio-political support and access to resources. We did not find empirical article on CE in the context of Serbia. This was one of motivating factor for conducting this study.

### 3. Research context

Over the last decade, the banking sector in Serbia has witnessed substantial changes. It is evidenced a decrease in the number of banks, the dissolution of small, non-viable banks, and a take-over of the market by foreign banks. Banking sector has been chosen as the research context for the following key reasons. Banking sector in any economy is a vital service industry and when is competitive and efficient it is able to spur positive impact on other industries.

In 2009, the Serbian banking sector operated with considerable profit. Its nominal pre-tax profit came at RSD 20 billion. Of total 34 banks, 13 operated at a loss. Return on equity (ROE) worsened from 9.28% at the end-2008 to 4.6% in December 2009. Despite a high share of equity in balance sheet total, return on assets (ROA) dwindled as well to 1.0% y-o-y in December. A comparative analysis shows that local banks still report the highest efficiency ratio in managing their assets compared to countries in the region and that they rank exceptionally high in terms of ROE. This is highly important given the build-up of risks of consolidation of large international banking groups operating in the region of South Eastern Europe. Banking sector operational efficiency remains satisfactory as net earnings from interest (starting from March 2008) are sufficient to fully cover operational expenses – in Q4 2009, the efficiency ratio stood at 1.1x [21, pp30-31].

With the rapid spill-over of the crisis from developed European countries to South Eastern Europe and Serbia in September 2008, it became evident that the confidence in the stability of the Serbian banking sector largely depends on the reputation of parent banks of Serbian subsidiaries. Confidence in local banks was seriously dented by the bankruptcy of a number of world banks and uncertainties that surfaced with respect to Austrian banks (Hypo Alpe Adria in particular) that are systemically important for the Serbian banking sector. However, owing to the timely response of government institutions, confidence was restored and evidenced by visible signs of recovery already in 2009. Similarly, reputation of Greek banks may be dented by writings of economic analysts on fiscal problems in Greece [21, p29].

Focus bank: Two main criteria were used in selecting process: (1) access to the bank, (2) bank's competitive position. In Serbia, Eurobank EFG Group became operational in 2003 with a greenfield investment. Eurobank EFG Group has become the majority owner of the National Savings Bank in March 2006. Following the legal merger of National Savings Bank with Eurobank EFG, Eurobank EFG a.d. Beograd has been created as one of the top banking organizations based on market share, assets and size of its business network.

Despite the difficulties which the Serbian financial sector, Eurobank EFG improved its position in the local banking system. The bank's market share in terms of assets rose to 6.8%, bringing it to the fourth place, after just five years of actual presence in the country [22, p35]. It is worth noting that the bank is ranked third in terms of equity. Moreover, Eurobank EFG retained, with slight variations, the previous year's substantial market shares in most banking product categories. By the end of the year the bank's network comprised 119 branches and 10 business centres all over the country.

Eurobank EFG Serbia remains one of the best capitalized banks in the market and holds the third position in terms of total equity. As at 31 December 2009 Total Equity stood at RSD 38.4 billion while the Capital Adequacy Ratio was 18.3%. Pre-provision revenues increased by 3% reaching RSD 11.2 billion. Net Interest Income remained at RSD 8.5 billion, the same level as in 2008, despite of the increased cost of deposits and the lower returns on state and NBS securities. Net Commission Income increased by 38.7% and reached RSD 2.2 billion, while Net Interest Margin was at the level of 7.5%.

The vision statement is following [22, p3]:

"We want to become the first choice bank for our retail and corporate clients, operating with a sense of responsibility toward customers, employees, stakeholders and society".

The activities of the Eurobank EFG are governed by the Organization's values: creativity, innovation, efficiency, emphasis on quality and respect towards people and the environment comprise a web of values that permeates the philosophy and guides the actions of the Group's staff. The incessant effort to improve the economic environment, along with the cultivation of an open dialogue with its stakeholders and the Organization's active participation in, and contribution to society, comprise the corporate responsibility of Eurobank EFG [22, p16]. These principles and values not only create a spirit of cooperation and trust between employees, but also determine work within the local communities and how bank serves its clients and shareholders. These values are embedded in everyday practice and behavior and characterize the way that bank operates.

Applying its successful business model, Eurobank EFG offers wide spread of standard and innovative banking products to its clients, employing jointly with subsidiaries EFG Leasing, EFG Property Services, EFG Business Services over 1600 banking professionals. In 2009, the bank introduced many new products and services, such as the upgrading of e-banking services for corporate clients, the provision of text message notifications for credit card and current account transactions, the offer of bancassurance products through its branches etc. These initiatives helped the bank win the annual award of Serbia's Club of Economic Journalists, the "GOLD PLAQUE in the banking sector for 2009".

Eurobank EFG was actively involved in the field of Corporate Responsibility. The bank received the "VIRTUS" award of the Balkan Community Initiatives Fund for its contribution to the local community, and the "Best Regional Business Partner 2009" award of Mass Media International. Moreover, the bank upgraded its methods and programs for the efficient selection, training and development of human resources. One of the most important innovations in this field was the introduction and implementation of a mass e-learning program.

#### 4. Research methodology

This study focused on the assessment of corporate entrepreneurship in the banking sector. Specifically, it attention was to determinate impact of centralization of CE, than to identify the factors that promoted or inhibited CE within Eurobank EFG, a.d. Belgrade. In pursuit of these aims, the following research questions are investigated:

Q1: Is centralization related to CE strategy?

Q2: To what extent is management support used to promote CE within Eurobank EFG?

Q3: Are rewards used to promote CE?

Q4: Do employees have time to think about innovations?

Q5: How employees assess bank's boundaries?

The empirical method is embedded in a case study design.

The assessment has been done by Corporate Entrepreneurship Assessment Instrument (CEAI) developed by Hornsby et al. [11]. The measuring instrument is constructed as a five-point Likert scale with options that ranged from strongly disagree to strongly agree. The desired outcome of the CEAI is to assessment a level of CE intensity and recognition of CE by management within an organization.

The questionnaire was consisted of two parts. The first part of questionnaire was consisted of following five sections:

- Management support (17 questions),
- Risk taking (10 questions),
- Rewards (6 questions),
- Time availability (6 questions), and
- Organizational boundaries (7 questions).

The second part of questionnaire was consisted of demographic characteristics of participants.

The research sample was 150 managers and employees in the Eurobank EFG. The parameters of the interest indicate that the participants must be full time employees from the top management level to account officers in all bank's branches in Serbia.

Over three-week period in October 2010, a total of 150 questionnaires were distributed to the managers and employees at aforementioned bank. The response rate was outstanding - 92%. The sample was distinguished by gender; education and age (see Table 1).

**Table 1** Respondents' profiles

Description	Number of respondents	Percentage of total sample
<b>Education</b>		
High school	34	24.82%
College	41	29.92%
Faculty	58	42.34%
Master	3	2.19%
BSc	1	0.73%
<b>Gender</b>		
Female	73	53.28%
Male	64	46.72%
<b>Age</b>		
21-30	30	21.89%
31-40	60	43.80%
41-50	31	22.63%
51-60	16	11.68%
<b>Total</b>	<b>137</b>	<b>100.00%</b>

The validity and reliability of the questionnaire was tested. The validity of questionnaire was confirmed by factor analysis. Internal consistency was examined by Cronbach's alpha. Cronbach's alpha of five CE dimensions was in range from 0.72 to 0.90.

Data analysis was conducting using SPSS Statistics 19. Descriptive statistics, a principal factor analysis and correlation analysis were computed.

## 5. Main findings and contribution

Our results suggested that there is a strong relationship between centralization and CE in the Eurobank EFG. In order to assess their impact we identified factors that promote CE (for positive correlation) or to inhibit CE (in the case of negative correlation).

Table 2. Reports the results of an analysis of the relationships among the five factors of CE measured in this study.

There is relative strong positive correlation between all five factors ( $p < 0.01$ ). As indicated in the correlation analysis, management support, risk taking, and rewards are significantly related to one another. This goes in line with the previous research that revealed that these factors are indicators of overall entrepreneurial activity in companies [15]. The strongest correlation is between risk taking and management support ( $r = 0.641$ ). On the contrary to results of Seborá et al [15], our study revealed positive correlation between OB and other CE factors.

The weakest correlation is between time availability and organizational boundaries ( $r = 0.254$ ).

**Table 2** Correlation matrix

	MS	RT	R	TA	OB
Management support (MS)	1	0.641(**)	0.631(**)	0.367(**)	0.536(**)
Risk taking (RT)	0.641(**)	1	0.578(**)	0.400(**)	0.594(**)
Rewards (R)	0.631(**)	0.578(**)	1	0.531(**)	0.530(**)
Time availability (TA)	0.367(**)	0.400(**)	0.531(**)	1	0.254(**)
Organizational boundaries (OB)	0.536(**)	0.594(**)	0.530(**)	0.254(**)	1

Authors' calculations

Further analysis was conducted regarding the potential influence of gender, education level, and age of participants on all five CE factors.

### **5.1. Management support**

Participants were asked to assess how the bank and management team supported the entrepreneurial behaviour.

The results indicated that there are not differences in the assessment of the factor between female and male participants. The 41-50 year old employees in Eurobank had the lowest management support rating. Faculty educated participants had the highest management support rating.

The results suggested that management support is high when it comes to promoting CE in the Eurobank EFG. The precondition for superior performance is combination of strategic management and entrepreneurship as the source of competitive advantage [10].

### **5.2. Risk taking**

The participants were asked to indicate their agreement or disagreement with statements pertaining to their own decision-making authority and responsibility in their jobs; the attitude of the bank towards failure; and the extent of freedom that employees enjoy to use their own initiative. There are differences in evaluation of risk taking among older and younger employees as well as females and males. The employees between the ages of 41-50 rated risk taking lowly. Females rated risk taking lower than their male counterparts. Top managers rate this factor highly. It can be concluded that in Bank risk taking is commensurate with seniority.

Banking sector is highly regulated by procedures. Any mistake by employee can be costly to the bank. Therefore, tolerance of failure is relative low.

### **5.3. Rewards**

Participants were asked to specify their agreement or disagreement with statements pertaining to increase in job responsibilities; recognition; removal of obstacles in the workplace by managers; and monetary rewards linked to performance.

The mean score indicates the level of recognition and reward associated with CE inside a bank. This goes in line with evidence of a correlation between the presences of the rewards which encourage CE. The results showed that faculty educated employees rated rewards higher than other employees. There was no significant difference according to gender or age. The management of Eurobank EFG has a CE strategy which is clearly understood by all employees. This strategy highlights rewards and bonuses in the transparent manner.

### **5.4. Time availability**

Participants had to indicate their agreement or disagreement with statements regarding the time employees have to work on wider organisational problems other than simply their job responsibilities and workload.

Top managers and young employees (21-30 years) higher rated time availability than the other groups. Male rated time availability lower than their female counterparts. Based on our analysis it can be concluded that employees in the Bank thought that there is no time available to promote CE strategy. The mean score indicates that this factor inhibits CE in the bank. This can be solved by employing more people. Eurobank EFG operates in competitive market and under the pressure to manage cost. Salary costs are the biggest overhead for banks that operate in Serbian market. At the end of 2009 expenses in the Bank were reduced by 13%.

### **5.5. Organizational boundaries**

Participants were asked to specify their agreement or disagreement with statements focusing on the certainty of employees with respect to job expectations and standard procedures, performance standards and outcomes of tasks.

Eurobank EFG has standard procedures for all parts of the job as result of the given the rigidity of the legislative environment banks in Serbia operates in. This result in relative lower assessment of the factor which implicates those employees must look at the bank from a broad perspective. Another explanation can be cultural difference, but in the proposed questionnaire there were no questions regarding national culture or divergences.

The following groups of participants assessed this factor different than others: 31-40 year old employees, males, and middle managers.

Eurobank EFG has the strategy for promoting CE. With the exception of organizational boundaries, the means for four factors are greater than four of maximum five on the Likert scale. The level of centralization had strong positive impact on the strategic issues concerning corporate entrepreneurship activities.

## 6. Conclusions

The main purpose of this study was to key factors that promote or inhibit corporate entrepreneurship. Strategic leadership, management support, and rewards are key factors of CE strategy in Eurobank EFG. The results of factor analysis showed that the Corporate Entrepreneurship Assessment Instrument (CEAI) is adequate for investigating phenomena of CE in banking sector. The answers to the proposed questionnaire can explain internal factors of CE.

This study makes at least two important contributions to the existing literature. Firstly, the findings contribute to our understanding of corporate entrepreneurial in banking sector in transition economy. Secondly, the study provides insights in the key influencing factors and barriers to CE in selected bank in Serbia. Because the study was limited on one bank it was possible to precisely identify the internal factors.

From a practical perspective, the results of this study have important implications for management in the bank. These implications are highlighted below:

- Strategic leadership and top management support play a critical role in creating entrepreneurial behaviour in the bank.
- Rewards for CE encourage entrepreneurial behaviour. Rewards need to be financial as well as non-financial.
- The strategies for promoting CE will be improved by provide employees the freedom to determinate appropriate method of problem solving.

Notwithstanding the results of this study, there are three main limitations. The study was conducted in a specific national (Serbia) and industry context (banking sector). Caution should be exercised in generalising the findings.

Future research should test these findings across other banks and financial institutions in Serbia. It is also suggested that future research should focus on identifying and measuring other organizational factors that may promote or inhibit the CE capability. Possible direction for future research can be identification of cultural differences between Western European banks and banks that operates in transition economies.

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# Comparison of Industrial Dynamics in Bulgaria, Romania, Greece and Turkey

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The prospects of economy growth and enlargement are set up years ago. Some of the key driving forces of the economic growth are economic and political alliances but on the other hand there are regional features like cultural and social behavior, that influence industrial dynamics. Our hypothesis is that there a lot of similarities among Balkan economies and the dynamic changes. According to the papers main idea, the industrial dynamics is naturally inherent to the national economies and is a key indicator for economic stability. The paper aims to present and to analyse similarities and differences in industrial dynamics. It includes comparative analysis of three different groups of countries – “old”, “new” and candidate EU member states, located in Balkan Peninsula, namely Bulgaria, Romania, Greece and Turkey, for the period 2000-2009. The authors claim that except national (macroeconomic) factors exist regional factors (i.e. political, historical, social, cultural) that have impact on the industrial development. The paper has following structure: section one is Introduction. Section 2 provides a brief explanation of the current economic situation in one “old” EU member state (Greece), two “new” EU member states – Bulgaria, and one candidate country – Turkey. The picture shows a close industry development even the different economy starting level. Analysis of the basic determinants of industrial growth in the last decade in four countries is given in Section 3. The conclusions of the study are presented in Section 4.

## Keywords

Balkan countries, Industrial dynamics; Industrial growth; Innovation practices; Regional policies.

## 1. Introduction

Economies of Balkan countries perform different paths of development during the last fifty years. Bulgaria and Romania followed dramatic changes: through nationalization and centrally-planned economic development to market economy. They began the transition in 1989 with a largely obsolete industrial base and a pattern of output unsuited to the country's needs. Last twenty years both countries perform significant structural changes and economic stability. At the same time, Turkey has reduced state involvement in basic industry, banking, transport and communication, and an emerging cadre of middle-class entrepreneurs is adding dynamism to the economy. After Turkey experienced a severe financial crisis in 2001, Ankara adopted financial and fiscal reforms as part of an IMF program. The reforms strengthened the country's economic fundamentals and ushered in an era of strong growth - averaging more than 6% annually until 2009, when global economic conditions and tighter fiscal policy slowed growth to 4.7%. The economy, however, continues to be burdened by a high current account deficit and remains dependent on often volatile, short-term investment to finance its

trade deficit. After relatively smooth economic development, Greece faced severe economic and financial crisis in 2009 -2010, which negatively impact economic country performance.

Four Balkan countries, namely Bulgaria, Greece, Romania and Turkey, despite differences have similar and close competitiveness index 2010/2011. The best performed country is Turkey – rank 61, followed by Romania – rank 67, Bulgaria – rank 71 and Greece – rank 83. We can claim that the average competitiveness rank of all counties in the region is 70.5.

The studied countries participate in different alliances and unions. Bulgaria, Romania and Greece are members of the European Union, while Turkey is a candidate- member state. In the first group two sub-groups could be identified – “old” (Greece) and “new” (Bulgaria and Romania) member states. Some of the key driving forces of the economic growth are these economic and political alliances but on the other hand there are regional features like cultural and social behavior, that influence industrial dynamics. Our hypothesis is that there a lot of similarities among Balkan economies and the dynamic changes. According to the papers main idea, the industrial dynamics is naturally inherent to the national economies and is a key indicator for economic stability. The paper aims to present and to analyse similarities and differences in industrial dynamics. It includes comparative analysis of three different groups of countries – “old”, “new” and candidate EU member states, located in Balkan Peninsula, namely Bulgaria, Romania, Greece and Turkey, for the period 2000-2009. The authors claim that except national (macroeconomic) factors exist regional factors (i.e. political, historical, social, cultural) that have impact on the industrial development.

The paper has following structure: section one is Introduction. Section 2 provides a brief explanation of the current economic situation in one “old” EU member state (Greece), two “new” EU member states – Bulgaria, and one candidate country – Turkey. The picture shows a close industry development even the different economy starting level. Analysis of the basic determinants of industrial growth in the last decade in four countries is given in Section 3. The conclusions of the study are presented in Section 4.

## **2. Current economic situation**

Industrial growth potential depends not only on current expenditures for innovations but on economic development of the country. According to this we find out first micro thesis of the paper: Participation in different economic and politic alliances gives a different development path.

Therefore we expect two find at least three different dynamic development trend of Balkans countries – EU old members (for example Greece); new members states (for example: Bulgaria and Romania) and EU candidate countries (for example: Turkey).

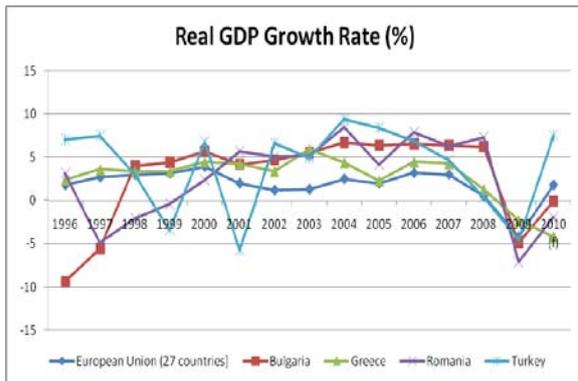
Confirmation of the micro-hypothesis above gives the overall indicators that depend on the economic alliances policy. Rejection of the micro-hypothesis above gives the Balkans regional indicator that brings similarity in Balkan countries industrial development.

Analysis of two different types of indicators gives enough reasons to confirm or to reject our hypothesis. These types are divided as follows: macroeconomic indicators (for example: GDP; CPI etc.) and industrial growth indicators (for example: new orders indices; production and turnover indices; price indices).

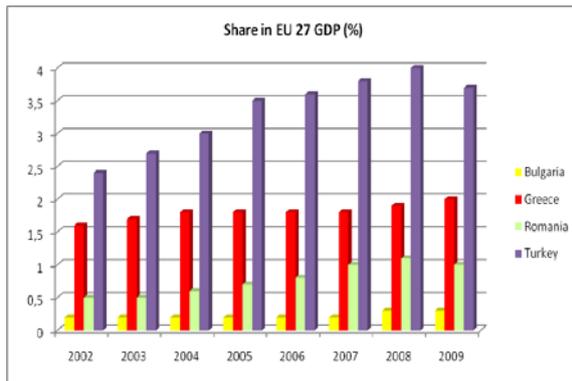
All of the analyses are based on available statistic data for a period (2000 – 2010).

### **2.1 Macro-economic indicators**

Macroeconomic analysis gives the framework within which economic sectors perform. Data analysis confirms the severe impact of the recent economic and financial crisis. Observed stable annual growth of GDP - about 2 % to 3 %, between 2002 and 2007 in the EU, was interrupted by the crisis. All member-states and candidate countries encounter significant decline in economic growth (Figure 1). The breakdown of GDP growth by its main aggregates confirms that more than 70 % of EU total value added originates from service industries. The economies that we analysed are fairly heterogeneous in terms of size, income levels and economic structure, but they perform similar economic performance. Two of analysed countries – Greece and Romania, belong to the group of so called medium sized member states with a GDP share in EU27 between 1% and 5 %. Turkey also could be assigned to that group with its share from 2,4 % (2002) to 4 % (2008). Bulgaria is in the group of small sized member states which generate less than 1%. (Figure 2).

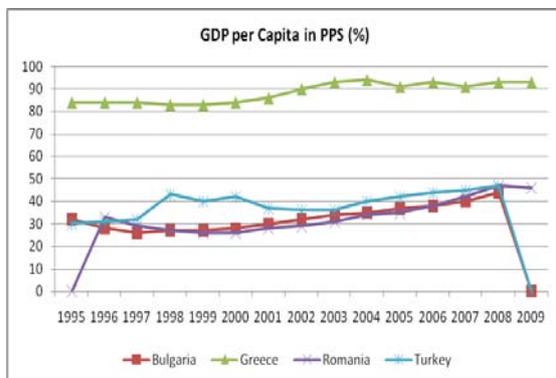


**Figure 1** Real GDP Growth Rate (Eurostat,2010)

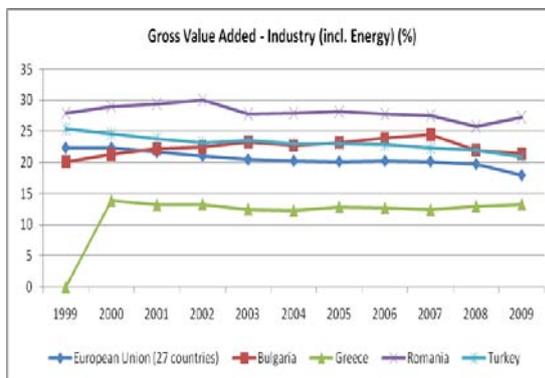


**Figure 2** Share in EU27 GDP (:Eurostat,2010)

Divergences between GDP per inhabitant among the EU regions are still very high, but have been narrowing over recent years. Bulgaria, Romania and Turkey have similar level of GDP per capita in PPS, while this indicator in Greece is twice higher.



**Figure 3** GDP per capita (Eurostat, 2010)



**Figure 4** GVA in Industry (Eurostat, 2010)

The main effects of the recent crisis were a decline in manufacturing output, investments and profits, while government services, private consumption and 'compensation of employees' (i.e. pay) remained relatively resilient. The overall structure of the EU GVA was fairly stable over earlier years, some effects of the economic and financial crisis can be seen in the decline in GVA generated by total industry, which is dominated by manufacturing, and an expansion of other services, which includes public administration and defence, education and health GVA generated in industry in Bulgaria, Romania and Turkey are similar to the trend in EU27. Greece perform relatively lower level of GVA in industry than the other three countries. (Figure 4).

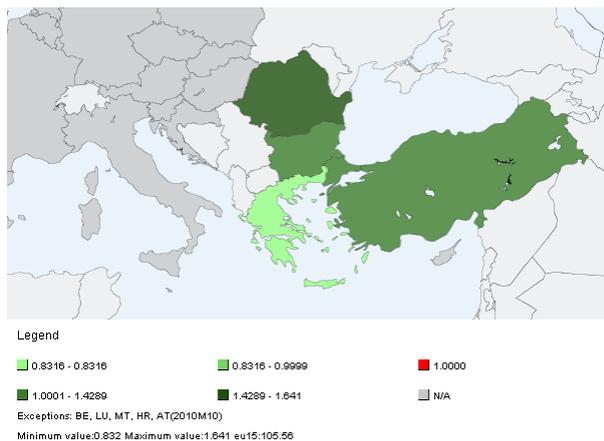
The annual average inflation rate in the euro area fell to a low of 0.3 % in 2009, after several years of relative stability at around 2.2 % and substantial increases in 2008 (EU trends followed a broadly similar pattern). Balkan countries and Hungary formed the group with the highest inflation from 2.8 to 8.6 %.

## 2.2 Industrial growth indicators

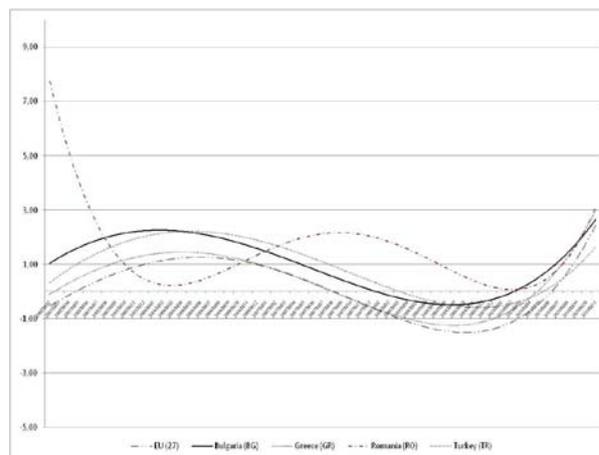
Industrial growth is measured by the production and sells change. These indicators could give a point of differentiation in growth potential of Balkans and Balkan countries. A growth potential could be measured by the new orders indices.

Looking onto statistic data [1], [4] as a static view (Figure 6) we can summarize that Balkans has a limited perspectives for industrial growth for the next few months. Bulgaria and Turkey show an average for European union (27 countries) industrial new orders dynamic. Romania is a Balkan favorite with almost over 50% increase of new orders. The Greece is an opposite side with new orders at almost double less then Romania level.

This result gives a primary alert for confirmation of the stated micro-hypothesis: we find evidences for differentiation in industrial development opportunities.



**Figure 6** Industrial new orders (Nov 2010)



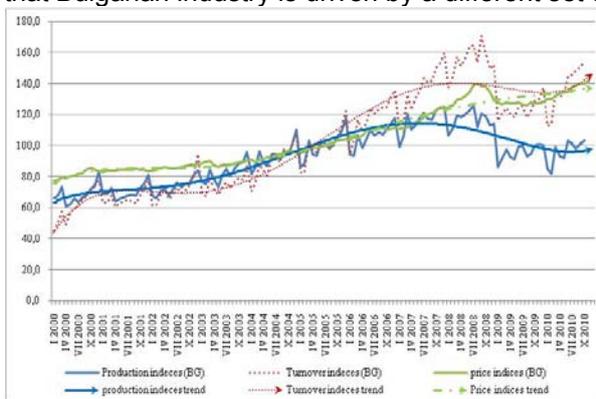
**Figure 7** Dynamic indices of industrial new orders (Feb 2005 - Nov 2010)

To check our hypothesis we need to go deeply in dynamic of new order's indices change (Figure 7). The EUROSTAT database confirms the statement above. We can easily find that Balkan countries could be divided in three groups according to trend of the observed indicator:

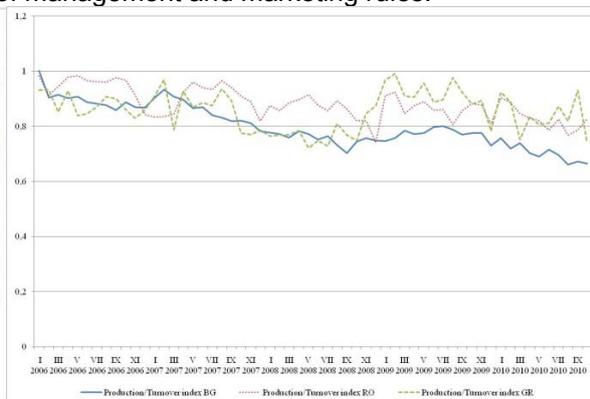
- In first group we have Greece. Its dynamic change is very close to the European indices for the whole period (Feb 2005 – Nov 2010). This position shows that Greece has a different growth path despite the deep economic crises during the last two years;
- In second group we can see Romania. As a previous figure shows, Romanian industry development is opposite to the EU's (27) one. We find that at the period of EU countries new orders drop the Romanian ones are turning up, and vice-versa.
- In third group we put Bulgaria and Turkey. Although the observed indices in these two countries have a similar direction as a Greece and EU (27) ones, the dynamic of change is at different level. This statement could be evaluated positively to the beginning of 2007, but the roles have been changed in the last three years. Thus Bulgaria and Turkey show a slight less growth potential than the EU (27) does.

Results give an interesting picture: they confirm existence of three different country types of industrial growth potential, but Bulgaria is not in one group with Romania but with Turkey!

To find out some reasons for different industry development potential we need to see the change of two other industrial indices: production indices and turnover indices. The ratio between production and turnover indices gives a slight view of the industry development. It has to be close to one (1.00) if the industry and products are developing in a good market environment. The Bulgarian data shows that the observed ratio drops down continuously for the last five years (Figure 8). This trend is not the same with the ratio change in Romania and Greece as an addition. So, we can confirm the statement that Bulgarian industry is driven by a different set of management and marketing rules.



**Figure 8** Production/turnover index in Bulgaria (BG), Romania (RO) and Greece (GR)



**Figure 9** Production, turnover and price indices in Bulgaria (BG)

To find out more details we analyze the dynamic change in the three main industrial indices for Bulgaria (Figure 9). Main results are as follows:

- Production growth in Bulgaria has anticipated sells growth for the last three years. But it is more interesting that turnover indices have dramatically changed since the mid-2006. One reason for this state could be explanation that industrial plants produce more added value products or sell them at more expensive price. Otherwise the state could be as a result of lack of know-how for free market competition. In addition this state is pointed to the period immediately before Bulgarian membership in the EU. Therefore the common crisis of Bulgarian industry is defined as a medicine for curing EU membership's over-optimism in the industry [2], [3].
- Price indices trend does not follow the industry production's change. The industry prices have been raised slightly for last few years even a big drop of production and sell in the last two years. This state is directly pointed to lack of connection between product price and its added value. So, managers are more concerned on a total profit than on a market presentation. In addition, this state means that market competition in Bulgaria is more on paper than the real one.

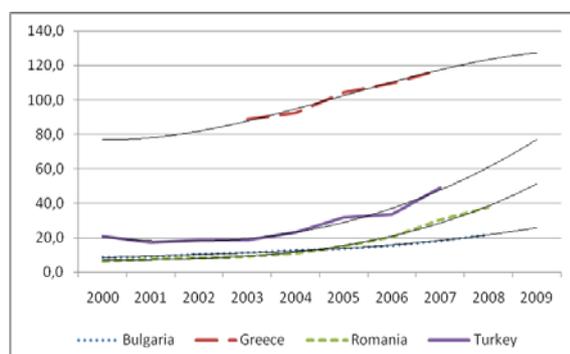
Summarized we find out our hypothesis confirmed. Therefore industrial dynamic potential depends mainly on economic alliances integration. But there are some regional aspects. A closely collaboration between Bulgaria and Turkey supplemented with psychological and cultural aspects of this collaboration gives a different picture for Bulgarian industrial potential. In this term we find that EU over optimism and some bad trade practices gives a disadvantage of Bulgarian industry and limits its future industrial development!

### 3. Analysis of basic determinants of industrial growth

Industrial growth at the macro level is determined by the dynamics of growth of firms. Growth at the firm level is generated by many factors and driving forces, but particular attention among them deserve innovation and investment activity.

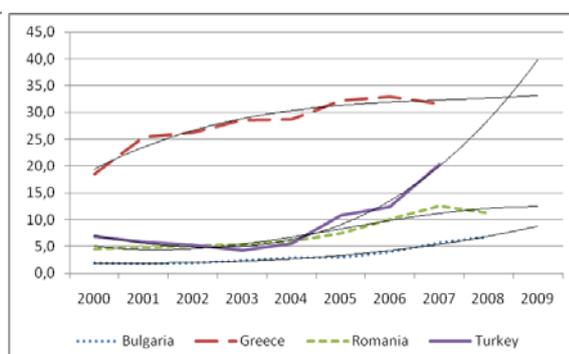
#### 3.1 Innovation and innovation activities of firms as a factor in achieving industrial growth

In recent years, innovation has become a key factor in improving the competitiveness of national economies and has established itself as one of the key elements for achieving industrial dynamics with a positive growth rate. They proved a successful tool to overcome the negative effects of the global economic crisis. It could be argued that countries with high levels of innovation costs can generate growth. Comparing the costs of innovation per capita made in the countries of Balkan Peninsula (Figure 10) indicates that over the last decade all countries reported rising growth rate. This rate however is with varying intensity. There is a lagging rate of growth of spending on innovation in Bulgaria, despite identical starting points with Romania. There is a huge gap in this indicator between the old EU countries such as Greece and the new ones like Bulgaria and Romania (Figure 11). Under the influence of global economic crisis, our southern neighbor has experienced a number of economic shocks, but its expenditure for innovation activities are at times more than those of other countries in the Balkans. Turkey, which is currently not yet started negotiations for EU accession, in innovation is staying a lot better than Bulgaria and Romania. Based on this indicator can be concluded that the Turkish economy will be much lower brake on the European economy than the economies of Bulgaria and Romania.



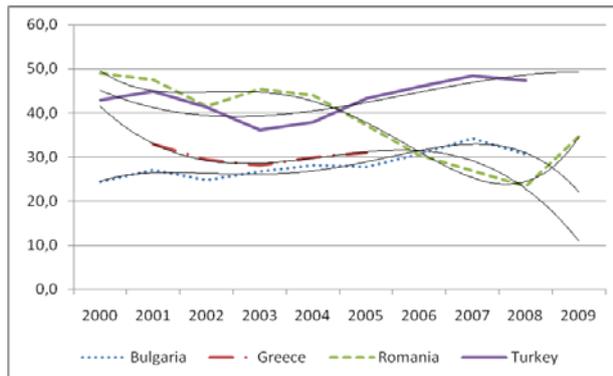
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**Figure 10** Total R&D expenditure by all sectors of business performance in Euro per inhabitant

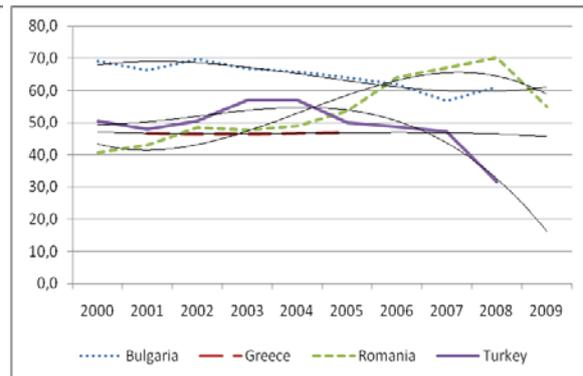


**Figure 11** Total R&D expenditure by enterprise sectors in Euro pre inhabitant

High rate of spending on innovation in developed countries is a direct consequence of the sources used to finance these activities. World experience shows that in the countries with the most highly innovative economies, innovation costs are made by firms, not by the state (government). This is the result of conscious needs for businesses to produce and offer products, services and technologies with high added value. They thus generate growth and higher profitability levels. Comparison of costs incurred for innovation in the countries of Balkan region shows that they rely primarily on public funds for R & D (Figure 12, Figure 13). Only in Greece, the state and companies alike invest funds in developing new products, services and technologies. According to this indicator Bulgaria is lagging position again and is with the lowest percentage of GDP spending on innovation made by business. Given that the country has the lowest levels of GDP per capita can be argued that the underlying funds allocated to R & D by the state and the companies have not yet been realized and have not adopted the innovation as a necessity factor for growth.



**Figure 12** RD funding by business sector in (%)



**Figure 13** RD funding by government sector in (%)

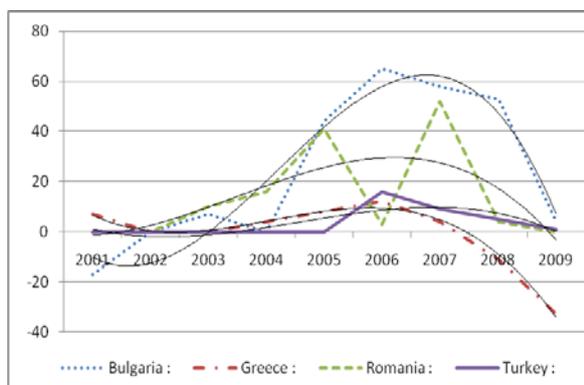
In times of crisis, defense mechanism of the companies and the state is reducing the cost, including for innovation activities. To provide better conditions for economic development and overcoming the negative effects of economic crisis, the country (government) is less willing to cut those costs. Very strongly pronounced is this trend in Romania. There, in the last decade the natural rate of reduction in government spending and increased business is disrupted. At the end of 2008 and 2009, under the influence of global economic crisis are increased the government expenditure on R & D, compared with expense made by the companies. The situation in Bulgaria is similar, but with a much lower rate of change. Overall, the Bulgarian economy is characterized by the highest level of government expenditure on R & D and the lowest corporate R & D spending.

It can be concluded that the Bulgarian economy is characterized by the lowest cost to innovation per capita. Much of the funding is made by the state. If this trend continues, it will have limited impact on the industrial dynamics of the economy.

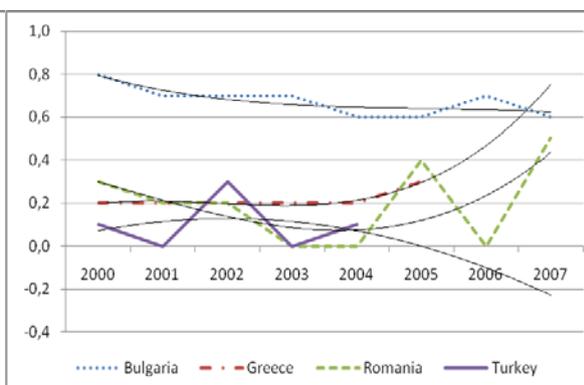
### **3.2. Business investment as a factor to generate industrial growth**

The next most important factor, which directly affect on industrial dynamics of the countries, is the level of investment (general and foreign direct investment) in national economies. From the level of investment in the economy can judge the stability of the macroeconomic environment in the country, for the degree of risk, and for the attractiveness of the economy and ultimately for the pace of industrial growth. According to the Global Competitiveness Index of the World Economic Forum, Bulgaria is placed at 115th spot, which means that in comparison with the countries of Europe and rest of world, the foreign direct investment in Bulgaria rarely transferred technology in the national economy. The indicator "investment in R & D" puts 101-ranked country, suggesting that foreign companies do not use local human resources to its research activities. Cooperation between universities and industry is very low (92<sup>th</sup> place in Bulgaria). By indicator Presence of scientists and engineers, Bulgaria is located at 93<sup>th</sup> place. Despite this unenviable position of the country, compared with investment activity in the Balkan region, Bulgaria has significantly higher levels of investment. This trend is very strong in the years before the onset of the global economic crisis (Figure 14). In the last two crisis years, investments in the country sharply reduced. This shows the deep recession in which the Bulgarian economy fell. For industrial growth not allowed speaking. The aim of the Bulgarian economy in the short term should be restoring the levels of investment before the crisis. The serious

decline in total investment in the economy of Bulgaria is inversely proportional dependence with relatively stable levels of investment in training of staff of firms (Figure 15). This results from the traditions of the Bulgarians to bet on investments in education and the availability of funding for various operating programs of the EU for continuing education.

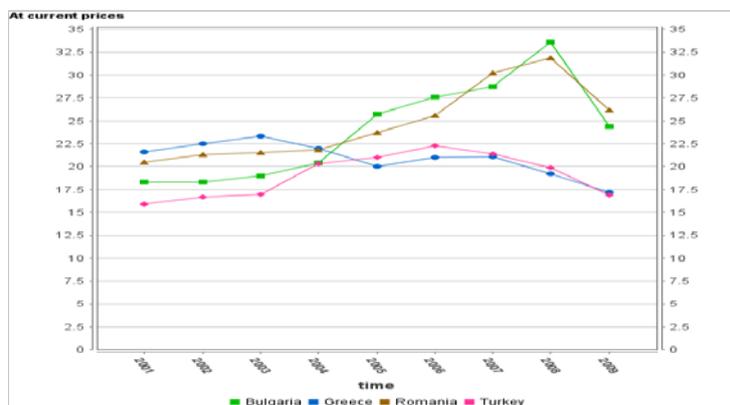


**Figure 14** Direct investment flows - Million EUR



**Figure 15** Expenditure on education from private sources as % of GDP

Classification of the country on different criteria for degree of competitiveness in the methodology of the World Economic Forum and the analysis of this base did conclude that investment in the economy rarely carry some kind of innovation in the country. Foreign companies investing in R & D does not use the human potential of research institutions and universities in Bulgaria. In confirmation of this is the structure of investment activity of firms in Bulgaria. The high level of investment is the result of investment in tangible assets (Figure 16). The "investment boom" in DMA indicates appreciable retardation in technical and technological development of the production of Bulgarian enterprises. This is an indicator of low value-added investment, although investment in fixed assets can be a certain extent the bearer of innovative knowledge in the form of technical documentation and know-how.



**Figure 16** Investments in fixed tangible or intangible assets, machinery and equipment, vehicles and buildings as a % of GDP.

From analyzed data on innovation and investment, can be summarized:

- Globally, they are a factor to generate industrial growth;
- Innovation activity of the new member States (Bulgaria and Romania) significantly lags behind that of the old members (Greece) and to a lesser degree in Turkey;
- The funding of innovation (as far as available) in these countries are mainly from public funds. Much less reliance on corporate R & D investment. This shows that many companies haven't separate departments for R & D. They have not cooperation with universities and other research units;
- The high rate of investment in the years before the crisis are resulting from the competitive level of wages in the two new EU countries (Bulgaria and Romania);
- Investments were mainly in fixed assets and low value-added and technology transfer;

All this gives us grounds to conclude that are confirmed the initial hypotheses formulated, for different levels of influence factors of industrial dynamics in the three categories of countries it is the Balkans - new and old EU members and countries outside the EU.

## 4. Conclusions

The prospects of economy growth and enlargement are set up years ago. Some of the key driving forces of the economic growth are economic and political alliances, but on the other hand there are regional features like cultural and social behaviour, that influence industrial dynamics. The analysis prove our hypothesis confirming existence of three different country types of industrial growth potential. Usual believe that Bulgaria and Romania have similar and very close path of development was not proved. The analysis shows that Bulgaria is in one group with Turkey.

The analysis highlights the role and the importance of different types of cooperation and integration. Industrial dynamic potential depends mainly on economic alliances integration. But there are some regional aspects. A closely collaboration between Bulgaria and Turkey supplemented with psychological and cultural aspects of this collaboration gives a different picture for Bulgarian industrial potential.

Innovation activity of the new member States (Bulgaria and Romania) significantly lags behind that of the old members (Greece) and to a lesser degree in Turkey. This conclusion is proved by the ranking of the four countries according to the Innovation sub index [2].

The perspective for future development for analysed countries is in direction of deepen and enlarged economic alliances and business networks in industry subsectors, which will have positive impact on industrial growth of each country in the region.

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# The impact of trade unions on entrepreneurship

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The paper separately investigates how labour unions and other institutions affect the small business ownership rate (best reflecting risk-bearing and managing) and the business entry rate (relatively well reflecting innovativity). Different variants of the general regression model explaining the investigated dimensions of entrepreneurship are estimated on time-series cross-section data for nine EU member states and the United States for the period 1995-2007. The estimation follows the Parks (1967) feasible generalized least squares approach. The results show that trade unions have small and somewhat differential impact on the two dimensions of entrepreneurship. It also provides interesting results about the impact of control variables on the two entrepreneurship indicators.

## Keywords

business entry, business ownership, FGLS, trade unions, OECD countries

## 1. Introduction

Entrepreneurship is recognized as an important source of economic growth, which has been confirmed by several empirical studies (e.g. Braunerhjelm et al. 2010, Thurik et al. 2008, Carree et al. 2007, van Stel and Carree 2004, Blanchflower 2000, van Stel et al. 2005). Formation of strategies for stimulating entrepreneurship ranks high on supranational (see e.g. European Commission's (2003) Green Paper on Entrepreneurship), national and local government agendas. Strategies for boosting entrepreneurial innovations include measures related to labour and product markets. Labour market and product market regulations are often viewed as being hostile to innovative entrepreneurship. High wages, high taxes, high entry cost, and strict technical standards raise costs, distort incentives, and therefore present barriers to entrepreneurship.

The paper empirically investigates the impact of trade unions and other chosen (mainly labour market) institutions on entrepreneurship in selected OECD countries. Due to multidimensional nature of entrepreneurship (see Iversen, Jørgensen and Malchow-Møller 2008), we measure entrepreneurship by two alternative indicators: the business ownership rate and the business entry rate from the. While the business ownership rate better reflects Knightian entrepreneurship (related to the Knight's (1921) concept of entrepreneurship), whose distinctive dimensions are managing and uncertainty bearing, the business entry rate relatively good highlights innovative or Schumpeterian dimension of entrepreneurship (the dimension related to Schumpeter's (1911 [2002]) early concept of entrepreneurship). We try to disclose whether institutions (in particular trade union power) affect dimensions of entrepreneurship highlighted by the two indicators in the same way.

While few studies investigate the effect of trade union power on entrepreneurship as measured by self-employment or business ownership rate (e.g. Ilmakunnas and Kannianen 2001, Kannianen and Vesala 2005), we encountered no empirical study directly relating trade union power to business creation/entry.

The impact of trade unions and other institutions on entrepreneurship is estimated on time-series cross-section data for nine EU countries (These nine EU countries are: Belgium, Denmark, Finland, France, German, Ireland, Italy, Netherlands and United Kingdom) and the United States for the period 1995-2007. The models including different sets of regressors are estimated by the feasible generalized least squares (FGLS) approach as proposed by Parks (1967). Beside trade union density and dummies for the existence of extension procedures, the set of explanatory variables includes other labour market institutions, variables that proxy shocks in terms of trade, industry structure and

openness, etc. The analysis is especially relevant for continental European economies with traditionally strong trade unions.

The paper consists of five sections. Following the introduction, Section 2 presents a framework for econometric analysis and describes the estimation approach. Section 3 describes a set of variables that are, in line with previous theoretical and empirical literature, important for the investigated dimensions of entrepreneurship. Results for different variants of the general model are presented in section 4. Section 5 concludes.

## 2. Econometric framework and methods of estimation

Our econometric analysis focuses on the impact of labour unions and other chosen (labour market) institutions on entrepreneurship measured by two alternative indicators: the (small) business ownership rate, which is a static measure, and the business entry rate, which is a dynamic measure. By estimating the empirical model, we are eager to find out if there are significant differences in how unions and other labour market institutions affect each of the two entrepreneurship indicators (highlighting different dimensions of entrepreneurship). The general form of the empirical model reads:

$$ent_{it} = \alpha + LMI_{it} \beta + MV_{it} \gamma + a_i + \varepsilon_{it} \quad (1)$$

where the subscript  $i$  denotes a country, and  $t$  stands for a time period;  $\varepsilon_{it}$  is the white noise error term, while  $a_i$  present country-specific effects (included only if necessary and appropriate as discussed in the follow-up).

The variable used in the regression equation are defined as follows. The dependent or explained variable,  $ent$ , is the business ownership rate ( $bor$ ) or the business entry rate ( $entryr$ ), respectively.  $LMI$  is a vector of labour market institutions that includes: the trade union density ( $tud$ ), the gross unemployment benefit replacement rate ( $grossbrr$ ), and the tax wedge on labour income ( $tw$ ).  $MV$  is a vector of relevant macroeconomic control variables, which includes logarithm of real GDP per capita ( $lnGDPpc$ ), the lagged unemployment rate ( $lagunempl$ ), the share of ICT manufactures in total economy's employment ( $eictman$ ), the logarithm of the size of population ( $lnpop$ ), total trade as a percentage of GDP ( $open$ ), the indicators of obstacles to starting a business ( $dbstartb$ ) and obstacles to getting a credit ( $dbgetc$ ), the level of educational attainment ( $edu$ ), and government spending share of real GDP ( $gov$ ). A more detailed description of variable is provided in the next section.

The regression model (1) is the most general variant of the model. We start by estimating the most specific version of the model (including only most relevant labour market institutions) and then gradually add other variables as suggested by economic theory and related empirical studies. If the signs and the significance of the regression coefficients of labour market variables are not substantially different between the variants of the model, we can speak in favour of their robustness.

The random effects model and the fixed effect model may be very useful for panel data but they do not deal with the important issues of heterogeneity in TSSC data (Beck 2006, 8). We expect data series to follow a particular (potentially cross-section specific) autocorrelation process, i.e. correlation of errors within cross-sectional units. What is also of crucial importance when choosing the estimation approach (or data transformation) is the stationarity of variables. To lower the risk of spurious regressions, it is very important to check whether the (dependent) variables follow stationary processes. For this purpose, we employ Fisher's test for the presence of a panel unit root that is based on an augmented Dickey-Fuller test (the test is proposed by Maddala and Wu 1999; for explanation see also Barbieri 2006, 10). Furthermore, our data might also suffer from typical problems with cross-sectional data such as cross-sectional or groupwise heteroskedasticity (i.e. the errors for different cross-sectional units have differing variances) and cross-sectional correlation (i.e. contemporaneous correlation of errors across cross-section units). For chosen model specifications, we check for these common problems with TSCS data by following the next diagnostic procedure:

- Firstly, we run Wooldridge's (2002) test for first-order autocorrelation in panel data..
- Secondly, the presence of heteroskedasticity in the error term is checked by running two regressions: i) iterated FGLS regression on the selected variables by imposing heteroskedastic error structure across cross-sections and ii) FGLS without any correction (therefore, OLS). Then we perform a likelihood ratio (LR) test, where we need to correct for the degrees of freedom (Wiggins and Poi 2003) and conclude which of the models is superior. If the LR test appears significant, we reject the null hypothesis of homoskedastic error term (Greene 2003, 327). To detect groupwise heteroskedasticity in the residuals we use the modified Wald statistic (Greene 2003, 324).

- Thirdly, we use the LM test of independence developed by Breusch and Pagan (1980) to check if data series violate the assumption of independence between cross-sectional units.

If the diagnostic checks show that our data do not significantly violate above mentioned assumptions, we estimate the regression equation by the fixed or the random effect approach. If the diagnostic checks confirm that our data violate some of the above assumptions, we estimate the regression equation by FGLS as proposed by Parks (1967).

### 3. Data and descriptive statistics

The paper employs two alternative measure of entrepreneurship: the business ownership rate and the business entry rate. *The business ownership rate* is calculated as a share of business owners in the total labour force. Business owners are unincorporated self-employed (sole proprietors and partners) as well as incorporated self-employed with less than 50 employees (owners-managers of incorporated businesses) in the non-agricultural sector, where contributing family members are excluded (van Stel 2005, 7). The data is taken from (EIM 2010a) from the harmonized dataset called COMPENDIA (COMParative ENTrepreneurship Data for International Analysis).

Schumpeterian aspect of entrepreneurship is measured by the business entry rate. The data is taken from the International Benchmark of Entrepreneurs (IBE) database compiled by EIM (2010b). The IBE entry rate is calculated as the number of enterprise entries divided by the total number of active enterprises in a certain period. Where an *entry* is defined as establishment of a new enterprise by a new entrepreneur (start-up) or by an existing entrepreneur, for which one person works at least one hour a week. The database includes all (incorporated and unincorporated) businesses and does not provide size-class and sector distributions. The agricultural sector is excluded from the dataset.

Beside selected labour market institutions (trade union density, the availability of legal procedures (In certain countries we observe a substantial gap between the union density rate and the union coverage rate *i.e.* the share of employees covered by collective agreements. For this reason we also use two interactive elements *tud\*ext1* and *tud\*ext2*) that extend the bargaining outcome to non union members, gross unemployment benefit replacement rate, tax wedge), the set of regressors in (1) includes control variables that in line with theoretical and/or empirical literature affect investigated dimensions of entrepreneurship (see Table 1).

**Table 1** Description and basic statistics for relevant variables for nine EU countries and the United States for the period 1995-2007

Variable	Name and description	Mean	Std. Dev.	Data source
<i>entryr</i> (in %)	Business entry rate (see the main text).	9.8785	2.3315	EIM (2010b)
<i>bor</i> (in %)	Business ownership rate (see the main text).	10.7085	3.7344	EIM (2010a)
<i>tud</i> (in %)	Trade union density (the union membership rate among active workers).	37.2754	22.3178	OECD (2010c).
<i>ext1 / ext2</i> (0 or 1)	<i>ext1</i> : dummy that takes the value of one when legal provision for mandatory extension is available but affects less than 10 percent of the workforce and zero otherwise. <i>ext2</i> : dummy that takes the value of one when legal provision for extension is regularly applied and affect at least 10 percent of the workforce.			Visser (2009)
<i>grossbrr</i> (in %)	Unemployment benefit replacement rate, <i>i.e.</i> the level of gross unemployment benefit relative to the average gross wage. (A summary measure of benefit entitlements employed).	33.1692	13.1657	OECD (2010a)
<i>tw</i> (in %)	Tax wedge for single persons without children at average earnings, <i>i.e.</i> the share of the sum of personal income taxes, employee plus employer social security contributions together with any payroll tax, minus benefits in labour costs (OECD 2007, 12).	42.8331	9.3577	OECD (2007, 2008)
<i>open</i> (in %)	Openness of a country to international trade (the share of total real value of trade ( <i>i.e.</i> the imports plus exports) in real GDP in constant prices).	80.7	42.5558	Heston, Summers in Aten (2009)
<i>pop</i> (in mio)	Population expressed in millions of inhabitants.	58.6275	8.0626	Heston, Summers in Aten (2009)

Variable	Name and description	Mean	Std. Dev.	Data source
<i>eictman</i> (in %)	The share of ICT manufactures in total economy's employment.	1.0632	0.5396	OECD (2009b)
<i>dbstartb</i> [0,1]	Summary <i>starting a business</i> indicator (calculated as the arithmetic average of different components). It is rescaled such that it can take the values between 0 and 1; the closer it gets to 1, the heavier are the barriers to starting a business.	0.2117	0.0863	World Bank Group (2010).  We use 2004 data for all years in the period 1995–2004.
<i>dbgetc</i> [0,1]	Summary <i>getting credit</i> indicator (calculated as the arithmetic average of the four components). It is rescaled such that it can take the values between 0 and 1; the closer it gets to 1, the harder it becomes for a business to get a credit.	0.1966	0.1313	
<i>TOTvol</i>	The volatility in the terms of trade calculated as the absolute value of the annual change in the logarithm of terms of trade multiplied by the indicator of trade openness: $TOTvol =  \Delta \ln(PX/PM)  * open$ , with <i>PX</i> denoting export price index and <i>PM</i> standing for the import price index (Gillitzer and Jonathan 2005).	-0.1489	1.703	OECD (2010d)
<i>lngdppc</i>	The (logarithm of) real GDP per capita ( <i>lnGDPpc</i> ) as one of the regressors. For this purpose, we use GDP per capita in 2009 United States dollars.	10.4703	0.1411	TEDI (2010).
<i>unempl</i> (in %)	Unemployment rate.	7.59	2.8356	OECD (2010b)
<i>edu</i> (in %)	Educational attainment (the share of population aged between 25 and 64 years with completed tertiary education.	26.0571	7.1592	OECD (2006, 2010e)
<i>gov</i> (in %)	Government's share of real GDP (the percentage share of government expenditures in real GDP per capita at constant prices).	13.9282	2.9625	Heston, Summers in Aten (2009)

## 4. Description and interpretation of the results

For estimating different variants of model (1), we use TSCS data for nine EU countries (see footnote 1) and the United States over the period 1995–2007. In the first part of the section, we present and interpret the results for regression models explaining variation in the business entry rate with different combinations of included control variables. Specific combinations of control variables satisfy the assumption of low multicollinearity (i.e. variance inflation factors, VIFs, are considerably below 10). In the second part, we present and interpret the results for regression models explaining the business ownership rate. Also these models differ with respect to a combination of included control variables that satisfy the condition of low multicollinearity.

### 4.1 Explaining the business entry rate

In this section, we present the results of estimation of different variants of the regression equation (1) with the business entry rate serving as the dependent variable. Fisher's test for the presence of a panel unit root for the business entry rate rejects the null hypothesis of the presence of a unit root for all considered cases: driftless random walk, random walk with drift, and trend (The results of the tests are available from the authors on request). We may therefore conclude that the business entry rate follows a stationary process. Since many of the control variables are also stationary, we estimate (1) on original (rather than transformed) data series.

We have decided to estimate five variants of the general regression equation (1). All five models regress the business entry rate on the trade union density rate, the gross benefit replacement rate, and the tax wedge. All models but the first also include two interactive elements ( $tud * ext2$ ,  $tud * ext1$ ) that enable us to estimate a differential impact of union density in the presence of mandatory provision for extension of union bargaining outcomes to non-unionized sectors. Control variables included in the last four models are: *dbstartb*, *dbgetc*, *eictman*, *open*, *pop*, and *TOTvol*. Different models differ with respect to a combination of chosen control variables as shown in Table 1.

In the first stage of estimation, we *preliminarily estimate* all five variants of (1) presented in Table 1 by the OLS and calculate VIFs, which for all variables (in all models) take the values significantly lower than 10. We also perform the *diagnostic tests* and confirm the presence of AR(1), cross-sectional dependence and groupwise heteroskedasticity in all five models. This implies that we should *correct the preliminary estimates* by estimating the models by Parks (1967) FGLS approach. Table 1 depicts the FGLS estimates with common AR(1) and with panel-specific AR(1) for all five models.

The results in Table 1, somewhat surprisingly, suggest that in countries with no legal or mandatory provision for extension of bargaining outcome the union density positively affects the business entry rate. The respective regression coefficient has positive signs in all models and appears significant in the first three models and, when correcting the standard errors for common AR(1), also in the fifth model. The results, however, provide evidence on the reverse (therefore negative) impact of union density on the business entry rate in countries where the union bargaining outcomes are extended by law or other rule to at least 10 percent of the workforce that is not directly covered by the negotiations. The regression coefficient of gross benefit replacement rate, *grossbrr*, is negative (but small) in all five models; in all models but the fifth it also (weakly) significant. The regression coefficient of the tax wedge is negative in all models but appears highly insignificant when controlling for the size of population or the share of IT sector in economy's employment. Moreover, the size of the regression coefficient implies that quantitative effects of the gross benefit replacement rate and the tax wage on business entry is very small.

The first among the control variables that is found to significantly affect the business entry rates is World Bank Group's (2010) indicator of obstacles to getting a credit, *dbgetc*. Its impact is negative, quantitatively important and highly significant in both models that include *dbgetc*. The regression coefficient for the World Bank Group's (2010) indicator that measures obstacles encountered when starting a business, *dbstartb*, is negative in all cases but statistically insignificant. Population (in logs), which is present only in the fourth model, is found to have a significantly positive and quantitatively non-negligible impact on the business entry rate. Bigger countries therefore exhibit higher business entry rate, which is expected (see Eurostat – OECD 2008, 10 – 11). Country's openness, *open*, significantly positively influences the business entry rate in two out of three models, in which it is included.

**Table 2** Results of the regression analysis explaining the business entry rate

Model	Model 1		Model 2		Model 3		Model 4		Model 5	
	GLS-H-AR1	GLS-H-psAR1	GLS-H-AR1	GLS-H-psAR1	GLS-H-AR1	GLS-H	GLS-H-AR1	GLS-H	GLS-H	GLS-H
<i>tud</i>	0.04926*** (0.000)	0.04770*** (0.000)	0.07620*** (0.000)	0.05641*** (0.000)	0.04471*** (0.001)	0.04335** (0.003)	0.00531 (0.741)	0.00232 (0.900)	0.02655* (0.015)	0.02687 (0.075)
<i>tud*ext1</i>			-0.07582 (0.062)	-0.08207* (0.027)	-0.02386 (0.104)	-0.01597 (0.265)	-0.02474* (0.017)	-0.02626 (0.053)	-0.0204 (0.076)	-0.02108 (0.150)
<i>tud*ext2</i>			-0.05244* (0.012)	-0.05483** (0.005)	-0.07086** (0.001)	-0.06938** (0.002)	-0.05622** (0.003)	-0.03568 (0.155)	-0.06688*** (0.000)	-0.05176* (0.013)
<i>Grossbrr</i>	-0.04470* (0.038)	-0.04609* (0.025)	-0.05431* (0.014)	-0.04738* (0.035)	-0.03795 (0.056)	-0.03931* (0.044)	-0.04195* (0.019)	-0.03319 (0.062)	-0.01209 (0.490)	-0.00757 (0.664)
<i>Tw</i>	-0.13414*** (0.000)	-0.13206*** (0.000)	-0.03544* (0.049)	-0.02488 (0.094)	-0.06401 (0.069)	-0.06399* (0.046)	-0.02464 (0.430)	-0.0259 (0.433)	-0.02071 (0.517)	-0.03183 (0.349)
<i>Open</i>					0.02246** (0.001)	0.02020*** (0.001)	0.00296 (0.728)	-0.00362 (0.664)	0.02012*** (0.000)	0.01751** (0.002)
<i>Pop</i>							-0.92058* (0.012)	-1.10135** (0.001)		
<i>Eictman</i>					0.64792 (0.244)	0.38328 (0.424)			0.68258 (.121)	1.04424** (0.008)
<i>Dbstartb</i>							-0.97279 (0.587)	0.91235 (0.550)	-1.9742 (0.259)	-0.95274 (0.547)
<i>Dbgetc</i>							-7.97868*** (0.000)	-9.55957*** (0.000)	-5.20474** (0.002)	-5.15562** (0.008)
<i>TOTvol</i>									-0.00781 (0.798)	-0.00052 (0.987)
<i>constant</i>	15.14761***	15.59714***	12.94959**	14.23023***	10.31341***	10.93009***	23.84557***	25.99107***	9.85857***	9.66067***
N	130	130	130	130	117	117	130	130	117	117
Wald chi2	35.84 (000)	37.17 (000)	54.26 (000)	42.81 (000)	65.13 (000)	88.19 (000)	287.57 (000)	463.26 (000)	144.27 (000)	230.63 (000)

Note:

\* Correlation coefficient is significant at the 5% (2-tailed), \*\* Correlation coefficient is significant at the 1% (2-tailed), \*\*\* Correlation coefficient is significant at the 0.1% (2-tailed).

N stands for the number of observations. Figures provided in brackets are the significance levels of respective regression coefficients. The equation is estimated by feasible generalized least squares (FGLS) approach. Standard errors are adjusted to take into account heteroskedasticity (H) and common autocorrelation (AR(1)) or panel-specific autocorrelation (psAR(1)).

Source: own estimation.

## 4.2 Explaining the business ownership rate

Let us now present the results of estimation of different variants of the regression equation (1) with the business ownership rate serving as the dependent variable. Fisher's test for the presence of a panel unit root for the business ownership rate cannot reject the null hypothesis of the presence of a unit root (for driftless random walk and random walk with trend). Further analysis confirms that the variable is first-difference stationary. Since estimation of the regression equation on original data series yields a non-stationary error term (The results of the tests are available from the authors on request), we estimate the model in first differences. This removes all time constant effects (omitted and observed, including country-specific effects) from the analysis and limits our analysis to within-country movements, which sweeps away lots of interesting information about explanatory variables. We accept this as the price of lowering the risk of getting a spurious regression.

We have decided to estimate four variants of the general regression equation (1) on first-differenced data series. All five models regress the first difference in business ownership rate on first differences in the trade union density rate, the gross benefit replacement rate and the tax wedge. Control variables included (in first differences, as indicated by the prefix D. In Table 2) in the last three models are: *lngdppc*, *lagunempl* (i.e. once lagged unemployment rate), *open*, *gov*, *edu*, and *TOTvol*. Since *dbstartb* and *dbgetc* are nearly time invariant, we exclude them from the analysis. The models differ with respect to a combination of chosen control variables as shown in Table 2.

**Table 3** Results of the regression analysis explaining the business ownership rate

Model	Model 1		Model 2		Model 3		Model 4	
Estimation method	GLS-H-AR1	GLS-H-psAR1	GLS-H-AR1	GLS-H-psAR1	GLS-H-AR1	GLS-H-psAR1	GLS-H-AR1	GLS-H-psAR1
<i>D.tud</i>	-0.04981* (0.046)	-0.03174 (0.152)	-0.05745* (0.022)	-0.04769* (0.038)	-0.05074* (0.038)	-0.04542* (0.037)	-0.06631* (0.011)	-0.05583* (0.026)
<i>D.grossbr</i>	0.00084 (0.930)	0.00781 (0.337)	0.00433 (0.633)	0.01084 (0.144)	0.00644 (0.463)	0.01310 (0.051)	0.00727 (0.403)	0.01278 (0.112)
<i>D.tw</i>	0.02572 (0.110)	0.01527 (0.248)	0.01684 (0.276)	0.00664 (0.572)	0.00916 (0.537)	0.00044 (0.967)	0.01739 (0.293)	0.01205 (0.384)
<i>D.lngdppc</i>			0.05165 (0.969)	0.09068 (0.934)	-144,158 (0.276)	-165,946 (0.138)	-192,056 (0.272)	-2.53550* (0.048)
<i>D.lagunempl</i>			0.08252*** (0.000)	0.07665*** (0.000)	0.07792*** (0.000)	0.07408*** (0.000)	0.10098*** (0.000)	0.09003*** (0.001)
<i>D.TOTvol</i>					-0.01273* (0.027)	-0.01482** (0.010)	-0.01554** (0.003)	-0.01449** (0.004)
<i>D.open</i>					0.01573* (0.039)	0.01552* (0.013)	0.01075 (0.203)	0.01161 (0.107)
<i>D.edu</i>							0.01807 (0.489)	0.01616 (0.493)
<i>D.gov</i>							-0.02929 (0.672)	-0.07710 (0.168)
<i>constant</i>	0.02594	0.02051	0.03100	0.02693	0.04008	0.04049	0.05072	0.05302
N	138	138	138	138	138	138	121	121
Wald Chi2	6.04	3.46	23.20	20.24	38.5	40.39	46.88	45.31

Note: *bor* – business ownership rate, *lnGDPpc* – logarithm of real GDP per capita, *lagunempl* – once lagged unemployment rate. Variables are added to the prefix *D.*, since they are expressed in first differences (i.e. annual changes). For other denotations, see the note to Table 1.

Source: own estimation.

In the first stage of estimation, we *preliminarily estimate* all four variants of (1) presented in Table 2 by OLS and calculate VIFs, which for all variables (in all models) take the values significantly lower than 10. Diagnostic tests detect some problem with the AR(1) processes, cross-sectional dependence and groupwise heteroskedasticity. For this reason we estimate the model using the Parks (1967) FGLS approach with common AR(1) and, alternatively, with panel-specific AR(1).

The results in Table 2 suggest the union density negatively (and in most cases statistically significantly) affects the business ownership rate. The quantitative effect expressed by the size of the regression coefficient is, however, very small (a decrease in *tud* for 10 percent increases *bor* by only 0.5 percent). The regression coefficient of gross benefit replacement rate, *grossbrr*, is positive but statistically insignificant in all models. Similar holds for the tax wedge on labour income.

T-tests (and the corresponding p-values, *i.e.* the exact levels of significance) for the regression coefficients of control variables show that countries' openness to international trade positively affects the business ownership rate, which is in line with our expectations. Negative shocks to terms of trade significantly negatively affect the business ownership rate, which is intuitive. The negative sign of the regression coefficient of (first-differenced) lagged unemployment rate (which is statistically significant) confirms that unemployment acts a push factor for self-employment. In other words, self-employment serves as a solution to a job loss. Educational attainment and the share of government expenditure in GDP do not show statistically significant impact on the business ownership rate in the nine EU countries and the United States in the period 1995-2007.

## 5. Conclusions

The paper empirically investigates how labour unions and other institutions affect the business ownership rate and the business entry rate. Different variants of the regression model explaining the investigated dimensions of entrepreneurship are estimated on time-series cross-section data for nine EU member states and the United States for the period 1995-2007. We adopted the Parks (1987) feasible generalized least squares approach to estimation.

The results show that trade unions have small and somewhat different impact on the two dimensions of entrepreneurship. In countries with no legal or mandatory provision for extension of bargaining outcomes, the union density positively affects the business entry rate. The impact of labour union density on the business entry appears to be reversed (therefore negative but very small) in countries where the union bargaining outcomes are extended by law or other rule to at least 10 percent of the workforce that is not directly covered by the negotiations. The impact of union density on the business ownership rate is negative (even in countries without legal provisions for extensions of the bargaining outcome to non-union members). The quantitative effect expressed by the size of the regression coefficient is, however, very small (a decrease in unions density for 10 percent increases the business ownership by 0.5 percent). According to our estimation results, unemployment benefits do not significantly affect the business ownership rate, while they show negative (but weak) influence on the business entry rate. The impact of the tax wedge (*i.e.* the overall tax rate on labour income) on entrepreneurship is insignificant whatever the measure of entrepreneurship (at least when controlling for other important factors).

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# Model for Effective “Science – Business” Collaboration in Bulgarian Economy

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The aim of this paper is to develop a model for effective science-business collaboration based on the project competitiveness concept oriented to the practical applications and innovations. The model is verified on the basis of 4 projects generated by practical problems defined by companies from the chemical industry branch. The research teams from scientific institutions or universities are those who deliver research results for the practical problems. This science – business collaboration based on the common issue – project with clear defined aim, results and indicators are the tool allowing the science and research team and business or company team to build fruitful collaboration on the common practical problem and interact effectively to find a research decision.

## Keywords

Innovation, project competitiveness model, science-business

## 1. Introduction

In this paper we consider science – business cooperation as the main driver in the National innovation system [1] to increase innovations in Bulgarian economy. In this system at least, three different social systems - ‘business’, ‘science’, and ‘policy’ - with different modes of interpretation, decision rules, objectives, and specific communicative standards are interacting.

The innovation as the overarching policy objective of the EU and its Member States [2] is to adopt a much more strategic approach to innovation. An approach whereby, all policy instruments, measures and funding are designed to contribute to innovation, where EU and national/regional policies are closely aligned and mutually reinforcing.

The business system is profit-oriented and communicates via the market mechanism. The science system aims at the production of knowledge and communicates via publications. In fact, the specific advantage of the innovation system is not being a system in the meaning of a separate and autonomus entity, but the process of collaboration between actors who often belong to different systems. It is the exchange of formerly unrelated information that reinforces innovativeness. Crossing the border between different systems stimulates changes in the systems in general [3]. In the particular case of industry-science interaction this might, among other things, result in product innovation. There was held in Bulgaria 12 academy-industry meetings for 2-years period for different industry branches with participants from research organizations and universities and industrial companies. As an initial process of the science-business communication the results were quite encouraged – 12 innovative projects have been initiated and realized, while the participants were more than 1000 in total. Even the effectiveness of such bridges is not so satisfied they were essentially necessary to establish this communication. Most important was that they put the question how to increase the effectiveness of science – business communication in order to make their collaboration more profitable and leading to more innovative products, processes and services.

In the National innovation system as in the knowledge triangle [4] another important element is the education.

So, the aim of this paper is to develop a model for effective collaboration between science and business in Bulgaria including the education, too. Another aim is find indicators which can evaluate the effectiveness of this science-business collaboration.

## 2. Problem Statement

GIS Transfer center foundation is developing this model in the framework of a project supported by the National Science Fund using its active network of companies that offers its members vital contacts with customers as well as peer and stakeholder groups. Networks are of great importance in general, particularly in the current situation when we considered the knowledge-based economy. For companies this means a sound innovation based and easy access the necessary knowledge and to qualified labor in order to be competitive with innovative products, processes or services. Close and effective cooperation between the science and business actors is of particular importance now that the word economy is recovering from the turmoil of the financial crises and global recession. The proposed model is based on the concept of project competitiveness [5] as it is shown on Figure.1.

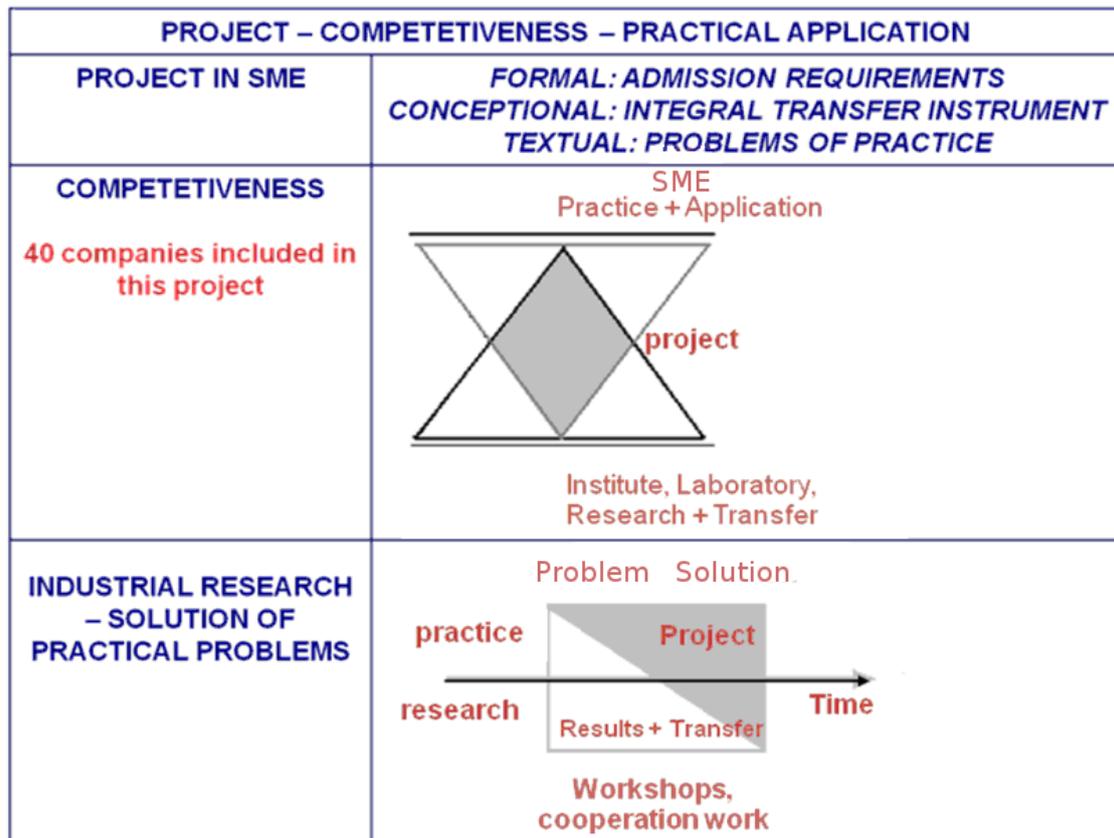


Figure1 Project competitiveness concept.

### 2.1 Methods and instruments for effective interaction science – business

For having a successful interaction between the science and the business is necessary to create in the scientific researches in addition of their creative ability a spirit of an enterprise, what will be achieved by:

- Creation of innovations for the production practice.
- Obtaining the specific professional qualification for a technological activity /work.
- Determination
- Adaptability
- Communication skills.
- Learning new subjects such as business – plan, market – surveys etc.

The successful and getting more effective interaction between the science and the business during the project establishment is realized by various methods and instruments, namely:

- Common work meeting with company representatives to prepare work plans of scientific research in order to obtain the project results and to exploit them.

## **2.2 Methodology**

The methodology applied in the proposed model for project competitiveness comprises different actions, which can be classified in the following groups :

- Scientific research tasks with fundamental character.
- Scientific applicable tasks for creation of innovative technologies and products.
- Development works in the companies, trial samples, prototypes development.
- Financial operations, purchasing new apparatus and equipment and putting them in action, registration and protection of intellectual properties.
- Public activities (conference ,web site of the project , posters , showing in the medias )
- Dissemination plan of results.
- Management of project accomplishment, stage and final report.

Methodology to obtain the aim of this paper is based on the following steps and actions:

- Right selection of proper science subjects-scientific tasks which contain recourse of obtaining scientific applicable results. Most of them have to be finished to laboratory technological innovations and products.
- Selection of requested partners- scientific and research teams with qualified researchers with successful experience in technological development and in practice.
- Selection of manufacturing companies as partners and co-partners among our successful partners from the GIS-TC network.
- Establishment of good coordination among the companies performing all projects defined, including building a Project Council for better exploitation of project results.
- Systematic work on the project implementation and management.
- Realistic action plan for consecutively realization of the tasks and their upgrading for creation of:
  - new scientific knowledge with a fundamental character;
  - Scientific applicable results;
  - Laboratory innovation technologies and products (new materials) ;
  - Experimental development (development work for testing and optimization) in manufacturing companies;
  - Trial samples obtained in industrial conditions;
  - Preparing of common applications for patents and useful models to protect the intellectual property created in the framework of the common projects;

Preliminary marketing surveys and prognoses.

- Training of partners teams aiming increasing of their qualification and enterprising skills
- Consolidation of this common base in inters institutional integration among manifold groups. Continuing of combined actions through new common projects for participation in national and European competition procedures.
- Preparation of multiplication plan for exploitation of the most successful technological and product innovations, which will have the highest market potential;
- Public relation activities for informing our society and national institution about successful results as well the difficulties in implementation of this new kind of projects.

## **2.3 Quantity measurable indicators of the model implementation.**

The progress in the implementation of the model verification plan is done through the following indicators measured as a number and as a quality:

- Working meeting between representatives of scientific organizations and companies.
- Working programs of joint scientific – applicable investigations and laboratory testing.
- Scientific publications in international and Bulgarian journals.
- Lectures at national and international forums, published in
- Test laboratory processes – technological innovations.

- Test samples of obtained new materials, including nanomaterials.
- Functional indicators for qualifying the test samples in accordance with internationally recognized standards.
- Development activities realized in the companies – tests and optimization of the **experimental** technologies and the equipments as well.
- Analysis's and Testing carried out in the scientific project teams.
- Combined technical and economic appraisals of the test processes and samples.
- Applications for patent and useful design requests jointly made by partners.
- Technological audits of the companies.
- Offers for participation of firms in SMEs EF.
- Common seminars.
- Participations in fairs and expositions.
- Prepared common projects for participation in competition procedures.
- Surveys of the possibilities for an innovative cluster creation.

## **2.4 Common research projects.**

To verify the proposed model for science-business collaboration several common research projects have been initiated in cooperation with companies from the chemical industry branch. The companies have been used to specify the specific requirements to the research results as an output of the following projects:

1. "Electrochemical obtaining of Ni nanocomposite layers for application in protective-decorative and functional coatings"

Nowadays the electrolytic obtained nanocomposite layers/coatings are not very investigated for potential industry applications. Another case is the nanocomposite zinc coatings.

The scientific-fundamental aspect aims the mechanism determination of the incorporating in the Ni matrix of carbon nanotubes, the changes in the microstructure and morphology of the layers. The scientific-applied aspect is targeted on important functional properties of these coatings – protective ability against corrosion as well as the main physical-mechanical parameters: brilliance, hardness and wear resistance. The technology for electrolytic obtaining of the layers has been investigated non-sensitive against contamination with iron ions by Institute of physic-chemistry from Bulgarian Academy of Sciences (IPC-BAS) and Chemical Faculty at Sofia University "St. Kl. Ohridski" (CF-SU). The developed nanotechnology [6] for the obtaining such protective-decorative and functional coatings is proved and optimized by the company "Gabex" Ltd, Sofia.

2. "Electrolytic obtaining of functional silver alloy coatings"

The obtaining and investigation of the properties of some series of silver alloys is an accelerated tendency in the last decade. The fundamental results obtained for self-organized creating of symmetric structures in the layers, as well as the results with applied character for technology for high-speed electro deposition of silver coatings for the company FEM, Schwäbisch Gmünd, Germany take a significant place in this area.

The project task is the optimization of the obtaining of different coatings: Ag – Bi, Ag – Sb, Ag – In and Ag – Sn accompanied by studying of the kinetics and mechanism of the electrodeposition [7, 8]. Additionally, the main functional properties of these coatings like hardness, wear resistance, electrical conductivity, lubrication (very low friction against other surfaces), appearance etc are investigated [9].

The laboratory technologies are oriented for application in some industrial branches – electronic and electronic engineering, mechanical engineering, jewellery. Part of these investigations [10] is realized by IPC-BAS in cooperation with the Institute for noble metals (FEM), Schwäbisch Gmünd, Germany.

3. "Rust converters on water-organic basis including compositions with passivating effect".

Scientific-applied investigations upon new generation of rust converters on organic-water basis including compositions with stable passivating effect against iron and steel wares after the rust conversion process have been carried out by the common team from IPC-BAS and CF-SU. The development activity is consisted of producing of experimental samples and their testing at real conditions. These results are compared with laboratory results and from the accelerated standard tests (ISO standard), realized in wares. These products ensure fully and fast conversion of the rust in a dense protective oxide-phosphate film with high corrosion resistance and act as a hopeful basis for laying on polymeric protective-decorative coatings [11,12]. Additionally, this product can be also used in the building industry, transport, ore output, metallurgy, mechanical engineering etc.

The development activity for several products is carried out in the company "Chemical products" Ltd, city of Yambol and "Podeminvest-technology" Ltd, Sofia including the obtaining and testing of experimental samples.

4. "Chemical compositions without six valence Cr and technology for passivation of galvanic Zn and Zn alloy coatings".

The scientific-investigating aspect in this project includes obtaining of results by IPC-BAS and CF-US for the element and phase composition of the passive films (XPS – analysis), as well as for the changes in the composition and their structure as a result of the corrosion treatment in model aggressive media. The implementation of different practical orders will lead to obtaining of compositions for surface films with several colors like transparent, black, gray and green, iridescent yellow [13]. These films increase 3-4 times the corrosion resistance of the system "base metal – zinc coating - passive film" [14,15]. The main innovation is the realizing of these results in the technological processes and branches in the absence of Cr6+, which is forbidden in EU from 2007.

The development activity is carried out in "Chemical products" Ltd, Yambol, "Artchim" Ltd and "Gabex" Ltd, Sofia including also the obtaining and testing of the experimental samples.

5. "Chemical and electrochemical obtaining of protective conversion layers without six valence chromium (Cr6+) on aluminum and Al alloys".

The processes and peculiarities (catalysts) during the formation of protective-decorative films on Al and its alloys widely used in the practice, mainly for components in the electrical engineering, mechanical engineering, transport and building industry, which is the aim of this project study.

The innovation takes place in the fact that the electrolytes do not contain the harmful Cr6+, but other effective substitute [16]. At present, some compositions for chemical and electrochemical finishing are offered on the market, but they do not ensure sufficient corrosion resistance. In our product some newly developed by IPC-BAS compositions will lead to higher protective ability compared to the other products and technologies of the leading foreign firms.

The development activity is carried out in cooperation with company "Samel", city of Samokov. The compositions and technologies for the different colored films – transparent, black, yellow, iridescent yellow etc. are optimized including preparing and testing of experimental samples.

6. "Obtaining and properties of multi-component Ni and Co based alloys for electrodes in fuel cells for hydrogen energetic".

The investigation and functional properties of multi-component Ni and Co based alloys (additionally components can be B, Mn, W, Mo, V, P etc.) is realized by IPC-BAS team in the framework of this project #6. The aim is to receive new materials with appropriate properties to be used as electrodes in electrochemical current sources - fuel cells, as well as for anodes in electrochemical manufacturing and hydrogen storage containers including obtaining and testing of experimental samples [17].

Here with this project an appropriated Bulgarian company wishing to carry out the development activity will be looked for, since for this case such company has been not provided in advance.

7. "Obtaining and specifying the properties of oxidized alloyed Titanium anodes".

In scientific-fundamental aspect the main functional characteristics of oxidized and alloyed Ti anodes in the composition of the films also other oxides – of Ru, In, Sn etc. incorporated together with the Ti oxides is investigated by CF-SU. Special attention is paid on to following characteristics: film composition, structure, morphology and their influence on the kinetics and overvoltage during the electrolytic oxygen evolution.

The scientific-applied aspect includes the optimizing of the following parameters: corrosion resistance in model media and wear resistance of the films during the intensive oxygen evolution since these properties play an important role by using of such anodes in the cathodic protection against corrosion as well as in electrochemical reactors including units for purification of polluted water.

"Aquaproducts" Ltd, Yambol is carried out the technological testing in semi-industrial electrochemical reactor aimed to characterize the anodes and to optimize the experimental technology for purification of polluted industrial water.

### 3. Sustainability activity plan for model implementation.

Sustainable implementation of the activities validated and optimized in the framework of this project is important criterion for its successful implementation. Such activities to get sustainability of the project are foreseen in the framework of two groups of organizations considering the science-business interaction:

1. First group are partners and subcontractors of this project, for which continuation of the common activities is consisted of:

- Delivering consultancy services for initiation, preparation and implementation of common project with research teams from IPC-BAS and Sofia University “St. Kliment Ohridski” mainly from Chemical and Physical Faculties;
- Widening the collaboration between GIS-TransferCenter and Technology Transfer Office of Sofia University for common work with the technology oriented company from the South-West region of Bulgaria, selection of attaché consultants, initiation of contract research services, assessment of new technological projects, technology consultancy, expertise’s, etc.
- Continuation of implementation activities in the industry as follow up of the stage of prototyping and preparation of the research results in the form more acceptable for the industry;
- Initiation and preparation of common projects between Institute of Physical Chemistry – BAS and some research teams from Sofia University with industrial partners for application in the operative program “Competitiveness of Bulgarian Economy”, National innovation fund, European competitiveness and innovation program (CIP), FP7, etc.
- In the framework of the follow-up activities of the project ROSIO Sofia initially funded by PHARE (2006-2007) GIS-TransferCenter Sofia and Kostinbrod municipalities will continue to attract the investments in the high-technology enterprises, especially in the fields of new materials and ecology, i.e. the priorities of the National Science Fund of Bulgaria.
- Specialization and mobility of staff members of those companies into the research organizations in preparation and implementation of research and high technology projects, as well as in GIS-TransferCenter in preparation, monitoring and management of projects.
- Common feasibility studies and forecasts for innovative processes as well as marketing studies, too.
- Preparation of common applications for patents, trademarks etc.

2. The second group of activities planned after the end of the project aim to initiate similar activities in other NGO, research institutes, universities and industry, not taking part in the project yet, but having good contacts with the project participants and with companies wishing to increase their competitiveness based on the proposed in this paper model for project competitiveness.

#### 4. Discussion and Conclusion remarks

The developed model for effective collaboration between science and industry will be used for widening of above described activities as well as those described in the dissemination plan of the results for the second group wider in structure and research teams.

This group will be in size of about 100 research institutes and universities, NGO and companies, mostly SMEs, but and large sized enterprises, too. For example companies like NPS“Kozloduy”, Toplofikacija-Sofia S.A., Toplofikacija – Pernik S.A. etc.

Synergy between science and innovation is always bilateral. Sometimes precedes innovation and science explained her subsequently (steam motor - the principles of thermodynamics), but always the science-business interaction takes play the important role in the competitiveness of the Bulgarian economy.

People in industry may build relationships with academics and vice versa using the proposed model based on the project competitiveness. Actually, the question how to manage the interaction and how to ensure both that science is useful for the benefit of society to innovate and ensure the reproduction of science- updated the scientific staff and research infrastructure is very important when the society has to decide how to harness the science for society purposes[18].

We think that there is enough evidence that the benefit in terms of increased innovativeness on the side of business as well as stimulated research activities on the side of science makes it worth while for science and technology policy to target these difficulties and to stimulate collaborative relations between industry and science more intensively and effectively.

#### Acknowledgements

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# Use of innovative multi-criteria model in process of investment in public institutions

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The innovative approach has become an important aspect in the design and implementation of the organizational strategy. The multi-criteria (MC) model allows the systematic planning of successful investments. Through this methodology, both the strategic as well as operational aspects of the integrated innovation management system are addressed.

A prime advantage of this methodology is the systematic approach, something that leads to complete continuity throughout the whole investment cycle, even though it is already a primary tool in the early phases of the cycle.

In order to arrive at a practical tool that facilitates the whole process of arriving at a successful investment, the different process phases are coupled to existing and new methods of planning. This not only describes the steps required (what should be done) but also shows how to do it practically with the aid of methodological support.

In the following article the most important requirements for a methodology to plan technological investment will be described. On the one hand, these requirements have been deduced from the characteristics of the planning object "Investment as Innovation" and the planning process "Innovation Process as Route".

On the other hand, they have been deduced and changed based on practical experience as well as by analyzing available studies looking at innovation and the requirements of a planning methodology. As such, they are a reflection of the requirements of public organizations.

The planning process and the specific methods used during idea generation for technological investment are unique for each specific planning object of working organisation.

In Slovenia, each public organisation must prepare, according to legislation, an investment project in the correct and transparent way. The document "Decree amending Decree on the uniform methodology for the preparation and treatment of investment documentation in the field of public finance" lays on organisation that has to use a word of MC approach for evaluating different investment project and its possibilities.

Investment projects are evaluated from different points of view – including economical, political, health, and time aspect. Public money should be used as transparently as possible and in accordance with certain methodology.

In our article we present a unique approach to an investment project in the area of idea recognition and of investment idea evaluation in the early phase. This model has already been proven on different products and it has already been used for the development of potential ideas.

## Keywords

product development, investment, innovation, public institutions.

# 1. Introduction

Investment decisions are at the core of any development strategy. Economic growth and welfare depends on productive capital, infrastructure, human capital, knowledge, total factor productivity and the quality of institutions. All of these development ingredients imply - to some extent - taking the hard decision to sink economic resources now, in the hope of future benefits, betting on the distant and uncertain future horizon.[1]

Every time an investment decision has to be made, one form or another of weighting costs against benefits is involved, and some form of calculation over time is needed to compare the former with the latter when they accrue in different years. Private companies and the public sector at national, regional or local levels make these calculations every day.

“Decree amending Decree on the uniform methodology for the preparation and treatment of investment documentation in the field of public finance” (Decree) [2] accepted by the Slovenian government in 2010 is the basic legislation for the field of preparing investment documentation of projects which are financed through public finance or the national budget. The Decree is part of a greater field of financial legislation of the Public Finance Act in the Official Gazette of the Republic of Slovenia Nr. 79/1999 and its changes. All Slovenian legislation in the field of investment is in accordance with the European legislation and its principles. The Decree has been written with the ambition to be helpful to managing authorities, public administrators and their advisors in Slovenia and Member States of the European Union (EU), when they examine project ideas or pre-feasibility studies at an early stage of the project cycle.

In fact, a timely and simplified financial and economic analysis can do a lot to unveil weaknesses in project design. These weak points would probably become apparent at a later stage, when a lot of time and effort has been already wasted on an option that in the end has to be abandoned or thoroughly restructured. Using the tools presented in the Decree, or included in national guidelines, to check projects before preparing the application for EU assistance and build a national or regional selection process, will be beneficial to all actors involved, as their attention will focus only on the really good projects to enhance their probability of success.

The preparation of investment documentation is composed of three main fields divided by the cost of the project. The so called Document of identification of investment project – its prefeasibility study of the new project and its cost should be half a million Euros. The second degree is the Pre-investment plan which must be written for projects over two and a half million Euros. The third and most important document is the Investment program which presents the complete program for projects over half a million Euros and also includes the realization study. The Investment program describes the complete investment for only the most appropriate variant and this article discusses the way, in which the most promising idea comes to realisation.

The product development (PD) has a long history in engineering including research in global industrial experience [3, 4], design and analysis product design [5, 6] and creativity in product innovation [5].

On the other hand, it includes research in marketing on customer preferences [7], product positioning and segmentation [3, 8, 9], product forecasting [10, 11, 12] and test marketing [13, 14].

The applications have been many and varied and have led to a deeper understanding of how to gather and use information about the customer and engineering in the design, testing, launch, and management of new products. Many integrative texts on product development have been published to review the issues, the methods, and the applications [15].

## 2. Structural approaches to new project investment

A project can be defined as an operation comprising a series of works, activities or services intended to accomplish an indivisible task of a precise economic or technical nature; one which has well defined goals. The appraisal needs to focus on the whole project as a self-sufficient unit of analysis and not on fragments or sections of it. Partitions of projects for purely administrative reasons are not appropriate objects of appraisal.

Cost-Benefit Analysis (CBA) is an applied social science and it is not an exact discipline. It is largely based on approximations, working hypotheses and shortcuts due to the lack of data or because of constraints on the resources of evaluators. It needs intuition and not just data crunching and should be based on the right incentives for the evaluators to do their job in the most independent and honest environment. [1]

Practical tools for product development are presented in different literature. [12, 15]. The main requirements for a methodology used to plan investment can be summarized in nine points [16]. Those nine steps are written hereon to show how the idea was developed.

## **2.1 Nine steps to investment in public institutions**

Practical tools for product development are presented in different literature. [17] The main requirements for a methodology used to plan investments can be summarized in nine points – similar to product development. Those nine steps are written hereon to show how the idea was developed [16, 18]:

### **1. Set clear goals**

Setting *clear goals* and following these systematically ensures that both the goals of the institution as well as those of the decision maker (Ministry of Health) are known and are being followed. Only when innovation goals and the innovation strategy - based on the enterprise strategy - have been identified, defined, and communicated within strategic and operational planning can relevant solutions be sought or found.

### **2. Quality of ideas more important than quantity**

Innovation studies and project experience show that successful product innovation is more often than not the result of ideas from individual, motivated employees, and as such basically happens by chance. The methodology for investment planning must support the systematic generation of *qualitatively highly valuable ideas*.

### **3. Create for the future**

The fulfilment of future and latent patient requirements through future-oriented or at least leading-edge technology creates uniqueness. An important prerequisite for not only the continued success of an institution but also the improvement thereof through the continuous and precise fulfilment of patient wishes and demands will be the ability to continually recognize or even create new or developing trends, and then to develop relevant investment through a network of the most competent, creative and innovative institutions. Part of a strategy-driven investment planning therefore has to be *the identification or recognition of these latent and future customer (patient) requirements* and from these the deduction of the innovation potential.

### **4. Use existing strengths**

Good ideas lead to success only if they are implemented. This can be achieved only if the institution succeeds in leaning on or using its own particular strengths. In rating or choosing certain investment ideas, besides the competitive potential, the "institutional fit" of the ideas also needs to be evaluated.

### **5. Create transparent and standardized processes**

Successful control of complex problems requires two distinct levels. On the one hand, the theoretical struggle with such a complex problem has to be simplified and done systematically, while on the other hand, the holistic overview needs to be kept in the detailed analysis. To be efficient, particular attention has to be given to rationalization potentials.

### **6. Objective, retraceable idea selection**

The easier it is to physically imagine something, the more available specific information regarding a certain alternative is, the higher the chance that that idea will be regarded in a positive light. In practice, this can lead to the fact that existing, well-known solutions are rated higher than new, lesser known technologies. This results in ideas being further refined that seem to have a higher information availability, instead of exploring or searching for further information on possibly better alternatives. It is therefore vital for an objective idea selection not to focus on the institutional specific history and even on well-known approaches, but to make sure that totally different but functionally equivalent opportunities are included in the analysis.

In judging or rating different ideas, vague and qualitative factors need to be taken into account. Should the decision maker insist on using well-defined, quantified information, the implementation risk might be reduced, but in order to obtain this information.

### **7. Accepting uncertainties**

In the early phase of the investment process one will always be confronted with the uncertainty of the eventual realization of envisaged developments. In this environment of uncertainty and time pressure relevant methods are required.

### **8. Synchronize national health problems, technology requirements and institution possibilities**

In technology-intensive environments such as medicine it is especially important to obtain a high technological competence. To be on the forefront in new technology requires that the necessary resources for the development and refinement of these are made available. In the development of medical equipment there is, however, an inherent risk. Technologies developed too late result in the

non-satisfaction of a hospital demand. On the other hand, too early developments of technologies put undue pressure on financial and human resources that could have been used more effectively. It is therefore required that market and technology developments are synchronized through a methodical, systematic support system that makes the realization of necessary technologies on a just-in-time basis possible.

9. Keep an open mind and stimulate creativity

The planning process and specific methods used during idea generation and the implementation of technological product innovations are unique for each specific planning object. There is no generic or "ideal" way; there is only the "best" approach for successful investment.

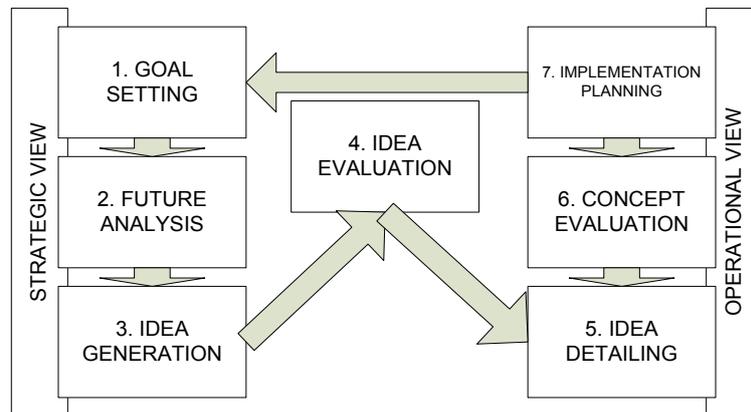


Figure 1 The W model [16]

This standardized approach has the advantage that, though providing for the specific requirements for creativity and intuition, the co-ordination of all participants is made easier and the underlying structure of the approach does not need to be re-developed for each separate planning process.

## 2.2 Simultaneous development with MC approach

The idea about MC analysis of investment acceptability in the health system was developed from observing two-dimensional graphs showing the dependence of the dependent variable from the independent one. The independent variable represents time, the dependent one is derived from the observed and most representative parameters [15, 19].

Besides the strategic goals, an analysis of the technological potentials is required for innovation planning. Here the potentials refer to the totality of all institution capabilities in answering requests for problem solutions and reacting quickly to public health requirements as well as to develop and apply new products and commercial success.

The analysis and collection of trends is a continual process used in the early clarification. A trend can be described as the basic direction of either a development or a development bias. The "trend scanning" takes place in different observation areas, which together form the observation field. It represents the global environment of the formation field. In the ideal case, detailed information on developments in single observation areas already exists in the business so that these can be analyzed formation field-specifically. If the trend-scanning in a business is established, a list of trends from the various observation areas exists, that is reviewed, updated permanently and/or analyzed regarding its relevance. In addition to the available trends, the observation areas can be examined formation field-specific. Obviously, a complete analysis of the collection of trends is required.

In the trend test, the examination of the resemblance of the trend identified in the individual observation areas is important. During the resemblance analysis, the goal has to be to objectively rate the weighting of the trend while avoiding an overrating of a trend direction by the consideration of several similar trends. If similar trends are taken up in the matrix such as Table 1, this could lead to an overrating of future projections.

### **2.3 Empirical study of renovation of Paediatric clinic of University clinical centre of Maribor**

Data which are represented in the following text is part of the larger investment documentation prepared for the Rebuilding of the Paediatric clinic of the University clinical centre of Maribor in 2011. Due to the complexity of the health care infrastructure, there is a need to clearly describe the objectives and characteristics of the project proposed. The main typologies of features to be considered are the following [1]:

1. Functional features:

- the group of pathologies involved,
- the scope of the target population,
- the diagnostic functions,
- the short or long term treatment.

2. Basic data:

- the average and maximum numbers of users per day, month, year,
- a list of the departments for assistance and prevention, treatment and diagnosis.

3. Physical data:

- the surface area and covered area,
- number of treatment rooms, wards, prevention and/or diagnostic consulting rooms,
- existence and size of outpatients departments.

4. Technical and engineering features:

- arrangement of internal/external areas (lay-out),
- description of the principal equipment and machinery for diagnosis and/or treatment (e.g. X-ray, scans, nuclear medicine, endoscopes etc.),
- construction, and layout of buildings or parts,
- viability and access systems (plus possible car parks) and links with the local communication routes.

*The feasibility of the projects* should be verified according to patient flows and trends and by taking into consideration the epidemiological data available. For the alternative options, the critical issues to establish are: different medical-technological solutions, the construction of a new infrastructure, or the enlargement of the old one, different treatment systems.

*Financial inflows* are fees for hospital admission, fees for diagnosis, fees for treatment, additional services, single rooms, and transfer from the government budget.

*Financial outflows* (the time horizon is usually around 20 years)

1. Investment costs:

- works,
- general expenses,
- expenses for special equipment;

2. Operating costs:

- raw materials for operation,
- maintenance,
- medicines,
- medical and administrative personnel costs - out-sourced medical services.

Table 1 shows the matrix of different opportunities for the complex University clinical hospital located in Maribor, Slovenia. Variant 1 represents the option without investment and is not acceptable. Also, physical conditions such as that of the clinic cannot meet the statutory obligations relating to the coexistence of the child and parents. Given the increased workload, overcrowding and the conditions for coexistence of the child and parents, years ago a very large number of complaints was received by the clinic from patients, visitors, parents, and others.

Variant 2 meant to adapt non-medical facilities on the ground floor and on the 4<sup>th</sup> floor, and at their location to reconstruct the facilities necessary for carrying out medical activities. On the roof the appropriate remediation is planned. Facilities for children in the 4<sup>th</sup> surgical floor are removed to the Central hospital tower, which does not guarantee the quality of treatment for children in child surgery at the same time.

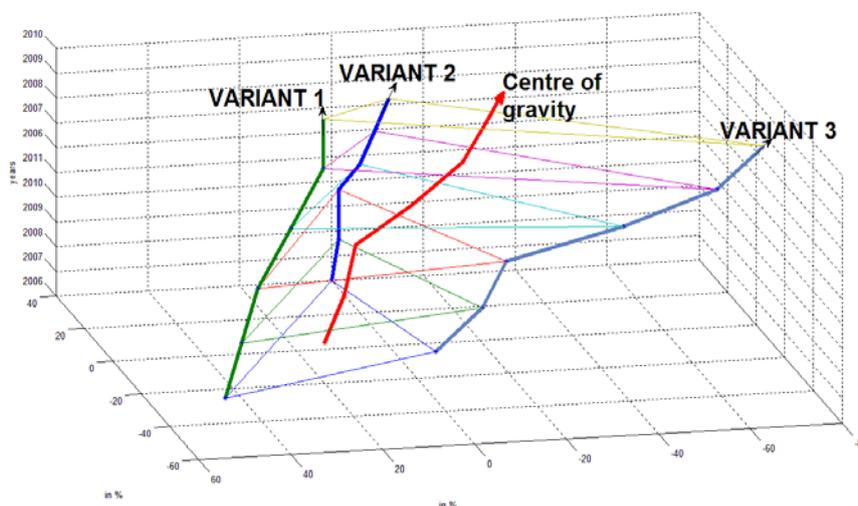
Variant 3 is a complex address space, functional and organizational problems of the two organizational units, and therefore the complete variant does not have better alternative. Senior Staff from the Clinical centre surgeries notes that the professional growth of children with any kind of surgery. Lack of individual space for children with parents is crucial. In this context it is obvious that the ideal solution in the hospitalization of paediatric patients and parents is to remain in the same

building as the paediatric intensive care unit and operating rooms. Simultaneously the location and the entire children's department of surgery in this building should be connected to the maternity hospital with a passage.

**Table 1 Analysed parameters of investment opportunities**

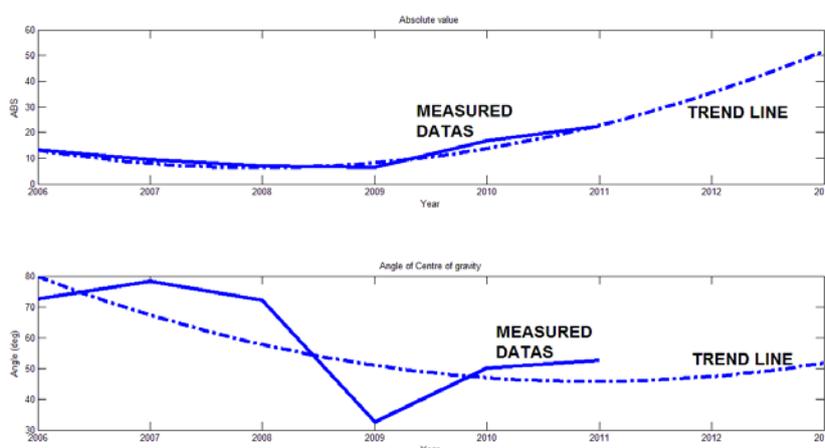
Time (year)	Variant parameters estimated in %			$\Sigma$
	VARIANT 1	VARIANT 2	VARIANT 3	
2006	40	50	10	100
2007	35	45	20	100
2008	35	40	25	100
2009	20	30	50	100
2010	10	20	70	100
2011	5	15	80	100

Limitations of different combinations of variants were eliminated in the beginning due to the demand for fast and effective reconstruction of the building and its still running activities.



**Figure 2** Demonstration of moving the centre of gravity in multi-dimensional space

Figure 2 shows the »skeleton« multidimensional graph of product development. Limits to the system are set uniformly with boundary lines of observed parameters.



**Figure 3** Demonstration of quadratic dependant trend

Figure 3 gives us the opportunity to observe a multidimensional curve, which is defined by the absolute value of the angle of aggregate indicator of the trend of the centre. These curves show a quadratic trend which, in the upcoming years, moves the centre of the observed investment towards

the importance of choosing the appropriate one. The importance of Variant 3 is shown as the most appropriate one.

### 3. Conclusion

Hospital and other healthcare infrastructure investment projects are correlated with the prevention and/or treatment of pathologies and refer to different categories of the population. The overarching goals are the increasing life expectancy and life quality.

Establishing the rational environment is largely a matter of institutional building, local culture and transparency of the decision-making process, including the political environment. No technical document can address these important issues which are beyond the scope of the Decree. In fact, the content of the Decree is no more than a structured set of suggestions, a check list, but good project analysis needs adaptation to local circumstances and it should be based on professional skills and personal ability.

Life cycles of technologies, products and processes are becoming ever shorter, so technological foresight is a very important aspect of their planning. In a time when foretelling the development of products is difficult and the price of error as steep as it is, the article offers a solution for the development of products through multidimensional analysis.

The developed model of product design through MC analysis can be used in the development of virtually any mass produced product. Model has a lot of potential and a lot of space for further investigations and real case study modifications.

The benefits of the investments in healthcare infrastructures can be derived primarily from morbidity and mortality changes, added quality of services or efficiency gains. Assigning a monetary value to health benefits is complex. The most prominent techniques are to refer to the market prices of the service or to use standard methods, such as the indices for increased life expectancy suitably adjusted by the quality which can be valorised according to the principle of lost income or to similar actuarial criteria. In accordance with this the most appropriate variant for the University clinical centre of Maribor is Variant 3.

Our methods try to forecast and analyse carefully the patient flows and trends in the area involved in the project. Special attention should be paid to the choice of the epidemiological data sources. Both presented methodologies try to forecast the trend in operating costs, specifically with reference to personnel, maintenance, and the replacement of equipment.

Considering the fact that the main economic benefits of health infrastructure investments are related to the human life value, analysts should focus on the value of statistical life evaluation approaches.

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# Testing the Possibility for Reducing the Papadopoulos/Heslop's PCI Research Variables by Combined Use of Factor and Regression Analyses

Igor Kostovski,

The primary purpose of this paper is to test the possibility for reducing the 36 variables for conducting PCI research that were suggested by Papadopoulos and Helsop [1]. In addition, respecting the specifics of the region of South-East Europe, the paper argues in favour of adding two additional variables to this list and tests their significance.

Related to the above stated, a series of factor regression analyses were conducted in order to reduce the number of variables. The factor analysis as well as the regression analyses were enabled by the data collected from a survey previously conducted in nine geographical regions in Macedonia.

The idea behind the paper is the attempt to reduce the PCI research variables in order to open the door for cheaper, faster and more extensive PCI research in Macedonia and the region of South-East Europe. Besides the aforementioned, the side focus of this paper is to introduce Country-of-Origin (COO) surveying in Macedonia.

## Keywords

Country of Origin, Factor Analysis, Multiple Regression Technique, Product Country Image, Salient Variables.

## 1. Introduction

The phenomenon of *Country of Origin* (COO) has emerged in mid-sixties of the last century, and become widely understood as an important factor in the decision-making process in marketing thought along with other factors such as brand, price, warranty and colour. It was launched as a product of the increased trade between the nations and its significance continues to grow with each additional product traded between the nations. It is in human nature to evaluate each product purchased and compare it with other products. This single attribute has resulted in defining the core characteristics and traits of some country's products. For example, the German products are usually perceived as reliable, precise and of good quality, Japanese as hi-tech and modern, English as solid and traditional, etc. One can think of some of the dozens of products marketed by linking the product to their place of origin: Russian vodka, Scottish whiskey, French perfume, etc.

Among the many factors which are believed to influence consumer perceptions of products in an age of global competition, COO effects have attracted the biggest attention [2]. The studies conducted in the field of COO and *Product-Country Image* (PCI), tend to examine these consumer's perceptions. According to Papadopoulos and Heslop "a country's particular image influences purchase decisions significantly, quite often more so than a brand name" [3]. Another excellent example of the importance of COO and PCI is presented by the work of Tan and Farley who claim that such effects "are the most researched issue in international buyer behaviour" [4].

The world today is strongly following a path of globalisation. National market boundaries are blurring, opening the door to a single international market. The barriers of entry for non-domestic products are vanishing and the importance of PCI effects is being recognized even more. South-Eastern Europe is also experiencing a transformation of this type. It would be more correctly to say that it is experiencing a process of regionalisation, rather than globalisation, however the effects would remain the same. In the dawn of this new, large and open market, the marketers increasingly justify their actions with the results of the conducted PCI surveys. Thus, it can be easily concluded that as the regional market becomes more and more visible, the demand for understanding the PCI effects progressively rises.

## 2. Country of Origin (COO) and Product Country Image (PCI)

### 2.1 Introduction to the Issues of Country of Origin and Product Country Image

A valuable definition of COO was provided by Roth and Romeo claiming that “country image is the overall perception that consumers form of products from a particular country, based on their prior perceptions on country’s production and marketing strengths and weaknesses” [5]. Papadopoulos and Helsop moved this issue to a qualitatively higher stage by introducing the term Product-Country Image (PCI), defining it as “an image of a country and thoughts such image creates in the minds of the consumers” [6]. Another, more up to date, but also broader perception of PCI is suggested by Laroche et al. who claim that “PCI effects refer to the extent to which the origin of a particular product influences its evaluation” [7].

As Shapiro noted “Uncertainty about quality is a widespread and important feature of markets for most firms’ goods and services. Virtually all goods and services are impossible to be evaluated until they are used”. [8]

In order to overcome this unpleasant situation of being uncertain of a product’s quality, a customer may refer to the Country-of-Origin effect along with other attributes, before she/he makes the purchasing decision [9]. One may detect the similarity between this and the case when the price serves as surrogate for other (not available) information of a product’s quality.

As Papadopoulos and Helsop argue, the whole idea “was inspired by an apparently simple hypothesis that customers regard products made in more developed countries as being of higher quality than those made in less developed ones” [10]; however, the research results presented a more complicated picture than the expected one.

### 2.2 Different Dimensions of the Country of Origin Phenomenon

In the early years of studying the Country-of-Origin phenomenon, the issue was perceived and treated in its most general form, as a single-dimension concept (i.e., as “Made in” issue). Accordingly, Nagashima defined the COO as “the picture, the reputation, and the stereotype that businessmen and consumers attach to products of a specific country” [11]. The widely proved influence and importance of the “Made in” label effects were present until recently. Namely, in the mid 1990s, a considerable number of Bulgarian producers labelled their products as “Made in Europe” or “Made in EU”, rather than as “Made in Bulgaria”. The Bulgarian authorities have tolerated these actions due to their belief that this strategy might result in better selling of domestic products, both at home and abroad. Commenting on the issue Thakor and Kohli noted that when a manufacturer is concerned over a consumer reaction on a product’s country of origin, it may attempt to mask the actual origin [12]. They consider that this is usually a case in the less developed countries.

In the beginning of 1980s, Bilkey and Nes narrowed the scope of COO to the “country of manufacture” [13]. In many cases, however, the rising process of globalisation has allowed international companies to some extent to choose the COO of their product. This became possible due to the different parts that were produced in different countries and then assembled in the final product, or when a product is produced in one country and marketed as having the quality of products of another country. Acknowledging this fact, Chao suggests that such cases, when products are designed in one country and manufactured in another, do not support the one-dimensional concept of the COO [14].

The types of products (when designed in one country and manufactured in another) are referred as hybrids, and have considerably influenced the issue of Country-of-Origin. Namely, they have forced academics to start recognising two separate aspects or dimensions of the issue: design (conception, engineering) and assembly [15]. In light of this, Chao calls for abandoning the one-dimensional concept of “Made in” and adopt a bi-dimensional concept of COO, consisting of Country-of-Design (COD) and Country-of-Assembly (COA) [16]. He supports this action with the continually increased presence of hybrid products in the global marketplace. Five years later, the same author summarising the findings of several international marketing studies, concludes that the consumers have used their knowledge on a country in order to assume the quality and the purchase value of the product in question [17]. Commenting on this matter, Ho stated that “the idea of one single country of origin is becoming increasingly out of date and out of touch with reality” [18].

Recently, some other authors like Lin and Kao have even further decomposed the issue of COO, claiming that it actually consists of not two, but four dimensions [19]. Namely, they argue that Country-of-Parts (COP), Country-of-Assembly (COA), Country-of-Design (COD) and Country-of-

Manufacture (COM) are the four key cues in the process of buyers' purchasing decisions. Identifying this trend, Papadopoulos and Helsop stated that "made-in can mean manufactured-in, but also assembled-, designed- or invented-in, made by a producer whose domicile is in, and, often wanting to look like it was made in" [20]. On the other hand, besides this claim of Lin and Kao [19], some other authors, like Lim and O'Casey, consider that the need for extracting multiple country information, such as manufacture, design, assembly, etc.), further complicates such studies and reduces the relevance of overall COO information [21].

Product related variables Prime Group P	Country related variables Prime Group P	People related variables Prime Group P
P1 - Workmanship	C1 - Knowledge on the country	N1 - People's trustworthiness
P2 - Reliability	C2 - Political stability of the country	N2 - Rich/Poor people
P3 - Innovativeness	C3 - Admirable role in world politics	N3 - The people have refined taste for beautiful things in life
P4 - Quality	C4 - Admirable role in regional politics	N4 - Highly educated people
P5 - After sales service	C5 - Technologically advanced country	N5 - Hardworking people
P6 - Hard to find	C6 - Aligned with the domicile country of the research	N6 - Likeableness of the people
P7 - Attractiveness of appearance	C7 - More investments from the country are welcomed	N7 - Knowledge on the people
P8 - Knowledge on country products	C8 - More imports from the country are welcomed	
P9 - Value for the money	C9 - Likeness to visit the country	
P10 - Have what customer likes to buy	C10 - Willingness to have closer ties with the country	
P11 - Technically advanced	C11 - Ideal country	
P12 - Recognisable brand names		
P13 - Wide variety		
P14 - Normally buy a lot of country's product		
P15 - Expensive		
P16 - Willingness to buy country's products		
P17 - Proud to own country's products		
P18 - Country's products are not for people like me		
P19 - Good overall products		
P20 - Satisfaction with country's products		

**Table 1** List of the 38 PCI variables used in the survey and analysis process organized in prime groups

In 2002, Papadopoulos and Heslop together with their international research group have established a comprehensive and extensive PCI research database integrating more than 750 publications by more than 780 authors [1]. Using the findings of three other authors, Kotler et al. [22], Jaffe and Nebenzahl [23] and Gold and Ward [24], and analysing the findings from the established database, the two authors have drawn number of conclusions, among the following one seems to be of great importance for future PCI researches: PCIs appear to consist of seven key constructs – three country constructs (comprising 16 variables) and four product constructs (comprising 20 variables). The general focus of the study was to test the significance of the three constructs for evaluation of buyer's willingness for purchasing a certain country products, and to test the significance of the variables proposed by Papadopoulos and Heslop [1].

With regard to these three categories of questions, for the purpose of the research, the question on the level of knowledge of the country and the people was divided into two separate questions – the level of knowledge of the country (coded as C1), the level of knowledge of the people (coded as N7), thus the number of questions increased by one. In addition this, acknowledging the regional aspect of the survey, additional – 38th question on the perception (positive or negative) of the regional politics of the country was added (coded as C4). A complete list of the 38 variables is presented in the Table 1.

### 3. Research

#### 3.1 Factor Analysis of Coherent-Group System (Combined Pair of Prime Groups)

The overall survey has incorporated the following three steps:

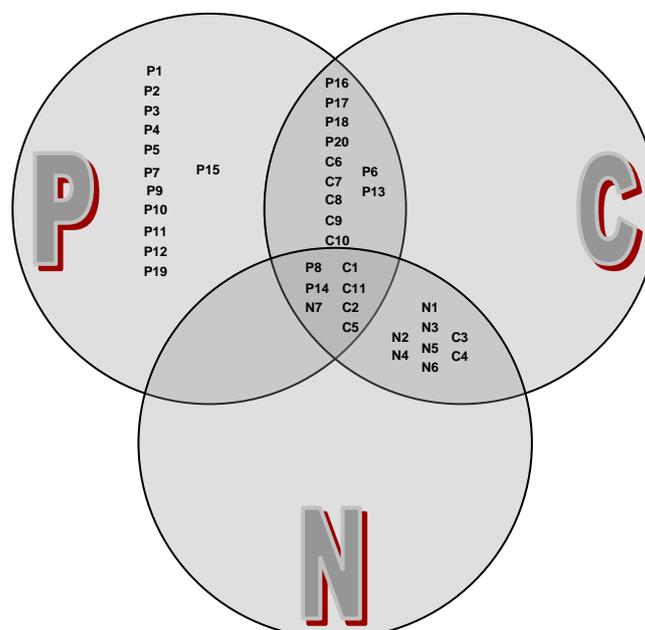
- Research conducted by using a single-entity questionnaire,
- Factor analysis that should reveal the different factors influencing the buyers in Macedonia, and
- Regression analysis of the variables included in the survey in order to point-out the salient ones and reduce the total number of PCI variables needed for conducting a PCI survey.

As part of the step one of the process, a structured monolingual (Macedonian) questionnaire was used. Slovenia was chosen as a country to be researched in the survey. This was due to the following reasons:

- The admirable presence of Slovenian products on the Macedonian market,
- The significant quantity of Slovenian investments in Macedonia,
- The perceived stronger knowledge of the Macedonian buyers on Slovenia and its people.

The questionnaire contained 5 sections: Letter to the respondent, Instructions, Background Information, Evaluation of the country, its people and products, and Comments. A total of 8 questions related to gender, nationality, age, level of education, level of monthly incomes, etc., are incorporated in the Background information section. The main part of the questionnaire (i.e., the section for evaluation of products, country and people) incorporated the 38 aforementioned questions, which for analytical purposes were divided into three categories, i.e. prime groups: Product group of variables – 20 variables coded as Group P, Country group of variables – 11 variables coded as Group C, and People group of variables – 7 variables coded as Group N (see Table 1). The rating system of all questions was based on a seven-point Likert scale anchored at poor and good.

Thus, the survey was conducted on a sample of 460 respondents. A total of 343 subjects (74,6%) responded to the survey; however, in 31 cases the returned questionnaires were incomplete and therefore eliminated from the analysis process. The response rate of the fully completed questionnaires was 67,8%.



**Figure 1:** Graphical presentation of the prime group pairs factor analyses summary results

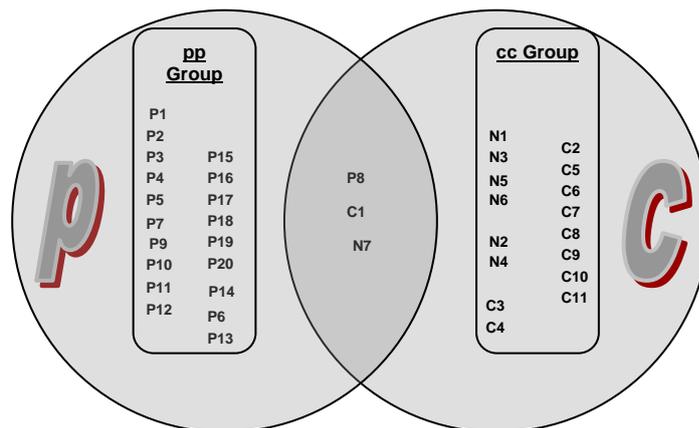
A logical starting point for conducting the factor analysis should be considering all 38 variables as single group (the PCN group of variables). However, keeping in mind that the pre-survey has obtained 312 valid responses, the N/K ratio (i.e., proportion between number of records - N and

number of variables - K) in this case equals 8.2 which is unsatisfactory and indicates an unstable system [26]. Thus, the results that will be provided by analysing the PCN group of variables will lack validity.

Consequently, in order to ensure a stable system (i.e., S/N ratio higher than 10), additional grouping of the variables was required. Therefore, the most reasonable action was to combine the already existing prime groups of variables, into a coherent-group system comprised of number of groups of coherent variables (for the purpose of this paper, each group (prime or factor group) that consists of variables that are strongly inter-related will be considered a coherent group of variables).

A combination of three factor analyses for investigating each of the three joined pairs of prime groups was conducted. The first pair consists of variables originating from P and C prime groups, the second one is formed by the P and N prime group variables, and the third one is created by merging C and N prime groups. In the first two analyses, the N/K ratio equals 10.1 and 11.6, respectively, which indicate limited system stability. The N/K ratio in the case of CN group analysis is 17.3, and therefore no signs of instability of that system were noticed.

A summarized graphical presentation of the three factor analyses results is offered in Figure 1. The figure clearly presents the affiliations of some variables to other prime groups. It appears that P1, P2, P3, P4, P5, P7, P9, P10, P11, P12 and P15 have strong affiliation to their “mother” prime group. The remaining 27 variables “demonstrate” doubtful group affiliation. For that reason, additional factor analysis was conducted in order to discover the precise affiliation of these variables. In light of this, one factor analysis was conducted for all variables included in the P segment (the p Group – P circle on the Figure 1 – 30 variables), and the second one included only the variables that are covered by the C segment (the c Group – C circle the on Figure 1 – 26 variables). The summary results of these factor analyses are graphically presented in Figure 2. The N/K ratio for the p Group is 10.4, while for the c Group is 12, both presenting slightly stable systems.



**Figure 2:** Graphical presentation of the summary results of *p* and *c* segments

The analysis of Figure 2 reveals that P8 (Knowledge of the products), C1 (Knowledge of the country) and N7 (Knowledge of the people) continue to present doubts over their group affiliation. During all factor analysis performed in this case, these three variables have also presented a very strong interrelationship among each other, and therefore might be considered as a separate factor. Therefore, the first group (the *pp* Group) will integrate all variables within the *p* segment (excluding P8, C1 and N7), while the second group (the *cc* Group) will incorporate the variables within the *c* segment (excluding P8, C1 and N7). The *pp* segment consists of 19 variables and its N/K ratio equals 16.4. On the other hand, the *cc* segment is composed of 16 variables, resulting in an N/K ratio of 19.5. Both group ratios are very satisfactory, ensuring significant stability of the two systems.

As result of the two latter factor analyses, four factors have been extracted from the *pp* segment (factors *pp*#1, *pp*#2, *pp*#3 and *pp*#4), and three factors were generated by the *cc* segment (factors *cc*#1, *cc*#2 and *cc*#3). Adding the previously identified (P8, C1, N7) factor provides the summarized table of variables organized by factors:

**Factor *pc*#1** (P1, P2, P3, P4, P5, P7, P9, P10, P11)  
**Factor *pc*#2** (P14, P16, P17, P18, P19, P20)  
**Factor *pc*#3** (P6, P12, P13)  
**Factor *pc*#4** (P15)

**Factor *pc*#5** (P8, C1, N7)  
**Factor *pc*#6** (C8, C11, N1, N3, N5, N6)  
**Factor *pc*#7** (C6, C7, C9, C10)  
**Factor *pc*#8** (C2, C3, C4, C5, N2, N4)

### 3.2 Multiple Regression Analysis

The idea behind the regression analysis of all factor elements was to test whether some of the 38 variables are more significant than others and thus, to reduce the overall number of the needed PCI variables. In light of this, regression analysis was conducted for each of the eight factors separately. The analyses have pointed to the results, presented in Table 2.

	Factor #1	Factor #2	Factor #3	Factor #4	Factor #5	Factor #6	Factor #7	Factor #8
P1	X		X		X	X		
P2	X		X					X
P3	X					X		X
P4	X	X				X		
P5	X							X
P6	X		X		X			
P7	X		X	X				
P8		X			X			
P9	X	X		X			X	
P10	X							
P11	X		X					
P12	X		X					X
P13	X	X	X					
P14	X	X	X	X	X			X
P15	X	X				X		
P16	X	X				X		
P17		X				X	X	
P18	X	X				X	X	
P19	X	X						X
P20		X						
C1	X	X			X			X
C2	X	X	X			X		X
C3	X						X	X
C4	X				X	X		X
C5	X	X	X			X	X	X
C6						X	X	
C7							X	X
C8	X	X				X		X
C9							X	
C10		X				X	X	X
C11	X	X				X		X
N1		X		X		X		X
N2			X		X	X		X
N3	X	X		X	X	X		X
N4	X					X		X
N5	X				X	X	X	X
N6					X	X		X
N7			X		X			X

**Table 2** Significant variables identified for each of the eight factors

The key for evaluating the usefulness of the regression technique to the COO research lies in the value of the equations' adjusted R squares. The values of the highest and the lowest adjusted R squares equal 0.706 and 0.154, respectively, while in all remaining cases it mostly ranges between 0.400 and 0.600. This means that in majority of the cases, the dependent variables can be 40 to 60% explained by their significant variables, which indicates that they cannot provide a solid accuracy of the results all variables of the system. However, some high values of the adjusted R squares of certain variables can ensure legitimate use of those variables' regression equations. Accordingly, instead of being generally applicable on all variables, the approach can be used only on those variables with substantially high values of the adjusted R squares

A closer inspection of the adjusted R squares for each factor separately, reveals that this particular approach can be used on the variables consisting Factor #2, which probably is one of the most important factors of all. The factor incorporates six extremely significant variables from the P prime

group: Buying a lot of products, Willingness to buy, Owning the products, Not for the people like me, Overall good products, Satisfaction of the products – which may be considered as core COO effects. The regression equations related to this factor point to a total of 19 variables that are significant to the six COO factor variables. However, this paper will focus only on the variables with the highest adjusted R squares (i.e., P16-Willingness to buy, P17-Owning the products, P19-Overall good products and P20-Satisfaction of the products), which for the purpose of this paper will be referred as the four COO variables.

The regression equations of the four COO variables identified a total of 16 variables (P4, P8, P14, P15, P16, P17, P18, P19, P20, C1, C2, C5, C8, C10, C11, N3) which are significant to them. Nine of them belong to the P prime group, six to the C prime group, and one to the N prime group. The system of equations has also shown that the four COO variables are significant to the remaining COO variables. The values of the adjusted R squares are very favourable, ranging from 0.649 to 0.706.

In conclusion, this particular approach of including the multiple regression analysis technique in the COO research has presented useful results. Namely, the number of COO-related research variables was reduced from 38 to only 16 (a 58% reduction), which may show as very beneficial for rapid expansion of the PCI research in Macedonia and the region of South-East Europe.

In addition, the regression analysis provided the answer to another important question – the validity of adding two additional variables (C4 and N7) to the original list of 36 variables. Namely, by analysing the variables which consist the factors pc#5 and pc#8, one may conclude that their “twin” variables C3 (Admirable role of a country in world politics) and C1 (Knowledge on the country), belong to the same factor, and therefore may question their contribution and usefulness to the system. However, the regression equations identified the significant variables for each variable separately, and offer additional arguments for deciding on the relevance of the two variables. Probably the most important finding, emerging from these results, is that all system variables are significant to at least one other system variable. For the case of the two aforementioned variables, C4 is significant to four other variables, while N7 to three variables. Therefore, it may be concluded that both variables are part of system’s significant variables, and thus, their importance to the system is widely confirmed. Consequently, this paper argues in favour of including these two variables in all future COO researches in Macedonia and the region, as well as examining their relevance in studies to be conducted in the other countries in the region.

### **3.3 Limitations of the Study**

This particular study has a number of limitations which may partially influence the results and findings of the research. Several limitations should be kept in mind when interpreting the results of this study. Namely, the initial constrain is due to the number of respondents planned which is far lower than a representative sample size in the case of Macedonia. This study has been further constrained by the inadequate representation of the Macedonian population within the sample in terms of ethnic affiliation, gender, educational background, etc., besides the efforts made towards decreasing the demographic bias. This implies that the survey results cannot be used for official purposes and cannot provide the adequate accuracy and should be perceived only as an attempt to introduce and foster the foundations of the COO research in Macedonia.

## **4. Conclusions**

The 36 variables identified by Papadopoulos and Heslop [1] were the actual starting point for this research. Additional two variables, that latter confirmed to be significant for the system, were also joined to this list, resulting in a total of 38 variables. The factor analysis has revealed that the 38 initial system variables that were used in the survey can be reduced to only eight. Naturally, these eight factors can not completely substitute the information that can be collected from the answers of all 38 variables, but they are offering a possibility for fast collection of data related to several tens of countries.

The factor analysis results have confirmed and supported the findings of number of authors on the large number of different factors influencing the process of purchasing decision-making. This survey, as many before it, has also confirmed that COO effects, price, and brand (three strong marketing elements) were clearly distinguished by the respondents. In addition, these initial results related to the Macedonian PCI factors can be also used as a base point in the process of identifying the importance (i.e., the influence) that each factor has on the purchasing decision.

One may question the relationship of the country and people related variables (i.e., questions) with consumer evaluations and attitudes towards products. However, the results of the regression analysis presented in Appendix G strongly oppose to this assumption by presenting a clear influence of the majority of C and N group variables (excluding C6, C7 and C9 variables) to the P group variables. Thus, it can be concluded that each researcher that aims to investigate purchasing patterns should research variables originating from all three prime groups (i.e., P, C and N prime group).

The results of the regression analyses resulted in the following conclusions:

- Each system variable is significant to at least one other system variable meaning that all 38 variables are salient; thus, the number of research variables cannot be reduced, and therefore, to study all the different dimensions of the issue, no reduction of the variables should be considered.
- The two new variables added to the list of the 36 original Papadopoulos/Heslop's variables, prove to be significant and thus should be included in the research process.
- The results unveiled the relationships among all system variables (i.e., which variables influence a particular variable).
- The most salient system variables (salient to more than 5 other system variables) are the following: P14-Buying a lot of country's products, C2-Political stability of the country, C5-Technological advancement of the country, N3-Country's people level of refined taste for beautiful things, and N5-Hardworking people.
- Product related variables are influenced by a total of 35 system variables, while the most salient to products (salient to at least 5 product variables) are the following variables: P1-Product workmanship, P9-Product value for the money, P14-Buying a lot of country's products, P15-Level of product pricing, and N3-Country's people level of refined taste for beautiful things,
- The low values of the regression equations' adjusted R squares cannot guarantee a solid accuracy of results for all variables of the system and this approach cannot be used for the system as a whole. However, some high values of the adjusted R squares of certain variables can ensure legitimate use of those variables' regression equations. Accordingly, instead of being generally applicable on all variables, the approach can be used only on those variables with substantially high values of the adjusted R squares,
- A total of 19 variables influence the six variables consisting the COO factor (i.e., Factor pc#2), while 16 variables influence the four COO variables.

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# THE TOURISM AND ITS IMPROVEMENT – KEY FACTORS FOR COUNTRY DEVELOPMENT: CASE STUDY OF THE REPUBLIC OF MACEDONIA

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The aim of this paper is to present the tourism sector and its precondition for international country development with the case study of the Republic of Macedonia. Also, the purpose of this study is to identify the tourism potential, examine the significance of tourism to the national economy and evaluate the marketing of the Republic of Macedonia as a potential tourist destination. The concepts of tourism development include government strategy, planning and promotion activities for tourism. Policy recommendations are created to design a strategy framework to improve the performance of the tourism sector in Republic of Macedonia.

This study provides some perspectives for understanding tourism planning and the importance of marketing promotion in creating the image for awareness and acknowledgement of the country's tourist product among international tourists markets. It provides useful empirical data and information that help tourism policy makers in Macedonia to develop their plans and strategies for the tourism sector, mitigate its problems and overcome its obstacles, which overall lead to sustainable tourism development.

The primary objective of this paper is to use the service sector setting of the Macedonian hotel industry to help the country to explore the strategy for planning the expansion of the tourism sector over the next years.

This study concludes that, without government contribution and commitment, together with an appropriate strategy and adequate budget for promotion, the potential for tourism will not be achieved. Creating strategies and policies for tourism must be carefully considered with high quality expertise which will lead to well-organized and sufficient plans to achieve sustainable tourism development that can make a significant input to sustaining the national economy.

## Keywords

Country development, Government strategy, Quality service, Tourism development.

## 1. Introduction

Macedonia is a country which is recognised by its culture and art, also by the many of historical monuments which can be found all over the country. Very often recognised as a 'Balcan pearl', the beauty of the country can be a significant factor in developing the tourism sector. Also, the friendliness and the kindness of the people symbolize Macedonians as welcomed and warmed people. However, in order to attract more foreign tourists, the country needs a good promotion which will increase the international awarness and this will lead to a positive perception and economic development of the Republic of Macedonia. The government has to use all natural resources and the culture program in order to attract more foreign tourists to visit Republic of Macedonia.

This paper will focus on the development of the tourism sector and the hotel industry in the Republic of Macedonia. Tourism promotion is an important aspect in promoting and selling the tourist products. The countries like Macedonia usually suffers from a number of problems, the most important of which is the difficulty in promoting the tourism potential in the country as well as the level of the quality of service offered to the travelers. This may be due to the lack of expertise and funds allocated for the

purpose of marketing or the low level of employee's interest to make a career in this industry in the Republic of Macedonia.

## **2. Development of the hotel industry**

The development of the hotel industry is in a close relation with the development of the tourism sector. The hotels have a very important role in many countries through their ability to provide hotel guests with different services: accommodation, meetings, conferences, seminars, recreation and entertainment. According to Medlik [1], the importance of the hotels is through the following: the hotels provide their guests with different services such as meetings, conferences, recreation and entertainment, the hotels are essential part for the economy as they allow continuous movements of passengers, communication and distribution of goods and services. In many areas, hotels are very important attractions for their guests who are able to spend more money during their stay at hotels instead of staying at home. And, at the end, the hotels are very important for the national economy as they employ many people in different departments.

As the changes in the business environment continuously increasing, the hotel industry continuously meets the challenges in different areas such as finance, development, marketing and operations [2]. The internet continues to create new opportunities for the industry and change the market in many different innovative ways. On the profit side, the easier access to information for travelling and making bookings on line will possibly increase the number of travelers and the users of those services. The hotels became aware of the marketing potential of internet and they installed a very fast internet connection in their rooms. Also, every hotel aims to offer a perfect service to its guests which will lead to entire guest's satisfaction.

## **3. Macedonian hotel industry**

Macedonia tourist industry in the past ten years has been showing some growth as well as some falling. The number of tourists has been going down for up to 100 000 tourists and in 2002 the number of tourists including business tourists was about 125 000. This was far below the 1980s when Macedonia had over 600 000 tourists who visit the country. Since 2003 until 2007, the number of tourists in the Republic of Macedonia has increased and from 157 000 tourists in 2003, this number has reached 230 000 tourists[3].

In the period between 2006 and 2008, the biggest contribution to the GDP for about 44 % was through the services including trade, hotels and restaurants, transport, financial consultancy, activities related with real estate and public institutions, health, education and other services. On the other side, the industry, including energy and constructions, had about 25 % contribution to the GDP. And, at the end, the agriculture had about 10 % contribution to the GDP [3].

### 3.1 Tourist traffic in the Republic of Macedonia

The tourists traffic in the Republic of Macedonia in the period between 2003 and 2007 is shown on figure 1:

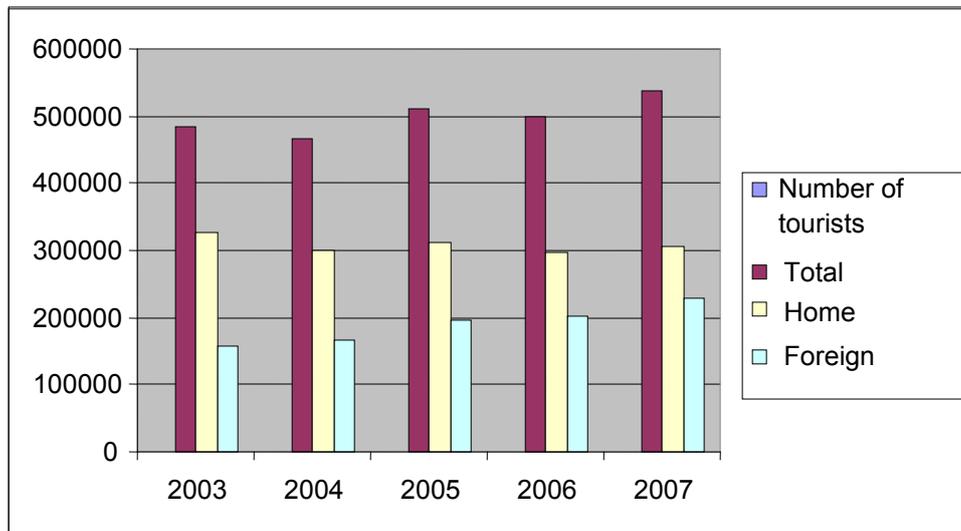


Figure 1. Tourist traffic in the Republic of Macedonia.

Source: Ministry of economy of the Republic of Macedonia, 2010

The figures have shown that the number of foreign tourists continuously increased in the period between 2003 and 2007 which is a good sign that the awareness of our country is growing and this trend needs to continue in the future. However, we can see that there is no continuous increase or decrease of the total tourists in the Republic of Macedonia in the past years. This is why it is difficult to announce that the government strategy for attracting more foreign tourists over the past years gives significant results. We need to see continuous increase of the total tourists to be able to agree with the government strategy for attracting more foreign tourists.

According to the National Institut for Statistics in the Republic of Macedonia in 2011 [3], most of the foreign tourists in Republic of Macedonia have stayed in a four star hotels comparing with home tourists who mostly stayed in a two star hotels. The reason for their stay in different star hotels is probably the budget, but also new visitors would prefer to stay in a better hotel, so they will feel more secure and they will expect to get a better service.

## 4. Key factors that affect hotel guest's decision

There are four major factors that affect hotel guest's opinion for the atmosphere at the hotel: employee's personalities, their greetings, leisure condition and employee's behaviors [4]. According to other authors, key factors that have an effect on the hotel industry are: the price, the location and the quality service [5]. The price is the main reason why the customers choose the selected hotel. After the price, the safety is the major factor for choosing the hotel, and the third factor is the hotel location [6]. Pricing is one of the most important elements in the tourism marketing mix. It signals to the customer the nature of service on offer. The right price should both satisfy tourist and meet the objectives of the tourist organisations. It is in this sense that the individual makes a judgement as to whether the price is in an acceptable range. Hence, pricing decisions are fundamental for the profitability of the tourist organisation, as it has immense impact on demand and sales volume.

Apparently, there are six major factors for the success of the hotel: the quality service, business environment, the price, the rooms and the reception, the food, the ability for leisure activities and the safety of the hotel [7]. Any of those factors has to be on a high level to make customer happy and leave the hotel fully satisfied. Sheldon [8], talks for innovation as a major factor for the hotel's success. Some authors look at the information technology as a crucial factor for the success in the hotel industry [9]. Creating an excellent web site became a good advantage to attract hotel guests.

## **4.1 The importance of the quality of the service for the hotel industry**

The hotels that put priority on better quality service are aware of the importance of the 'word of mouth' and they will do anything to satisfy hotel guests. Some of the hotels believe that through their survey for hotel guests and their comments, they will have a clear picture about the level of the quality service within the hotel. Also, some hotels perceive that the occupancy in their hotel compared with other hotels can be a good indicator for the level of customer satisfaction. Unfortunately, many of those models which are made through survey of hotel guests are not credible measure for the satisfaction of hotel guests which statistically is valid [10].

However, in any case the quality of the service is a crucial factor for customer satisfaction and the researchers need to be focused on new areas such as training for the employees, performance orientation which will all lead to real customer satisfaction.

### **4.1.1 The role of hotel managers**

Hotel managers has the most important role In the process of managing the performance in the hotel industry and they should be the one who needs to adapt its strategy in order to increase the number of its guests through introducing a very high quality of service. David [11] implements five main managers activities: Planning, organising, motivation, employment and controle.

Planning is the process that is nessecarly to connect the past with the future and increases the chances of achiving its goals. This process needs to have manager's involments, but also involments and support from all other employees. The process of plannning can easily affect all other activities (organising, motivation, employment and controle). Different level of management plans activities for different time, low level of management normally plan activities between two weeks and six months, middle management plans activities between six months and two years, and the top management plans activities for a period between two and five years.

If the monthly salary is one of the crucial factors for motivating the employees in the hotel industry in the Republic of Macedonia, then this industry is facing a big problem. One charateristic of the hotel industry in the Republic of Macedonia is the lowest salaries to its employees. This probably decreases the motivation for working in this industry and the students loose the interest to continue with education in this field. According to the National Institut for Statistics in the Republic of Macedonia in 2011 [3], the average salaries in the hotel industry are amongst the lowest paid in the country. The average net salary in Macedonia in month April 2010 was 20 449 MKD and the average monthly salary (for the same period) in the hotel industry in Republic of Macedonia was 14 209 MKD, which is about 30 % lower than the average net salary in the country. The low salary can affect the quality of the service which is one of the key factors to make hotel guests loyal to the hotel.

Another problem within this industry is that our country is not seen as an attractive destination comparing with other neighboring countries (who has access to sea), which means the requirements for new employees is not very high. At the hotels around the lake of Ohrid, the hotels are looking for new employees only during the summer period. The employees come to work for a very short time (approximately one or two months) and their priority is to receive only a salary for that period. They do not see opportunities for longer stay at the hotel and that is why their motivation is on a very low level. Their employment contract is generally for a few months and this does not give them an opportunity to look at those positions in a long term. This creates a problem for the hotel managers to have a better selection when they choose new employees. The solution for this is if they can possibly give a guaranty to the new employees that they will keep them for long term (or call them when there are available positions), but, of course, hotel managers need to be satisfied with their work commitments and professionalism. This will increase the competition for giving better performance at work, so the quality service can be especially improved.

The process of employment is very important for the hotel industry and the employment of the right candidates is the key for the success of every hotel [12]. If the company makes the right choice and employs the right candidates, then this will save time and money, which in another case will be spent on training for the employees. Every employee, especially the one who is in a direct communication with hotel guests needs to have the essential knowledge and skills to be able to offer a first class of service quality [13]. The question is how the organization should identify which candidate is the right choice for the company.

#### **4.1.2 The importance of the training for the employees**

It is very important for every hotel to be able to give enough education to its employees so they can professionally do their job. This can be done through additional education including attendance of seminars, trainings etc. The continuous investment in training and education are very important part for organization's success which enables employees to improve their performance and increases their motivation to a high level. In our country, hotel managers still look at those costs as wasted amount of money which is spent and does not give the wanted results. They need to understand that the continuous training and an additional education are among the factors that increase employee's motivation and this will lead to professionalism and perfect quality service offered to the hotel guests. The hotel manager's role should be to define, plan and forecast the return of investment in training and education and they should give a direction how to maximize the profit. It is necessary to give training to all employees, but especially to the employees that have a direct communication with hotel guests. The expenses for this kind of training and education will result with good handling of unexpected situation and flexibility in adaptation to hotel guest's requirements and this need to be aim of every hotel. The high level of quality service will give an opportunity for recommendation from the perspectives of hotel guests, and they should pass the message that Macedonia is the place that everyone needs to visit.

#### **4.2 Government strategy to attract more foreign tourists to the Republic of Macedonia**

The subvention that are given to the foreign tourists are definitely in a direction to increase the number of incoming tourists, but this model has to be more deeply analyzed and promoted in the best possible ways. The idea is to inform as more foreign tour operators as possible and get them excited about tourism potential in the Republic of Macedonia.

If we look at the SERVQUAL instrument for measuring the quality service, there are five basic factors: exterior design of the hotel, its safety, the willingness of the employees to offer a fast and prompt service, their knowledge and their friendliness and the opinion that hotel guests have for the hotel management and its organization [14]. If we take those factors as basic factors, 85 % of the all respondents in the Republic of Macedonia have stated positively to those factors. It is very important to notify that those results are based on the 4 and 5 star hotels in the Republic of Macedonia. The percentage of satisfied customers in the hotels with 3 or 2 stars will probably be much lower. Those results should be additional motivation for the government in creating the strategy for attracting more tourists to the Republic of Macedonia.

There are many institutions in Macedonia that have a priority to promote the country as a potential tourist destination. Those institutions are: the Hotel Association of Macedonia (HOTAM), the Agency for promotion of the tourism, the department for tourism at the Ministry of Economy, the department for tourism at the Chamber of Commerce, Association for touristic agency and others. It must be a good coordination among those institutions and also, well organization.

Both, international tourists and Macedonian tour operating companies viewed Macedonia as a small and beautiful country nestled in the South East of Europe who offers a unique blend of natural wonders, traditions and cultures as well as long tradition of first class hospitality and excellent quality service. The majority of Macedonian tour operating companies, who sells Macedonia as a holiday destination, have an average degree of familiarity with Macedonia as a holiday destination. There are many tour operators that offer Macedonians to go on holiday abroad, but not many tour operators see the potential in promoting Macedonia to the home and foreign tourists.

The majority of foreign tourists are not satisfied with the price of the tickets to visit Macedonia and also with the problem of not having a direct flight to most of the biggest European cities including London, Paris, Madrid and Moscow. The transfers are normally not convenient for the tourists, especially for the business tourists. Also, some foreign visitors are facing some difficulties with visa entrance procedure. Awareness, knowledge of the country, and safety were major reasons over the past years for foreign travelers eliminating Macedonia as a tourist destination among other tourist destination. However, it has been some improvements over the past few years regarding the promotion campaign of the country and this trend needs to continue.

## 5. Conclusion

The tourism in the Republic of Macedonia is a growing sector, but not enough developed touristic infrastructure, the budget constraints, and the promotion strategies that requires immediate consideration are the major barriers that affect tourism industry in the Republic of Macedonia and this will lead to a slow development of this sector. The tourism will not be developed on the satisfactory level if there is not a high contribution and maximum commitment from the government and if there is not a sufficient strategy and adequate budget for marketing promotion. There is an urgent need for creating of a strategy for tourism promotion which will be carefully consider by the high quality experts within this industry which will lead to very well organized and effective plans and ideas which aim is to achieve sustainable development of the tourism from one side, and also this will have a positive influence to the national economy.

Developing a model which will increase the number of foreign tourists is mainly dependent on overseas tour operators. Large tour operators have incredible control on directing a considerable influx of tourists to a particular destination, by organising package tours aimed at cutting the cost of travel and making holidays easier to be undertaken for travellers from different demographic backgrounds. Marketing promotion is essentially a process of communicating with selected target markets. Most promotional activities require an investment of time and money with careful planning in order to achieve excellent results. The promotional tools selected will essentially be determined by target markets and marketing budget. In the tourism industry, the satisfaction of people to travel and see new places, depends, not on the efficiency of one producer but rather on the performance of numerous organisations of different kinds, with not always similar objectives, operating in different places and at different times. To be successful in marketing a tourist destination, co-operation between public and private sectors became essential. Foremost, the right promotion mix must be developed where each of these is used as needed. In fact, the tourism marketer has most control over advertising and sales promotion. Both of them are created, implemented, and paid for by the marketer, while personal selling and public relation are the opposite. The first one is done indirectly through travel agents and the second is produced through the media. It is, therefore, meaningful for the tourism marketer to sustain good relations with both the travel trade and the media.

At the end, it is very important to have a clear picture about priorities in the tourism and what is the target group for the Republic of Macedonia, whether the tourists will be targeted by the culture offer, their budget, archeological wealth or the entertainment life. However, not matter of what group of people will be targeted, all hotels need to have intention for offering a perfect quality service, because every guest, not matter of his/her intention for the visit, will be expecting a high quality service from the all employees at the hotels in the Republic of Macedonia.

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# Creating Entrepreneurial Marketing Strategies based on Consumer Behavior

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**Emphasizing the role of creating successful entrepreneurial marketing strategies, this paper aims to point-out the key factors in consumer behavior analyses, as a cause for creating customer satisfaction. The total effectiveness of every marketing strategy is basically depending on how well a company recognizes, classifies and manages different consumer demands and actions.**

**Through the analyses of consumer behavior, emotional and cognitive aspects, and consumer surroundings, entrepreneurs can use this data to develop effective-based marketing designs. These concepts of common consumer actions as a result of their intrapersonal emotional reactions and their attitudes can be explained in correlation with the natural individual characteristics and their common social development.**

**Although long-term and constantly continuous work, consumer behavior analyses surely helps in better understand and clarifying the customer demands, which at the end, is the ultimate goal of every entrepreneur.**

## Keywords

Consumer behaviour, Consumer analysis, Entrepreneurship, Marketing, Marketing strategies

## 1. Introduction

In the dynamical surroundings of today's familiar characteristics of this global economic world, and particularly in the free market economies, the entrepreneurial marketing, as one of the basic tools of entrepreneurial existence, has the key role in creating innovative and growth-based concepts of the marketing itself. Basically, in every free-market national economy, entrepreneurship activities are involved in more than 85% of all enterprises. On a local and regional level, entrepreneurial marketing strategies are the main force of the trade and services economy. Therefore, satisfying customers' needs becomes natural right and a business obligation for every entrepreneur. On the other hand, the concept of marketing-oriented company is a choice, which allows more detailed understanding of the consumer needs, and finally – developing ways to satisfy those needs. The basic model of analyzing the consumer's behavior is dynamic but very broad field of marketing research and it has huge potential for effectively analyzing the thinking processes, behaviors and actions of different individuals or groups, and contributes to delivering the required marketing results. In this particular part, the entrepreneurship itself carries the straight of the direct involvement with the clients, understanding their feedback and desired needs, as well as the aspect of creating fast, flexible and adequate marketing approach.

## 2. Entrepreneurs Marketing – dynamics and effects

What makes the marketing driven by entrepreneur's principles so effective? If we analyze the entrepreneurial marketing researches, we can see that they are fundamentally made-up from several basic economic principles:

- client-orientation;
- implementing in relatively short period of time;

- fast feedback info;
- change-oriented flexibility

These kinds of starting positions in collecting, classifying and analyzing the feedback information and putting them into the mechanics of the future strategies of marketing-planning, as well as in development of the business plan and business model in particular, can significantly contribute to the success rate of satisfying consumer's needs. Therefore, the aspect of consumer behavior can be freely accepted as "moves vivendi" of the process of creating satisfied clients. Using the consumer behavior analyses, this powerful "scientific tool", the existing entrepreneurs can be brought even closer to the so-demanded competitive advantage to their businesses in front of other competitors on the market.

Also, the fact that this consumer behavior analyzing tool is very dynamical category which seeks permanent monitoring of the available resources, and even adding new ones, makes good entrepreneurs not taking them for granted, and as a result, the gained effects are far more clear and more precise. The fact is, every company should (and must) have this determination as their prime goal – the satisfied clients.

## 2. Analysing the consumers behaviour

According to the American Marketing Association, Consumers' Behavior is "a dynamical mutual action of all emotional and cognitive elements, surroundings and the behavior in which a certain person implements the trading aspect in his life" [1]. This particular definition is maybe the most clarifying definition that incorporates the key parameters in understanding the full concept of consumer behavior.

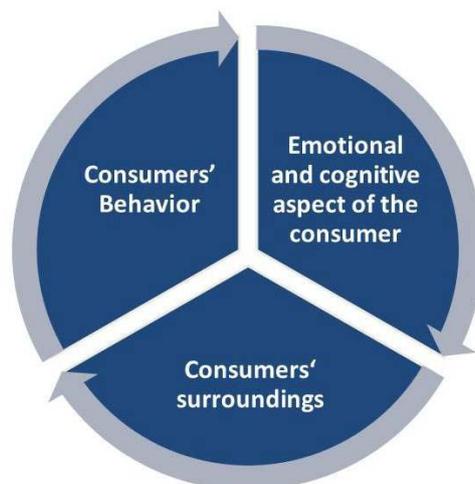
The behavior of the average consumers is always dynamic. It includes constant interaction between the businesses, their products, the marketing mix, consumers' needs and business current and future clients.

The fact is that consumer's behavior is "mutual action of all emotional and cognitive elements". In an open reaction, consumers often use the system of emotions and cognitions, which are mutually mixed in order to bring them into a conclusion of making a decision of taking or not taking an adequate action of the decision-making process.

"The surroundings and the person behavior" are the two key factors that can stimulate/dissimulate certain desired or undesired behavior or action in the decision-making process.

"The trading aspect" is a process that formulates certain individual actions which that particular individual is willing to trade for some other good or service.

According to this, the elements of the necessity of cognition and analyzing process can be put into 3 basic elements of consumers' behavior [2] and their strong connections, which can be a subject of broader scope of view by the decision-makers in the entrepreneur marketing segment.



**Picture 1:** The three elements of consumers' behavior analyses

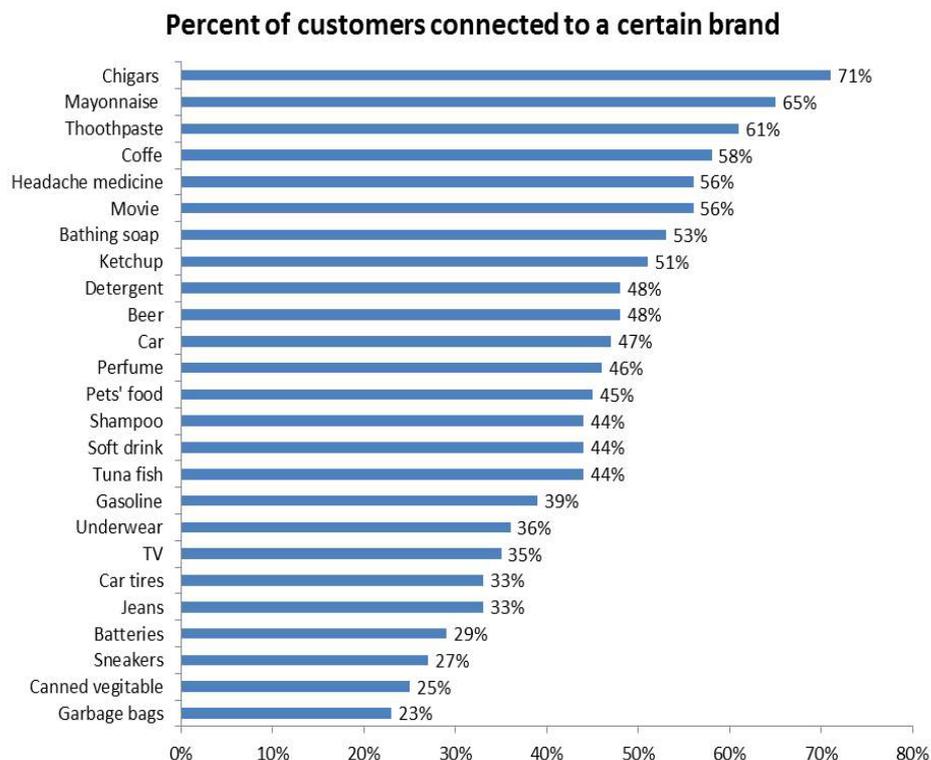
## 2.1 Consumers' behavior

Consumers' behavior is a process which recognizes reviews and analyses the actions of the individuals, through defining their physical procedures in buying or procuring the goods and services that they need. But, this way of behavior doesn't include, or specifically excludes the mental activity of the individual. This particular type of behavior is especially important for the entrepreneurs, because only this kind of behavior can result in actual buying the goods and services that one company can offer on the market. Although the behavior itself cannot be perceived as safe-sustained process, which in fact can be also said in the context of consumers' surroundings and the emotional and cognitive effects, it represents the first and very significant element in successfully understanding the basic causes and motives of the specific actions undertaken by the specific consumers. The physical behavior of the consumers can be observed from several stand-points:

### 2.1.1. The Consumer-product Connection

The Consumer-product Connection is a pretty underestimated subject of matter considering the big companies. They spend significant sum of money each year on understanding these values. On the other hand, entrepreneurs can relatively easy evaluate and estimate this type of connection relaying just on the fact that they are actually and physically closer to their clients and are in direct communication with them, which gives them the unique opportunity of gaining fast feedback and a chance to make competitive advantage. Every salesperson should know, understand and use the cognitive and emotional aspects of the consumer-product relation [3]. Successful entrepreneurs which are familiar with these opportunities, use this advantage like the consumer-product connection with bikes, cars, clothes lovers and people who enjoy new technologies, books, extreme sports... They should always have in minded the fact that consumer on the one hand, and salesman or manufacturer on the other, have often different or sometimes totally opposite views on the product characteristics, whether they may be technical or emotional.

This Consumer-product Connection may also refer to brand-loyalty. Many research projects which deal with the brand-loyalty confirm that these types of connections between the clients and the company trade-marks are pretty strong. That's why it's very hard to pursue certain clients to give-up a certain brand. The next picture gives a clear view of the existence of strong connections of the consumers with some types of brands [4].



**Picture 2:** Consumers connection with certain brands

Personal relevance among people has also significant role in consumer-product connection. If salespersons can effectively understand this connection, it can become useful marketing segmentation tool having in mind the personal relevance of the consumer [5].

### **2.1.2. Decision Making**

Making a decision on buying or no-buying a product/service from consumers' point of view is treated as solving a certain problem. If we elaborate the needs and goals of the buyer in relation with his/her desired values, we'll get a system of values-decisions whose primary objective is to satisfy some of that needs and goals. Although it seems rather complicated, these issue of problem solving which the average consumer is facing, actually includes simultaneously delivering a set of decisions, and then solving a few smaller problems. These kind of real processes of solving given issues consist of multiple continuous interaction between cognitive processes of the customer, his/hers behavior and the aspects of social and physical surroundings [6]. The problem-solving model consists of the following components: 1) recognizing the problem; 2) searching of alternative/s; 3) evaluating the alternative/s; 4) buying/no-buying decision [7].

### **2.1.3. Time as a decision –making factor**

The “time” factor has a significant impact on decision making issues, and with that, it has a significant impact of the whole process of making decisions. Time as such, affects:

- consumers' intentions; and
- consumers' behaviors

Consumers' intentions are those desired actions which are characterized with buying goods and services. According to the marketing criteria, the time spent from the moment of exposure on the marketing tools of the companies and perception of those messages, until the time spent in buying the product/service, can significantly change the original intentions of the consumers. For example, one survey shows that around 60% of the people which have intended to buy a car have actually bought a car during a one year period [8]. In broader sense, the time itself is that key factor that lowers the precise forecasts on buying actions in relevance to consumers' intentions to the concrete actions. Unexpected events on the other hand, can change consumers' intentions in a relative short amount of time. One electrical appliances manufacturer once asked his customers which were entering his shop which brand they intend to buy. From those who have responded, only 20% had actually bought that same brand [8]. Obviously, the events or the situation that occurred inside the shop had successfully changed the intentions and behavior of the consumers.

### **2.1.4. The Internet – useful shopping decision-making tool**

Lately, the Internet becomes more dominant media not just in the field of unlimited source of information, but also in the field of specialized data-base browsing, which gives customers relevant info on products, services and the companies any given time. The power of the Internet is excellent chance for entrepreneurs of better and easier understanding of their customers, as well as directly introducing their products, services and business operations, and even getting a fast feedback directly from their clients. Although the e-commerce sector is rapidly increasing, still, most of the customers refuse buying all kinds of stuff on the Internet. The comfort of “shopping” in comparison with, it seems – still difficult and complicated ways of “on-line shopping” and replacement of senses, smells, the touch, sounds and stimulations of all senses in good-old shops, cannot be easily replaced with the advanced technology of the Internet shopping. Still, relevant info-browsing, as well as testimonials and recommendations of other clients about using certain goods or services cannot be totally ignored [9].

## **2.2 Emotional and Cognitive aspect of the consumer**

As especially important part of the consumers' behavior analyses, both emotional and cognitive processes are presenting powerful tool in entrepreneurs marketing chain. Although, knowing the emotions and thinking processes often seek a continuous and deep analysis, which sometimes even

exceeds the frames of the business management or the company itself, it's very important that every good manager recognizes his clients' behavioral elements.

The emotional and cognitive aspects can be easily interpreted as feelings and thoughts. As opposite as it seem, the human brain functions in that way that, they cannot be studied separately because of their compatibility. The system of human feelings and thoughts is one unit, it has mutual interaction, and it compliments on many different levels. Both emotional and cognitive parts are products of the emotional and cognitive systems, and even separate, they are very connected in influencing each other [10]. Individually, every person has a unique interweavement of those two systems.

The emotional system is consisted of four main types of emotional reactions: 1) emotions; 2) concrete feelings; 3) moods; 4) values [11]. Any type of reaction may cause positive or negative reactions among consumers. It is important to mention that, the emotional system behaves reactive and impulsive. Reactive because it cannot plan, forecast or make decisions on meeting targets on its own, and impulsive because it reacts automatically on surroundings or on different concepts, like colors for example. Also, the emotional system is difficult to control. It's an impulse reaction, although the attitude reflecting on that specific reaction can be easily controlled. From physical standpoint, emotional reactions are easily noticed and you can physically feel them on your body.

The cognitive aspect on the other hand is an evolutionary process which performs highly sophisticated mental processes of understanding, evaluating, planning, making decisions and thinking [12]. This cognitive aspect has particular functions of interpreting, creating and understanding the personal experiences of the consumer. As its secondary objective, cognitive aspect can identify individual goals, ways of fulfilling them, and setting alternative ways of reaching them.

In today's world, the experts opinion on which of those two aspects – the emotional or the cognitive is more dominant are also divided. Some of the experts claim that the emotional part is more dominant simply because it is based on instinctive reactions. Others claim that the cognitive part should be more dominant because of man's highly refined characteristics of the evolutionary and rational process of thinking. Anyway, from marketing point of view, the most common approach is the one that recognizes both systems as one mixed system that, apart from other relevant occurrences shouldn't be overlooked in the role of consumer behavior analyzes, and at least should be positively used.

The attitude is also called "the necessary concept in modern American social psychology" [13]. Today there are more than 100 possible definitions of attitude, but the most accepted and, as it seems, the simplest is the one of Fishbaine and Turston that says: "the attitude is the level of feelings that a certain person has towards a certain object" [14]. The attitude actually is emotional valuation created by the cognitive system. In general, it presents a positive or a negative reaction to a certain product, trade mark, idea or a concept, through witch an individual defines its standpoints on certain issue. The personal view of the authors of this text is that the attitude refers more to the process or the benefit of the usage of some form or idea from the consumer side, then to the object or the intention that it's referred to. In short terms, if the subject is a product or concept of smaller significance to someone, then the attitude to that product or concept will be insignificant and vice-versa. In practice, even neutrality is an attitude, although in marketing it is considered that neutrality can't produce strong reaction from customers – at least not the one that is expected. But surely, attitudes can be changed. Many government agencies and public enterprises often use the tactics of changing the attitudes of the general population on subjects like: ecology, smoking diseases, consuming alcohol etc.

## **2.2 Consumers' surroundings**

Today, when every customer is bombarded with all kinds of marketing strategies on every possible step, entrepreneurs should carefully choose their adequate marketing approach. The modern characteristics of the surroundings cover all physical and social aspects of the consumers' outer-world, including physical objects, spaces, relations and social behavior of other individuals [15]. Micro-surroundings which consist of the direct things surrounding a person are in the focus of attention by many entrepreneurs. This includes the design of the store, retail saloons, the staff and their looks, social interactions, the lighting, the colors, rooms, sounds even the climate conditions and everything else that can impact consumers' behavior in that particular moments while they're buying or purchasing.

As integrated part of the consumers' behavior are *the culture and sub-culture*. We understand the culture as "meanings which are shared from most of representatives of one social group" [16]. Often the culture is analyzed by entrepreneurs on a macro-level, as cumulative values of one social group of people. That is generally wrong. Modern entrepreneurs must consider the sub-cultured values of minor groups, and referent groups as primary marketing values, even the so-called behavioristic

groups as: students or bikers. Multiculturalism is also an interesting part of studying the societies with multi-leveled cultural influences.

On a basic marketing level, besides the direct surroundings and cultural specifics along with the referent groups and their characteristics, *the products* themselves and their *prices* are playing the role of key factors on direct customers' surroundings. If we agree that the products are the main media of the consumers' actions, then each business strategy should be focused on planning the products [17]. Customers' satisfaction from buying the product or the brand, in marketing sense is the target concept. Therefore, the conclusion is that the main goal of the entrepreneurs' and every other kind of marketing is to increase the probability and frequency of customers that are coming in contact with the product and by doing so, to increase the desired action of actually buying the product. This includes the stimulations of the products and their attributes like: packaging, colors of the packaging, size, brand recognition etc. that also influences on consumers behavior.

*The price* as a factor, not by the relevance of pricing strategy from entrepreneurs' side of view but rather as part of the marketing mix of a product and as part of the consumers' direct surroundings remains relatively abstract concept, which can but not necessarily have, some heavy impact on consumers actions. From the consumers' perspective, the price is usually defined as something that must be traded in order to have possession on some product or service [18]. Not discussing the details of the classical value of money in these sorts of trades, and the perception of other non-financial factors, entrepreneurs must use the so-called "customers' value" which often does not correspondent with the actual price of the product/service. Here are some examples of that: every individual doesn't see the money as strict value. The money that is received as a gift, interest or lottery income in the sub-conches doesn't have the same value as the earned one. The same example can also be applied to the credit cards. Second example: the additional time, or the additional mental or physical effort that should be made while buying or purchasing a product/service sometimes is a motive plus, when deciding of buying certain good with higher price. Therefore, the price is mainly divided in three consumers' perceptions [19]:

- Comparison with the individual reference price – the individual referent price is the price that the consumers think that's fair and are ready to pay for;
- Encouraging consumers' interest – if the consumer is interested in buying the product, then the price has relatively lower influence on the decision of buying, of course, if the price itself is within the range of consumers' fair pricing;
- Controlling the alternatives – for large amount of products, consumers' must bring a decision between buying the product or cancel the purchasing. If they decide buying, the price is something that can be controlled by the consumer.

### 3. Conclusion

Entrepreneurs' marketing strategies today, more than ever, are being exposed to a fast, simple and efficient way of satisfying consumers' needs. For creation of successful marketing strategies among entrepreneurial companies, entrepreneurs must incorporate the concept of customers' satisfaction on continuous level. Reaching the targets, in that context, depends on the basis of collecting, analyzing and evaluating the consumers' behavior in every step of the way.

The core essence of consumers' behavior aims on explaining the thinking processes, influences and consumers actions when they come in direct contact, or when they are subject of a marketing campaign, whose main goal is to activate the consumers' interest and finally result in selling the product or service. Therefore, creating entrepreneurial marketing strategies based on the consumers' behavior presents a starting point of every business.

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# Entrepreneurship, LLL (3L) and labor market in Montenegro

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**Focus of this work "Entrepreneurship and labor market in Montenegro." Key issues of work are covered by the current employment situation and entrepreneurship in Montenegro.**

**Empirical researches show that expressed interest during hiring is worrying. If entering more deeply into this issue, one will find the problems and challenges facing the Montenegrin labor market.**

**Implementation of entrepreneurship is increasingly present in the world, and in our country. Nature of such a work is determined by management, which is undoubtedly needed to any business successfully managed. Entrepreneurial management reflects the situation of an organization in order to create change and exploit opportunities. Accordingly, organizations should strive for the Strategy of lifelong entrepreneurial learning, based on the three "L" (LLL).**

**When talking about the labor market in Montenegro, we should not leave out the regional development as the foundation for boosting employment and reducing regional disparities. Accordingly, it is necessary at all costs to attract green field investments in Montenegro, not so much for the money, as much for a change in the value systems of the environment in which to potentially invest.**

## **Keywords**

Labor market, regional development, lifelong learning entrepreneurial.

## **1. Introduction**

Human resources and human resources management in modern environment are important key factor for the success of every organization. In this sense, the concept of "human resources management" means a paradigm shift in content and method of organizing the personnel function in the modern enterprise.

Human resources management has become not only the most important business function, but also a specific philosophy and approach to management (Management) that people considered the most important potential and a key strategic and competitive advantage. This philosophy is focused on some elements of organizational performance in which people have a central place.

## **2. Employee engagement: Issues and Challenges**

Studies have shown a positive correlation between increased engagement and higher performance (operating result), which is reflected in the factors of employee satisfaction and customer loyalty, improved efficiency and productivity, greater profits and higher incomes, lower fluctuation, less absenteeism (absence from work) and presentism (due to the presence of the risk of loss of employment), a small number of accidents at work, better quality of work performed.

On the other hand, data on non-engagement of employees are quite disturbing since the index of non-engaged employees is very high compared to other countries. Despite the general belief, dissatisfaction with salary and rewards is not the main reason for non-engagement of employees. For most of the more important to how they evaluate the top leaders - whether they treat it as the greatest wealth the company or they are considered a necessary evil. Maintain and increase the level of engagement of employees depends primarily on how well management and leadership, meets their needs and expectations.

Engaged employees want an appropriate balance between work and lifestyle, flexible work, excellent leadership that shows respect and trust, they want to participate in decision-making, to work with top managers in the industry (clients, suppliers) and with people who inspire them. Want to work on important projects, seek opportunities for managing others, seeking recognition of ideas, open communication, supportive work environment, international opportunities, positive feedback and individual development sponsored by the employer, flexible financial benefits, opportunities for advancement and the like. If the company wants to improve engagement and business results, it is essential that the concept of employee satisfaction (also a customer satisfaction or customer) is directly and effectively linked with the overall performance management and relationship management factors with customers, since that time, and executives to gain interest in the implementation of various programs encouraging satisfaction and commitment of employees. Connection between employee satisfaction and performance, or a combination of higher employee satisfaction and high performance can be subsumed under the term of engagement of employees. It is, in fact, the environment and individuals who are willing to engage in order to achieve maximum notable and measurable business results (with assumption necessary confidence in the management of employees, associates and the entire organization). The main objective of today's organizations is clear: how to better manage human resources in order to maximize those involved, or at least reduce the number of so-called non-engaged contributors? The solution lies in encouraging the innovative abilities of employees in the different treatment of employees.

### **3. From entrepreneurial to management company**

What we can say with certainty is that the entrepreneur is the manager. An entrepreneur is someone who manages the entrepreneurial way. They are often operated by entrepreneurial work / business, or a new organization in an effort to revive an existing business. The entrepreneurial business is the management challenge. The nature of entrepreneurial business management determines that it needed to work successfully managed. Therefore we can say that entrepreneurial management is characterized by three items, namely:

- Changes
- Chance and
- Management of the overall organization.

#### **3.1 Change**

Entrepreneurs are managers of change. They connect people, money, ideas and resources to establish new organizations and to not change existing ones. Entrepreneurs are not so important because the results of its activities, but because of the changes they bring.

Unlike the entrepreneurs, managers in order to maintain the existing situation in the existing organization, and protection of its market position. Managers do not lead to change.

#### **3.2 Chance**

Entrepreneurs are constantly looking for the possibility of performing a particular job in a different and better way. They innovate business to create new value. Entrepreneurs are more interested in acceptance than likely to save resources.

This does not mean that entrepreneurs are not interested in the resources. On the contrary, they are aware of the fact that available resources are limited. Entrepreneurs can use their own resources, but

if you use return on investment will be under the control of the same. But entrepreneurs viewed resources as something that must be spent to create value, not to be kept as such. Entrepreneurs resources exposing risk, but the maximum use to achieve recovery. This distinguishes them from the foundation of business managers, because managers are saving more rare resources, than they used to accept the offered opportunities.

### **3.3 Overall management of the organization**

Entrepreneurial management approach implies taking into account the entire organization, not just its specific parts. This does not mean that some functions, such as marketing, finance, operations management, and the like. irrelevant. However, entrepreneurs look at this function as segments that have a role in the overall business, not as isolated activities.

### **3.4 Entrepreneurial managers as businessmen**

An entrepreneur is a manager who is ready for business: to create change and accept the odds, rather than maintaining the status quo and preserve resources. Of course, the contractor performs all these tasks at the right time. In certain circumstances it is necessary to maintain the status quo, and sometimes not wise to waste resources. One of the skills of successful entrepreneurs knows when to not take risks. However, at the right time, the entrepreneurial manager is ready to go on. There is no strictly defined the difference between entrepreneurs and other types of managers, which does not diminish the specificity of the entrepreneur, nor the importance of their work. Since entrepreneurship is a style of management, it is something that can be taught. Managers can be selected to be entrepreneurs. Very clear definition of entrepreneurship gave Czarniawska-Joerges and Wolff (1991), who are into theatrical language, but to emphasize the economic difference between management and entrepreneurship leadership:

"Management is the activity of introducing order by coordinating flows of things and people toward collective action."

"Leadership is a symbolic performance that expresses hope for the control of destiny."  
"Entrepreneurship is the creation of whole new worlds."

In conclusion, it can be argued that entrepreneurial management is characterized by its scope the entire organization, its goal is to create change and exploit opportunities to focus.

## **4. Regional Development**

Regional development strategy should define the objectives and instruments for the construction of the overall development potential, contribute to reducing inequalities in regional development and enhance the potential of those parts of the country which are lagging behind in the direction of the greater competitiveness.

The relevant objectives of the Regional Development Strategy are:

- Customization and development needs for better links between the local and regional level with development priorities at the state level;
- Adjusting the need to develop local and regional level with the available national and EU funds intended for development;
- Providing support to less developed regions / municipalities that is focused on identifying, enhancing and most of their development potential, through the elimination of the causes that prevent their development.

Regional Development Strategy of Montenegro should be based on three of foundation:

1. Determination of the level of development - classification and typology of the area;
2. Definition of development policies used to encourage regional development and
3. Strategy development institutions.

Moreover, there are significant differences in the degree of development of three regions: Southern, Middle (Central) and the North, as well as the income gap within the region. In this division using the geographic approach, while at the same term used by the European Union, the region includes the so-called. economic region, or division of territory into regions by development under certain socio-economic indicators.

The fundamental objectives of regional development strategy can be summarized as:

1. Sustainable development;
2. The growth of regional competitiveness;
3. Reduction of regional unevenness and poverty;
4. Stop the negative demographic trends;
5. Continuation of the decentralization process.

#### **4.1 Development strategies of the institutional framework for regional development**

Large differences in the level of regional development in Montenegro, among others, are due to lack of necessary institutional framework for balanced regional development, which would allow flexibility in the formulation of goals, mechanisms and instruments of regional policy.

Montenegro still has no law on regional development, and has not built any institutional network. Therefore, this important issue as soon as possible should be treated. Legislation to regulate the field of regional development of Montenegro should be regulated by the following questions:

1. The basic principles of regional development;
2. Definition and application of basic strategic planning documents of regional development, both at national and at other levels;
3. Institutional framework and mechanisms for managing regional development;
4. The new model of categorization of all local and regional authorities towards real development indicators;
5. The basis for the operational application development tools provided for the Strategy;
6. Sources of financing the implementation of regional development policies and
7. Lay the foundation for the development of methodology for monitoring and evaluating regional development policies CG.

Montenegro as a small and very open economic system has the potential to be flexible in the global trends in foreign direct investment, and in that sense it primarily has to devote its attention to the overall economic environment. Actions to attract foreign investment, except for changes that go in the direction of liberalization of FDI regimes (protection of property tax relief law, labor law), requires the simultaneous promotion of positive change and educating the local population.

#### **4.2 What you need to let the local government was an attractive investment?**

Successful and attractive to investors, local government is characterized by good infrastructure, and that means having good roads, water supply and sewage system, electrification and gasification. In addition, it implies the existence of good business infrastructure, i.e. landscaped GUP, the DUP and location studies, simple administrative procedures, and attractive conditions which the municipality provides for new investors. We should not ignore the fact that the required trained and friendly human resources, employees of local public administration, and qualified local residents that the municipality can offer investors for employment. Successful local government must actively promote their capabilities and diversity of potential investors. Therefore, to a local government was interesting to investors must have all the prerequisites for it and work on active animating them.

Last but not least, the proposal of fiscal measures that involve different treatment of economic operators that invest in manufacturing and services in the undeveloped area whether it be at the level of the entire local government or one of its segments. In particular, special treatment in fiscal terms, investment in office buildings and equipment intended for production. Does this violate the principles of the market and whether this intervention. Probably yes! But such measures exist everywhere in the world I have no other treatment than the treatment of state aid. Simulate the market makes sense only

if the bit causing demand and consumption for some time, the balanced level and the specific, in spatial terms, a market segment.

In order to stop the negative trends it is necessary at all costs to provide foreign investors (green field) and not just because of money investing as much due to changes in the system of values and thinking environment in which it invests.

Thus, the introduction of entrepreneurial culture that encourages entry into new businesses, a break with the value system in which success is vital to be employed in local or national government, and the crown of success make a transfer in Podgorica. And therefore, Montenegro will be in the area of balanced regional development is minimal and efficient public administration at the state and local levels that will place the institutions to dispose of high-quality and adaptable instruments. And with similar attributes to be a strategy and a law on regional development which would be eliminated barriers to business in the North of...

## 5. Strategies for lifelong learning Entrepreneurial LLL

Building a knowledge society based on human capital, education, research and innovation (creativity) enhances the potential for growth and allows to be prepared for the challenge that bears further development. Developing and fostering a culture of lifelong learning, starting from an early age, a key condition for building a knowledge society and to gather and organize all the partners in the country - ranging from support of the Government and all interested partners at national level, to local communities, institutions and individuals directly involved in educational and training processes.

Everyday technological change, increasing competition and globalization, resulting need for constant development and improvement. Once acquired knowledge and skills are not and may not be sufficient for personal and professional development. Estimates are that each individual in the course of his professional life to change the occupation of five to ten times. The question is how to adjust educational - educational system that meets the needs of contemporary society? The answer to this challenge is to build core competences - multi-functional, portable packages of knowledge, skills and attitudes that are necessary for every individual to personal fulfillment and development, inclusion and employment.

Entrepreneurship is a key driver of innovation, competitiveness and growth and one of eight key competences. Entrepreneurial learning offers people the opportunity to develop and exercise their creativity in a variety of economic and social contexts. Of entrepreneurial-minded people come ideas for creating wealth, necessary for economic growth, and they can be implemented in practice. They also can contribute significantly to the development of first-class public services and creating a successful social services sector, which responds to the needs of society.

Strategies for lifelong entrepreneurial learning will help the development of human capital that will make a significant contribution in creating a competitive and dynamic economy capable of sustainable economic growth with more and better jobs and greater social cohesion in Montenegro. The purpose of this strategy is to specify a set of goals for Entrepreneurial Learning, which will cover its development in a number of sectors over the next five years. They will include the role of entrepreneurial learning in all institutions involved in the stimulation and promotion of entrepreneurial activities.

Target groups of this strategy are in the framework of the education sector and outside it. The strategy is aimed at those involved in education and training. Overall responsibility for entrepreneurship in the education sector in the ministries and related institutions at the national and local levels. Target groups outside the education sector are those that provide help for self-employment or starting their own businesses, and those who provide assistance to businesses that are developing. This strategy also should be of interest to large employers, aimed at their organizations encourage a culture in which employees at all levels, encouraging the entrepreneurial activity.

**The strategy of lifelong entrepreneurial learning** is created in cooperation working group, composed of representatives of all relevant partners at national level: Ministry of Health, Labor and Social Welfare, the Ministry of Education, the Directorate for Small and Medium Sized Enterprises, Employment Service, Department of Education, Center for Vocational Education, Union of Employers and the Centre for Development of NGOs. Prepared in accordance with the new National Strategy for Employment and Human Resources Development for the period 2007-2011 and document the discussion 'Human resource development - Montenegro 2017th The'.

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# The Influence of Culture on Entrepreneurship - Special Focus on Women Entrepreneurs

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Entrepreneurship as a business activity has effects on the economy, and indirectly on the society. In this way it contributes to the economic and social growth and development of all countries regardless of the level of their economic development.

Although the prevailing view is that the entrepreneurial business is reserved for the male world, in modern times, almost a third of the world's entrepreneurial activities belong to women. In Serbia, "female" Entrepreneurship has been present over the last few years. At present, "female" Entrepreneurship is not developed sufficiently, and Serbia has done a little about it. Still, women are not treated equally as men due to external environment, that is, economic, political, technical, technological and social factors and certain elements of culture (national and business culture of a society and personal characteristics of women).

The analysis of the impact of cultural environments of American and European regions, regions of the Far East, Middle East and North Africa, and cultural environment in Serbian displayed that certain elements of culture determine the position and role of women in entrepreneurship. These elements are social structure of the national cultural environment, social norms and customs, values and attitudes, religion, education, business culture of a society and personal characteristics of women. The position and role of women in entrepreneurship are under the great influence of social norms that are the results of the values of prevailing religions and ideologies of a society. The aforementioned has been proved in preliminary studies that researched "female" Entrepreneurship in Serbia compared to "feminine" entrepreneurship in other countries. The research indicates that cultural environment has a significant impact on entrepreneurial ideas and ventures by women, taking into account political, economic, technical and technological factors.

## Keywords

Business Culture, Culture, Entrepreneurship, Religion, Women in Business

## 1. Introduction

This paper will analyze the impact of culture on the position and role of women in entrepreneurship. It examines the cultural environment of the American region, European region, then the cultural environment of countries of the Far East, the Middle East and North Africa. Cultural environment of Serbia will be individually analyzed.

It is indicative that many countries with very heterogeneous religious structure (USA, Canada, Switzerland, Australia) have a high level of GDP per capita, while, on the other hand, countries that are also religiously heterogeneous (Nigeria, Kenya, Ghana) with very low social product. Countries like Norway, Ireland, Finland have a high level of prosperity and great confessional homogeneity,

while other states where there is only one practical, mostly state religion (Egypt, Senegal, Colombia) have very low levels of GDP. But at first glance it appears that the possible influence of culture on economic development and growth is very complex. Such analysis requires a broader analysis of economic and political environment that sets the framework for the development of entrepreneurship and the position and role of women in it. Justified, because entrepreneurship is a multidimensional phenomenon that can be viewed through different aspects of human behavior, but is still largely recognized as a modern economic categories.

## **2. Analysis of the impact of culture on women - entrepreneurs**

The result of analysis of the impact of cultural influences surrounding the American and European regions, regions of the Far East, Middle East and North Africa, and cultural environment Serbian indicate the certain elements of culture that determine the position and role of women in entrepreneurship. These are the social structure of the national cultural environment, social norms and customs, values and attitudes, religion, education, business culture and personal characteristics of society women. The position and role of women in entrepreneurship depends of the great influence the social norms that are the result of the values on which the predominant religions and ideologies of society.

### ***2.1 The influence of culture on women entrepreneurs in the U.S.***

Analysis of the impact of American cultural environment on women in business will be conducted through an analysis of U.S. cultural environment for women - entrepreneurs. Although the U.S. representative of the country with the highest proportion of female entrepreneurship, there is still room to increase that participation. Justified, because the developed sector of services (creating almost 80 percent of GDP) and manufacturing sectors that are attractive for entrepreneurial business (products, chemicals, electronics, food, consumer goods, wood production). [12]

The dominant religion in the U.S. are Protestant (52 percent) and Catholic (24 percent), and English language (over 80 per cent). We stress this fact because the cultural shaping of social and private and business life U.S. is under considerable influence of the values that cultivated Protestant and Catholic religions. [5]

In terms of differences in position between women and men, the American Society is far away from all developed countries. Although the 80-ies of XX century in American society prevailing "rule of men", from the '80s to accept "feminist" version that mothers need to develop their career as well as fathers, but we still have such a position difficult to apply in practice . It suffices to mention the fact that the previous hypothesis is confirmed, it is only 1/5 Jobs of men and women entirely balanced in the American economy, and that women are still paid less. Therefore, companies in the U.S., employ women because they think they will agree to work for less money.

To change attitudes in American society comes the following shows. According to new statistics, as soon as men start in a large number to deal with traditional women's interest, it becomes more appreciated and more is paid.

### ***2.2 The influence of culture on women entrepreneurs in the EU***

European business practices are more difficult to determine in relation to the U.S. and Japan. Europeans have a sense of reality and patience. Greatly appreciated tradition. European management style consists of: cynical realism, the belief that the individual is the center of social and business structure, social responsibility, doubts about the formal authority, the desire for certainty, the belief that maximum profit is not the main objective of the business. Those characteristics are common to a number of European countries, but among them there are significant differences that are due primarily historical heritage. Each country has developed a composition of values and customs that are partly different in other countries.

Women - entrepreneurs in Europe face the same difficulties as well as male entrepreneurs. The problem of finance for starting entrepreneurial business for European women is more difficult to readily. Women in Europe often lack the confidence and skills to successfully started and run a business. Business and family life, women tend to balance the European than American, especially women who are in high places.

- *Great Britain*: The ethnic structure of the population of Great Britain dominated the English (more than 80 percent). The dominant religion in Britain is a Christian - Anglicans, Catholics, Presbyterians, Methodists (70 percent). Combined effect of variations of Christianity is reflected in the position and role of women in society and business. Open possibilities of employment and self employment of women in the attractive sectors for entrepreneurial business, as evidenced by the fact that women in the UK, despite a number of adverse working conditions, are in high positions in business service industries.

Women in the UK are lower levels of education than men. The British believe that education is not crucial for advancement in business, or that substantial training on the job. This fact can have negative consequences in terms of motivation for people to raise the level of education and training as important conditions for the acquisition of knowledge that are required for starting entrepreneurial ventures. [4]

- *German*: The significant participation of the private sector and service sector in the German economy confirms the fact of the importance of SMEs and entrepreneurship in this country. It contributes to the investment that is substantially in the following forms: establishing a company in its own domain or with domestic and foreign partners, buying an existing company, gaining share in the company, establishing joint venture (Joint Venture), equipment companies and funds for workshops or giving money help and approval of loans. [www.ino.komora.net](http://www.ino.komora.net) developed entrepreneurial culture encourage the development of female entrepreneurship in Germany, which is still low.

Causes of adverse position of women in the German economy and society should be sought in the traditional understanding of women is rooted in the values of the Catholic faith which exists. In Germany the government view that women should be with the children in the kitchen in the church. Mica and Ana Women who do not accept such a box set of universally accepted values have not been well accepted in the region.

- *France*: The ethnic composition of France dominated the French Celtic and Roman origin, with minorities of German, Slavic, North African, Indo-China and the Basque origin. [12] The dominant religion is Catholicism. More than 80 percent of the population declare themselves as Catholics, but it is only traditional religion, because most of the population is not considered to Catholic traditions. It should be noted that Islam in the last fifty years would greatly expanded because of the French Muslim immigrants from former colonies in North Africa.

The service sector in France could be a source of employment, especially self-employment of women. Since the French government takes care of maintenance of relative social justice and equality, which cause the reduction of disparities in income of most citizens, we can say that the situation of women as socially vulnerable groups in France, favorable. But not yet reached the optimum gender equality in the labor market and society.

Although exceptional attention to education, level of education of women is lower than in men. In France, women are most prevalent in intellectual circles as writers and teachers. Also present in the field of cosmetics, advertising, fashion and art. Mica and Ana Unlike the intellectual world, in the business world is a small number of women that can be found at the top levels. Mostly work as secretaries or dealing with administrative tasks low. France strictly distinguish between work and private life. They believe that family life is solely a private matter, and in this context, the role of women in society and business.

- *Sweden*: Sweden is ethnically homogeneous, because the Swedes do 93 percent of the total population. The dominant religion is Roman Catholic - Protestant. High living standard is due to the large industrial discipline and culture. Privately owned enterprises make up about 90 percent of Sweden's industrial production, which means that entrepreneurial activity was determined in the manufacturing sector. [12]

In Sweden, most women are employed and have higher birth rates than women in other countries who are not employed. Sweden is a country with the smallest differences between the sexes.

Most of the population are Finns. Religious, most evangelicals - Lutherans (84.2 percent). Finland's social life is focused on home and family. [5]

- *Finland*: Finland has a highly industrialized country and in managerial positions in Finland, both can be found both sexes. Women are represented at all levels in the organizational structure of enterprises, including top management or top management ladder. It is interesting that the educational qualifications of women at a higher level of qualifications of men. Relations between the sexes are equal and all kinds of discrimination against women are unacceptable.

- *Norway*: Most people are Norwegians, Religious evangelists. Norway has a successful economy. Norwegian women are present everywhere in the company, occupy high positions in government agencies and other organizations. A number of women top executives is also present in marine and

rail transport and banking. It is expected that women be treated with respect in the business. Norway is a country on the second place after Sweden with the smallest differences between the sexes

### **2.3 The influence of culture on women entrepreneurs Far East**

Japanese society is "corporate" society with a high degree of vertical integration. Relationships within families, between families, and society are strictly hierarchical. As in China and Korea, a lasting impetus to political and social modernization of the high valuation of education, strong family connections and high work ethic. [5].

Citizens of Japan traditionally shown a willingness subordination of authoritarian leadership and increasingly accepted hierarchical status differences. Primarily in rural areas can be found deeply rooted commitment to the individual, who wishes his community assumes its own interests. The Japanese define their social position with loyalty to their social group that has similarities with *lojalnošu* within the family. Therefore, more distinct than in other countries, as opposed to political institutions, there are specific social norms.

The position of women in Japan was not at all favorable. A woman's place was in the house - a family with children. Male dominance in Japanese society is weak in recent years, especially among the younger generation. Although one of the relations that characterize Confucian culture relationship a husband, women require their husbands to stay home after work and dedication to family life. High standard of living has created many opportunities for travel, the women of Japan closer to the European lifestyle.

The essence of Japan's industrial power is reflected in the educational system, Encouraging the competitive spirit necessary to undertake ventures in business. Revitalization of SMEs is one of the main directions of development of the Japanese economy in the future, and a source of social restructuring and changes the position of women in business and entrepreneurship.

Chinese culture based on Confucianism. In Chinese and Korean traditional role of the family, her father's authority, his son's love and unconditional respect, much more pronounced in a Japanese tradition. In China it is difficult to do anything if you do not know the ancient customs that have a major impact on business and the corporate culture, and thus the position and role of women in the business world. Therefore, the "female" Entrepreneurship less developed in this country. However, in the Asian countries, China ranks first in the level of gender equality (after it was Japan, and the back area of South Korea).

What has particularly raised the Korean economy and business is a great willingness of small entrepreneurs to educate their children and so prepare to be successful managers, modern entrepreneurs and owners.

### **2.4 The influence of culture on women entrepreneurs, the Middle East and North Africa**

In the countries of the Middle East and North Africa, women make up half of 325 million people in some countries as much as 63 percent of students. The causes of unemployment among women in the Middle East and North Africa and the unequal position in politics, economy and society are, in addition to laws on labor market regulations that favor men, conservative social norms. Accordingly, women's place in the house with her husband and children. The World Bank has urged policy makers to work on securing the same rights for men and women in the Middle East and North Africa, and to pay attention to women education and reform of regulations in the labor market. [13]

Arab business and private world, then, is linked exclusively to men. The position and role of women in entrepreneurship in the Arab World is committed traditions, local customs and norms that are rooted in religion.

By "the will of God," men and women are the same. Both have the same duties in religion and they will be on the Day of the same measure was tried. According to the Prophet's will, the daughter should have the same opportunities for education and a son. However, the position of women in society makes it difficult motherhood. Islam emphasizes the important role that women play in raising their children, believing that the future of mankind and societies depends on the mothers. It is a society in which the institution of marriage plays an important role. Critics say that Islam teaches that women are less valuable, and the Muslims to defend themselves by saying that the inequality between men and women of the consequences of natural and cultural differences, rather than Islamic law. The key to the advancement of women in the Muslim world is their economic and social independence.

Education is another area where Muslim women are lagging behind. According to numerous polls, more than 75 million women in the Middle East and North Africa were illiterate. Women in the Muslim world moving at a different pace, especially in Saudi Arabia, the cradle of Islam, the flow of change is very slow, and women are not entitled to vote or to have a driver's license

### **3. Analysis of the impact of cultural factors on women - entrepreneurs in Serbia**

Research on women's entrepreneurship has shown that women decide to work independently at different ages, and the earliest start to those who come from families where there was a tradition of the basic patterns of entrepreneurial culture adopted through socialization. Women to start their own business usually decide when they have no other alternative, when they enter the discharge list in the transition period, and because of "middle age" in which they are located, have the opportunity to re-employment. Those who start a business and continue a successful business, usually have the full support of their families, mostly engaged in trade and crafts or business for which were prepared in previous careers. Family and friends are critical to strengthening the confidence of women.

One of the problems of women in entrepreneurship is the distance of the business environment where women appear as the owner, director or manager of a company. Therefore, they require much more effort than men in order to be respected in what they do. [7]

Entrepreneurs in Serbia are well educated, belong to different professional groups, with previous relevant work experience. Their social origin extends along the ladder of social stratification, fairly equally divided into married and divorced, usually with children. Have developed their own business within a typical female areas - retail and traditional services, with the tendency of penetration in the area of certain types of intellectual services. There are specific problems and constraints for entrepreneurial endeavors of women in unstable economic conditions and still quite patriarchal regulated environment. Perceptions of personal characteristics related to success in business quite realistically reflects the requirements and principles of market economy, but also sheds new light on the differences in the understanding of these characteristics between men and women. Comparisons with the owners of private businesses in transition countries and developed countries point to the similarities and differences in personal characteristics of entrepreneurs, the motivation and requirements for private businesses

### **4. Conclusions**

Entrepreneurship is seen as a new sector of modern economy, and entrepreneurs as creators of new jobs. Inclusion of women in entrepreneurial business is encouraged self-employment, which is especially important because the rate of women is greater than the rate for men.

Unequal position of men and women throughout history is interpreted as a consequence of biological differences between them. [7] In modern societies, regardless of their economic and cultural development is considered to be the woman 's place in the house, the family, with her husband and children. Even in countries like the Nordic countries which are perceived as a country with the highest level achieved gender equality status of women in society, business and entrepreneurial businesses still can not be assessed as satisfactory. The limiting factors to improve the position and role of women in these areas are in the area of cultural elements such as social norms, values and attitudes that are the result of traditions based on patriarchy and ideology based on the traditional understanding of the nature of men. In this regard, religion and ideology almost as determine the status of women in society, business and entrepreneurial business, where Buddhism, Shinto, Taoism and Islam have a more limited action in relation to Christianity.

Under the influence of globalization of culture is changed life style of women in an economically and culturally less developed regions or regions where the traditional and conservative social norms determine the place of women in the house (the region of the Far East, Middle East and North Africa). Education level of women in the world is growing, which is a prerequisite for their advancement in society, business and entrepreneurship. Education is key to economic and social independence of women especially in the Middle East and North Africa.

In cultures that are characterized by traditional and conservative social norms can be seen a slight increase trend of employment and self employment of women in the service industry. In Japan, women require their husbands to stay home after work and dedication to family life and to have more opportunity for their business life.

Serbian women in entrepreneurial businesses faced with fact that the business world is reserved for man. One of solutions in addition to increasing education and work is to institutionalize gender equality, however practice shows that have not yet created optimal conditions for the development of entrepreneurial businesses by women who would be characterized as satisfactory. This is favored by slow implementation of legislative norms, weak financial and credit support, slow process of breaking up the phenomenon of "glass ceiling", poor networking and women's and PhD. Often, the rule of rules and social norms is more important than democracy and the law.

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# Challenges of the audit system's innovation according to the development of the public accountability

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In a democratic state citizens expect that those currently in power should give a detailed account on spending and utilising the public funds trusted to them. The enforcement of accountability has several preconditions, out of which this study focuses on the characteristics arising from the accounting system, since accounting requirements significantly influence the audit system's room for manouvering.

At the same time the accounting system is one part of the public sector's information system. Studying the information system in a systemic manner is important because the quality of the audit system is influenced not only by public accountability, but also by the other elements of the information system. It must be emphasised that the information system must meet differentiated needs. The paper would like to show these requirements.

Public accountability systems show a quite colourful picture in international comparison. The thinking of countries is different about in which area and how can be used the cash-flow approach and accrual based accounting. In consequence of these factors these two methods appear in public accountability nearly in all countries.

The application of public accounting methods can be examined according to various criterions. On the one hand there are some differences which accounting method are being used vertically and horizontally at different levels in public administration by budgetary accounting and accounting system. On the other hand we can obtain for further interdependencies from the horizontally point of view if we compare to the applied techniques of the two areas of public accountability. Third part we make comparison between the public accounting methods on certain levels of public administration.

The target of this paper is to verify that the usage of accrual based accounting how influence the public accounting methods the functions of public accountability.

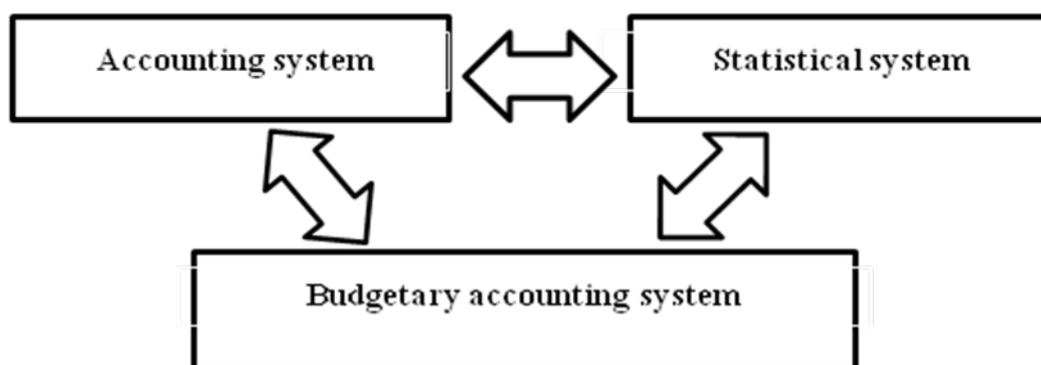
## Keywords:

Accrual based accounting, cash-based accounting, finance of local governments, information system, public accountability.

## 1. Introduction – the information system of public finances

The information system of the public sector plays a significant role in the solution of the above written. Studying the information system in a systemic manner is important because the quality of the audit system is influenced not only by public accountability, but also by the other two elements of the information system. This article presents the structure of the information system, and locates the accounting system within that.

**Table 1** Structure of the financial information system.



It must be emphasised that the information system must meet differentiated needs. The interested parties require different information on certain fields of the public finances, and look at the information system from different perspectives. Decision-makers typically want to know in which fields public funds have been used, but at the same time cost-efficiency is shifted to the background. In contrast with this, the operative implementers of tasks are driven by the aim to make the effectiveness of utilisation of public funds measurable. The society requires comprehensive information about the utilisation of public funds. In this respect the structure, understandability and information content of the report are of crucial importance.

The quality of the audit system cannot be separated from the system in which the audit activity forms only a portion. The information system of the public sector consists of three main parts: the budgetary accounting system, the statistical system and the accounting system. The systemic overview of the information system requires the presentation of the subsystems.

### **1.1 The budgetary accounting system**

The budgetary accounting system registers appropriations and the fulfilment thereof by matching them to voting units. [1] The goal of the control system (which appears in the "Final accounts" at the local governments) is to check whether the executive power utilises public funds and public assets in a transparent manner within the framework specified by law. Furthermore, it is responsible to restrict excessive influence by the executive power to ensure that political decision-makers retain their competence in relation to the utilisation of public funds and to prevent that a few elements of this power be returned to the scope of the government.

The basic element of the budgetary accounting system is the "voting unit", a group of tasks and budgetary frameworks that are approved by the National Assembly, and the fulfilment of which is mandatory upon authorization by the Budget Act. The basic principle is that the tasks must be implemented within the budgets specified by the National Assembly. Apart from this, the National Assembly has an exclusive right to modify the voting units, and the executive power has no say in this. When defining the voting units too broad or too narrow definitions should be avoided. In order to achieve the goals set in the budget it is necessary to create possible transfers between the voting units and the governmental functions. Practically this means that it is advisable to collect budget data according to supply functions, too, since the fact and extent of the achievement of the set social objectives can be determined on this basis. The main tool for the preparation of these data is the so called COFOG, which stands for the Classification of the Functions of Government in Britain. The Ministry of Finance is making efforts to introduce this method, but comprehensive application is still to come.

### **1.2 The statistical system**

The goal of statistical methodologies is to measure the financial transactions of public finances, and to process them in a unified structure. According to the statistical concepts, the basic feature of public finances is that the state supplies services to the society, and covers the costs of such tasks from taxes and other revenues, while it also redistributes income and assets.

Due to their significance, the SNA, the GFS and the ESA95 methodologies stand out of all the other statistical methodologies. The methodologies can be distinguished according to the following characteristics:

- temporal relationship between income and consumption – according to which either the cash flow or the accrual based approach is used,
- the conceptual interpretation of public finances,
- assumptions related to the income owners' behaviour – whether they are characterised by short or long-term thinking.

In the period of preparation for the EU budget supervision procedure Hungary was required to prepare its fiscal policy report in accordance with the ESA95 requirements within the Pre-Accession Economic Programme, already from 2001. According to the 2002 amendment of the Public Finance Act, the ESA95 rules need to be taken into account in the annual budget acts. The GFS type data of the budget had to be supplemented, corrected and re-classified so that the public finance deficit and debt data could be determined according to the ESA95 methodology.

### **1.3 The accounting system**

The accounting system must reliably and accurately reflect changes (growth and reduction) in public funds and public assets. The accounting system of the public sector must be in line with the fact that the primary goal of the public sector is the provision of a public task, the profit motive is generally not typical, a significant portion of resources for most institutions come from subsidies, and the effectiveness of financial management cannot be assessed simply on the basis of changes in assets in the given period. It is more difficult to establish relationship between the input and output units, and last but not least differences in the principal's and the consumer's entities also reinforce the specific features.

The accounting system of the public sector must not only provide information on the sources and value of public funds, but must also be able to present the costs of the provision of public goods, as well as the costs spent on individual goods and services.

Tasks of the accounting system of the public sector [1]:

- recording data derived from the monitoring, measurement and evaluation of the events occurring in relation to the economic systems, and of the resulting situations,
- processing and comparison of the information in a closed system,
- mediation of the reproduction process in organisations that economically separate the sub-processes of production, distribution, replacement,
- satisfying the need for information of the interested parties,
- and enforcement of the interests of the affected parties.

From among the elements of the public accountancy system two areas deserve utmost attention, the book-keeping and the reporting systems. The characteristic features of these two subsystems determine to which extent the public accountancy system is able to fulfil the tasks specified above.

Public finance institutions keep modified performance approach records about events affecting their assets and financial situation of their activities in the system of double bookkeeping, and in fact they apply the principle of the cash flow based approach. Hence, the expense and cost categories cannot be differentiated in the accounting system, and the revenues and revenue appropriations are not differentiated either.

## **2. Characteristic features of the public accountancy system**

The biggest problem of the budgetary accounting system is the lack of definition of the voting units. In the budget approved by the National Assembly titles and appropriations play a crucial role. Under the term voting unit the budget typically means budget titles, which appear in different forms. In certain places the budget title means an institution, while in other places a task or a type of transaction. Yet, the system of titles changes from year to year, and the accounting system is unable to follow. For the time being there is no methodology that could ensure the comprehensiveness and accuracy of the performance data. On a "small scale" this holds for the budget of the local governments, too. Here it would also be necessary to define voting units and build the budget accordingly. The individual local governmental tasks could be interpreted as voting units, or in the case of larger local governments the breakdown of the individual tasks would also be possible. The situation that has emerged is further complicated by the fact that the chapters and titles change year after year, and that the National Assembly renounces a significant portion of its budgetary right and transfers it to the executive power

branch. Therefore the National Assembly makes only apparent decisions about the distribution and utilisation of public funds, the real decision making power is vested to the Government.

In the financial and statistical system of the government serious methodological, and information system development tasks must be completed so that EUROSTAT conform data could be supplied by the Ministry of Finance. [2] During the development of the statistical system it cannot be ignored that more and more countries tend to apply the ESA95 methodology, and in relation with that, a version of the accrual based approach.

It can be asked to which extent the current accounting technique complies with the needs of modern financial management. It can be stated that the cash-flow approach does not meet the requirements set against efficient financial management.

Arising from the basic principle of the cash flow approach, liabilities and claims do not appear explicitly in book-keeping, since they do not imply actual money movements. [3] Consequently, one of the most important accounting principles, the principle of entirety is not enforced. Although the institutions may decide to keep separate analytical records about their liabilities and claims, but this cannot be regarded as a good practice for two reasons. On the one hand, the utilisation of information from this source is not ensured, since as long as no actual money movement is made, claims and liabilities are factors outside the system, and on the other hand keeping any additional records imply costs. What is more, these costs accumulate as time goes by. However, in reality, claims and liabilities carry important information, since the actual financial situation can be determined only with the joint consideration thereof.

Book-keeping fails to show the economic content of depreciation, too. Although it is specified for the institutions what depreciation rate they can use for the different assets, however the real value of depreciation is a factor outside the accounting system. On the other hand, if depreciation is not shown at the real value in accounting, in reality there is a big discrepancy between the market and book values of the assets. Consequently, asset management also gets into a hopeless situation.

Arising from the cash-flow approach the institutions are not able to determine the actual costs of the tasks they supply, since only those economic events are recorded that imply immediate money movements. However, this technique causes problems during budgeting, too, because several events of the accounted transactions burden a year other than the budget year, and vica versa, several items are not included in the budget for the subject year despite the fact that they should form integral parts thereof. However, without knowing the entire costs no decision can be made about the optimum organisational framework of the completion of the given task, about its implementation in an entrepreneurial or another organisational form. Effective financial management is impossible without knowing the entire costs.

The cash-flow approach makes it possible to cover financial management problems experienced in the public sector, the bad economic situation can be presented as favourable. The objective assessment of the financial management of the public sector is further hindered by the deficiencies of the reporting system. Due to the inaccuracy and incompleteness of the basic data on financial management the reports prepared on the financial management of the institutions do not give a real picture about financial management. The balance sheet is unsuitable for laying the foundation for any asset related decision. The asset balance sheet contains a lot of misleading information. The principle of evaluation is not only intransparent and incomprehensible, but it is explicitly suitable for misleading the decision-makers. The supplied information can be evaluated according to the objectives, and can be taken both as favourable and unfavourable values.

Ratings related to misunderstandings could be further listed. Such misunderstandings can result from the fact that the valid legal regulation does not include the mandatory separation of the operational and the development budgets. As a result it often happens that development funds are channelled to the other budget to cover operational expenses. This makes the evaluation of the financial management of the processes more confusing, less transparent and inaccurate.

Measuring the effectiveness of financial management is almost impossible. The calculation of the economic indicators used in the business sector is hindered, and the yielded results must also be taken with reservations. This problem is encountered by, for instance, the economic partners of the local governments, who must assess the financial situation of the local government in order to reduce their risks, but this is not possible in the absence of relevant information. The financial evaluation of the public sector is an especially important and topical issue for Hungarian financial service suppliers, since the local governments are becoming increasingly indebted. The strategy formerly used by credit institutions, according to which it is worth lending to local governments, since in case of non-payment the state will support local governments in need of help, is beginning to change. Credit institutions are more prudent about lending to local governments, since it has become clear for them, too, that most of the Hungarian local governments have insufficient resources, and two thirds of the nearly 3,200 local

governments are unable to fulfil even their mandatory tasks, i.e. the overwhelming majority of the local governments lack adequate financial capacities to secure or repay loans.

For political decision-makers application of the cash-flow approach may seem advantageous, since it can be easily seen from the budget which institutions and in what amounts receive public funds, and after the closure of the subject year the reports reflect spending the given resources. In other words, the desired objectives may seem to have been achieved for the decision-makers.

The institution-centred cash flow financing technique does not allow for tracking the spending of public funds, and only shows the amounts spent by the individual institutions during the given year. Therefore, the actual performance of the institution performing the task cannot be measured, and on top of that, the adequate quality of task performance cannot be guaranteed either. However, political arguments for the cash-flow approach represent only half of the truth. In the short run, within a year, the above political interests can prevail, however, in the long run, over more than a year, not only the path of financial resources, but the cost-efficient utilisation thereof would matter equally for politicians committed to public affairs. In the case of limited resources efficient utilisation is a key question.

Information on revenues yielded and costs spent in a given budget year is provided by the final accounts in order to make the executive power and the assembly of the local governmental give account of the utilisation of public funds trusted to them, as well as of changes in the value of public assets. [4] However, for the time being the content of final accounts is not defined exactly, requirements exist only for the structure thereof. Presentation of the statements and balance sheets required to be attached to the final accounts represents a rather sizeable problem at the level of public finance institutions and local governments alike. The major elements of the established table system are defined; however the concrete content thereof is not clear. These deficiencies are highlighted by the audits conducted by the State Audit Office (SAO) every year. It would be extremely necessary to provide clear regulations for the table system, and tables showing non-relevant information should be deleted from this set of tables.

The accuracy of data contained in the final accounts can be questioned. This comes from the fact that on one hand almost all revenue items are presented without compliance with centrally regulated financial reporting rules, while on the other hand the basic financial reports contain only hardly over 50 percent of the expenditures. It poses a further problem that hardly more than 30 percent of the basic reports are subjected to financial audits. Another problem related to the reports is that they are prepared according to the institutional approach, i.e. data are specified at the level of the institutions. The other problem is that the accounting system includes the appropriations, too. Hence, the accounting records become even more detailed, which considerably hinders the interpretation of voting units. It can be noted that the local governments could calculate other data, too, from the mandatory registration and accounting systems, from which information relevant to them could also be generated.

The greatest problem of the current regulation is that cash flow based book-keeping and the related reporting practice do not serve the interests of public finance management, the pieces of information are often inaccurate, and therefore they too generate the possibility of squandering.

### **3. Expectations of the audit system towards public accountability**

For the time being public accountability cannot produce the appropriate information for the affected parties, including the audit system. To prove this statement we must first of all interpret the type of information required by the audit system, and then we must explore the causes due to which the public accountability system is unable to generate the required information. The inspection of all connection points between the audit and the public accountability systems would be beyond the scope of this study, wherefore in this article the subjects of analysis are SAO audits within the audit system, and the accounting systems of the local governments of settlements with the public accountability system.

Pursuant to the law in effect, the SAO is responsible for the audit of the financial management of the local governments, however the concrete content of this task is not specified. The SAO is free to decide on the method of task performance, as well as on the subject and method of such audits. Due to its limited capacity the SAO is unable to audit the financial management of all local governments each year. Therefore, the SAO focuses its so called comprehensive audits on the local governments of the capital, the counties, towns with county rank, and of the districts of Budapest, which have more significant assets at their disposal. Comprehensive audits affect around 300 local governments a year, and on top of that a few hundred other local governments can be audited within a given year using other audit types. [5] Consequently, in a given year the financial management of more than 2,000 of

the 3,200 local governments is not subjected to an external audit. Typically small local governments are left out of the audits. This requirement is a typical example of legal underregulation.

The information needed for SAO audits in the local governmental sector can basically be derived from the characteristic features of comprehensive audits. The main objective of comprehensive audits is to provide a systemic evaluation for a given period of whether the development and operation of the internal control systems in the public sector provide sufficient security for the adequate, lawful, cost-effective, efficient and/or effective completion of state and/or local governmental financial management tasks, for the protection of resources, and for ensuring reliable financial and non-financial information supply and reporting systems.

During comprehensive audits the internal management system becomes assessable through the evaluation of the control system. The most important areas of the analysis of the control systems are the following [6]:

- the budgeting and the final accounts preparation processes,
- the level of regulation of the financial and accounting activities of the mayor's office,
- whether or not the IT system used during financial and accounting tasks is regulated.

SAO audits must collect information on these areas. However, practical experience shows that the accounting system is not suitable for the generation of the required information.

#### **4. Conclusions - Why does the accounting system used by the local governments fail to meet the audit needs?**

The problem is caused by the inadequacy of the public accountancy system. Not only has Hungary got no public accountancy act, consistency among the elements of regulations is not ensured either. Under- and overregulation are present at the same time. The applied bookkeeping technique, i.e. the cash-flow approach is not able to meet the needs of the affected parties. The features arising from the cash-flow approach hinder the efficient performance of SAO audits, too.

Certain part of the generated information is unnecessary, these pieces of information can be used neither during the decision-making process, nor during the audits. The accounting principles are not fully enforced in the accounting and the registration systems, and consequently the public accountancy system cannot be expected to be efficient. Another feature of the system is that the data can be generated only at significant costs. Due to the cash-flow approach local governmental decision-makers cannot determine the exact actual costs of the individual tasks, without which rational financial management is inconceivable.

Transparency is also hampered by the fact that the local governments do not separate their operational and development budgets, although this can be regarded as a golden rule in public finances. In many cases separation is not effected due to the financial problems of the local governments, since in this manner the balance of the budget can be seemingly ensured. However, the risks that will appear in the budget later on may jeopardise task performance by the local governments. Even if separation is carried out formally, it often happens that the operational and the development budgets include "rows" that belong to the other budget type contentwise, and where operational and development expenditures are mixed. The basic principles of budgeting are not enforced during the compilation of the budget or the final accounts, wherefore accountability is almost impossible to maintain. Another problem is institution-centredness in financial management, which does not serve efficient task performance. Institution-level financial management itself hinders task-level financial management, and the definition of expenditures at task level.

The cash-flow approach and institution-level financial management do not allow for financial management on the basis of the cost-benefit principle, not even where it would directly be possible. Institution-centred financial management further aggravates the situation arising from the application of the cash-flow approach, since most of the available information can be interpreted at institutional level, and due to the cash-flow approach the reality content must also be taken with some reservations. The books of the institutions, similarly to those of the local governments, do not clearly show the actual expenditures, wherefore breakdown by tasks is not possible either, which would be of utmost importance. It causes further problems in the system that due to the established financial system the players are not interested in maintaining transparency. In most cases the financing local government obviously knows that the resources provided are not sufficient for the quality operation of the institution, but has no adequate funding ability.

The rules of local governmental reporting are not well thought after; the data tables required to be attached to the reports contain little information. Due to the basic principle of the accounting system

the reality content of the basic institutional reports can be questioned, what is more, the external, independent audit thereof is not ensured either. External audits cannot rely on internal audits either. The asset management of the local governments is not efficient, the asset balance sheet contains unreliable data, mostly due to the improper handling of depreciation. The accounting and the registration systems are unable to functionally classify book-keeping data, which would be the starting point for external audits. Changes in and non-compliance with the rules result in the fact that it is impossible to create multiannual data series, and audits are unable to do comparisons.

The situation is further complicated by the fact that public finance institutions can also establish economic organisations. These organisations have significant public funds at their disposal. According to some estimates, in the local governmental system such funds account for around 15–20 percent of local governmental expenditures [7], whereby they significantly influence economic processes. In fact, these organisations form a quasi-sector where the public sector (community policy aspects) and the private sector (market economy aspects) are present at the same time, and separation of the public area is ensured neither theoretically, nor empirically. The applied accounting logic is of utmost importance from this point of view, too, since the book-keeping and reporting obligations of institutions belonging to the quasi-sector are stipulated by the Accounting Act, while other public finance institutions are governed by Government Decree 249 of 2000. This means that in the system of double-entry book-keeping organisations belonging to the first group apply the rules pertaining to business organisations, while public finance organisations apply the cash flow based approach. Consequently, aggregation of the data is hindered, and not only the methodology is unavailable, but unfortunately, the desire for transparency is also often missing. Audits by the owners must evidently be reinforced.

Apart from the lack of information audits are also hindered by the lack of definition of audit tasks. As an example one can cite the budget proposal, the content of which is not specified in the Act on the SAO. The SAO gets into a difficult situation at the local governments, too, since the law appoints the SAO to audit the financial management of the local governments, however it is not clear whether other organisations may also perform checks, and if yes, with what content. The relationship between SAO audits and book-keeping at the local governments is an especially topical issue.

In today's Hungary public accountancy does not provide an appropriate registration and accounting basis for audits to follow the movements and utilisation of public funds in a comprehensive and continuous manner. Therefore, audits are primarily able to examine the validity and lawfulness of the utilisation of public funds.

The accounting system used in the public sector needs to be transformed. The most important step is that a shift must be made from cash flow to accrual based accounting. This improves the conditions for financial and SAO audits to have an adequate manoeuvring room, and to be able to assess the legality, economic rationality and efficiency of the utilisation of public funds.

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# The Impact of Economic Internationalization on Economic Growth

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The paper analyses the economic growth of ten new member states (NMS-10) of the European Union (EU) in relation to internationalization of economies. The degree of internationalization is measured by foreign direct investment (FDI) and international trade. The widespread opinion of research literature is that there is an existing association between internationalization of economies through international trade and FDI on one hand and economic growth on the other.

Our research focus is on NMS-10 before and after their accession to the EU. We expect that EU economic integration has contributed essentially to the increase of trade and FDI flows. We investigate both the impact of inward FDI and outward FDI on host country's economic growth. In addition, we test the association between international trade and economic growth. The research uses panel datasets for the NMS-10 during the period 2000-2008. We employ panel data regression analyses using fixed effects model. We find that trade and investment liberalization have provided an important incentive for exports and FDI flows in NMS-10 countries, which have had a positive impact on their economic growth. The findings would be useful for possible scenarios and thus for predicting the change in trade and FDI flows for the candidate countries as future members of EU with implications, which are expected by accession in EU.

## Keywords

Economic growth, Europe, foreign direct investment, foreign trade.

## 1. Introduction

Globalization is the word, which has several different meanings. However globalization is first and mainly thought of as an economic globalization, which means a high level of internationalization of the world economy at different levels of regions and countries. The level of their economic globalization is most suitably expressed as a level of internationalization of their economies. The magnitude and intensity of globalization can be measured by several indicators, such as capital movements and foreign direct investment (FDI) flows, international trade flows, the economic activity of multinational firms and the internationalization of technology. [1]

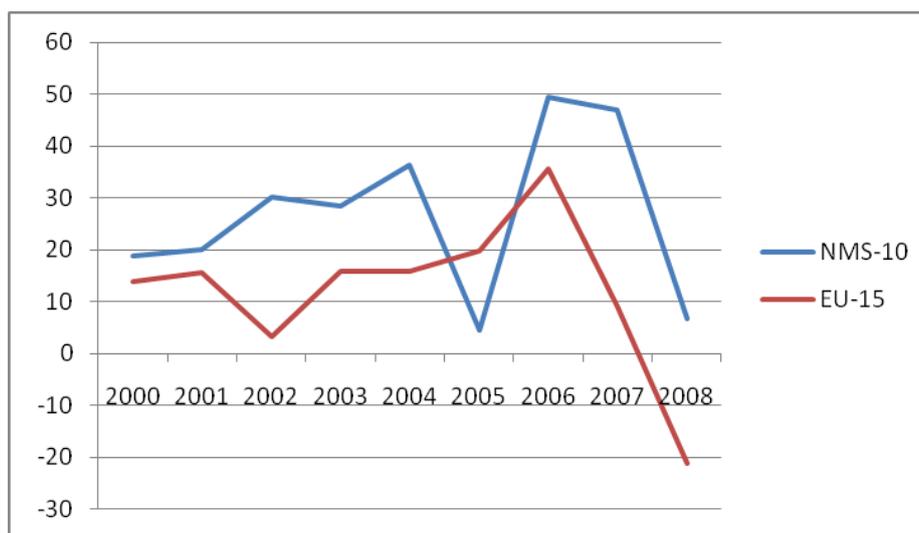
FDI can be defined as an internationalization strategy in which the firm establishes a physical presence abroad through acquisition of productive assets. [2] Similarly Organisation for Economic Co-operation and Development (OECD) [3] defines FDI as an objective of establishing a lasting interest by a resident enterprise in one economy (direct investor) in an enterprise (direct investment enterprise) that is resident in an economy other than that of the direct investor.

FDI is considered a key component of national development strategies for developed and developing countries. Although FDI inflow is expected to have a positive correlation with economic growth, empirical evidence gives mixed results, and the role of FDI as a driver of economic growth is not a unanimously supported fact in economic literature. Typically some new studies give support to a positive contribution of FDI inflows on economic growth. [4] OECD points out the positive influence of FDI on total factor productivity raise and increase in resource efficiency. The FDI is also considered as a major catalyst to development especially in developing countries, emerging economies and

countries in transition. FDI is expected to trigger technology spill-overs, assist human capital formation, contribute to international trade integration, help to create a competitive business environment and enhance firms' development. [5] Summing up the previous theoretical literature, it argues that the FDI has an impact on economic growth in two basic ways. Firstly it affects capital accumulation and secondly it stimulates technology diffusion. In relation to domestic investments, the presence of FDI can crowd in domestic upstream and/or downstream investments, but can also overtake or displace domestic investments and thus crowd them out. [6]

Possible influences of FDI on economic growth are biased to the host economy's characteristics hence transition economies are expected to experience similar effects. The transition-induced liberalization of international trade attracted large capital inflows, including FDI, to transition economies, although FDI inflows to the Central and Eastern European (CEE) transition economies in the 1990's started as relatively low. [7] The conditions in transition countries enabled potential gains from the FDI in the presence of adequate human capital.[8] The association between transition process and FDI is endogenous, since the transition process enables the basis for effective FDI, whilst the FDI accelerates the transition process. [9]

In addition to the transition process, trade liberalization and investment risk diminution in form of global and regional European integration also played an important role in creating an environment that enables countries to benefit from FDI. Several researches established a positive correlation between EU accession and FDI inflows to acceding countries. [10], [11], [12], [13] Strong FDI inflows, following the EU accession, largely contributed to the new EU members economic performance. [14] The announcements about EU accession prospects or accession negotiation positively affected the attraction of FDI to candidate countries. On the other hand, FDI inflows can largely contribute to the fulfilment of the economic conditions for EU accession. [9] As seen from Figure 1, the growth rate of inward FDI of ten new member states (NMS-10) was constantly surpassing the rate of the EU-15 countries until the downfall, experienced in the year 2005, which could be the consequence of the adverse impact of EU accession on FDI, as suggested by Iwasaki and Suganuma. [13]



**Figure 1** Growth rate of inward FDI (in percentages)  
(Source: UNCTAD, 2010 [15])

The importance of establishing the direction of the impact of FDI on economic growth lies in the fact that it represents a base for policy decisions of countries, which will consecutively either encourage or restrict FDI. Most of authors, which are strong supporters of the positive effects of FDI on economic growth in transition process, highly recommend transition countries to take every possible measure to enhance the investment climate. At the same time attention is given to the fact, that FDI incentives should promote activities that create a potential for spill-over effects, linkages between foreign and local firms, education, training, and research and development (R&D). [16], [17] Especially authors, focusing on the non-EU emerging market economies, point out the importance of higher FDI inflows for the progress in transition process. [9]

Previous and ongoing research on the impact of FDI on economic growth in NMS-10 is primarily affected by the relative small number of countries, which experience advanced FDI inflows in the transition process and during adjustment to the EU integration. There have been also considerable

differentials between NMS-10 in the initial starting point conditions and different pace in reform progress. The main limitation for empirical analysis is the availability of data for longer observation period. Considering these facts and limitations, the empirical analysis of this research consists of the NMS-10 that joined EU in its largest single expansion on 1st May 2004, observed during the period 2000-2008, which enables the comparison of periods before and after the EU accession in the limits of available data.

## 2. Literature Review

The impacts and channels of FDI on economic growth have been investigated by several studies. There has been a shift in literature from a highly negative connotation of the impact of FDI on economic growth during the 1960's and 1970's towards more positive connotation during the 1980's and 1990's.

The neo-classical economists include technological progress into the production function as a production factor, [18] although their models handle technological progress as exogenous and focus on the capital accumulation as the main active factor of economic growth. FDI therefore contributes to the capital accumulation and subsequently affects the economic growth in the short-run, while the long-run impact is constrained due to hypothesis of diminishing returns.

On the other hand, endogenous growth theory developed a model, which handles economic growth as a result of endogenous factors. [19], [20] Latter model also includes knowledge and technology, which enable increase in rates of economic growth on a long-run. In endogenous growth models, FDI has a role of a diffuser, which facilitates the transfer of knowledge and technology as drivers of economic growth. They identified two-channels for the impact of FDI on economic growth: transfer of tangible and intangible assets. [21] The transfer of technological and business know-how through FDI helps to bridge the "ideal gap" between nations and can have spill-over effects on entire national economy. [22] The impact of FDI on economic growth has been tested by several empirical studies. They are largely based on either neo-classical or endogenous growth theoretical approaches. Microeconomic studies provide mixed results on the association between FDI and economic growth. Typically they find that the association can be attributed to certain specific factors and therefore cannot be generalized. On the other hand, macroeconomic studies mostly suggest a positive impact of FDI on economic growth, especially if some additional requirements about absorptive capacities are met. Among additional important factors are technology diffusion and stock of human capital available in the host country, which enables the exploitation of the spill-over effects of FDI. [23], [24] There are also mixed findings about the effect of FDI on domestic investment.

The positive impact of FDI on economic growth can also be explained through adequate level of development of financial markets conditions in the host country that allow the exploitation of FDI spill-over effects. [25], [26], [27], [28] Some other studies promote the importance of absorptive capacities with market structures and human capital. [29], [30], [31] In addition, economic freedom in the host country can be an important determinant for a positive impact of FDI on economic growth. [32]

There might be some statistical weaknesses of previous research and consequently their results on the association between FDI and economic growth. [33] Similarly some studies that have been conducted for transition economies also did not find evidence of causality effects between FDI and economic growth, [34], [35], [36] while some other studies confirm findings on the importance of absorptive capacities for the interaction between trade and FDI to be decisive for the impact on economic growth. [8], [23], [7]

To sum up, most of the studies on the impact of FDI on economic growth are of microeconomic nature, dealing with the benefits of firms from FDI, or locally limited on certain regions, whilst studies, focused on a specific group of countries in a certain period are rare. Some studies on transition economies exist, but they focus either on strictly Eastern-European and Balkan countries or they miscellaneously study Eastern-European with other Eastern, former Soviet Union countries. This research therefore contributes to the empirical analysis of the NMS-10 for the studied period.

## 3. Methodology and Data

The research uses balanced panel data for the NMS-10 for the period 2000-2008. The data used was acquired from UNCTAD (UNCTADstat) [15] and World Bank (World Development Indicators database) [37]. Table 1 presents basic summary statistics of variables that are used in the empirical analysis,

which values vary from negative minimum to largely positive maximum values, the exception being the variable for investment (I) to gross domestic product (GDP) ratio (I/Y).

Panel data was chosen for the research, as it provides advantages over cross-sectional and time series data, enabling the observation of heterogeneous cross-section units in a specified time period, and thus providing more informative, variable and efficient data. With panel data it is possible to study the dynamics of adjustment as well as to construct and test complicated behavioural models.

The data was analyzed using a fixed effects regression model, which summarizes theoretically grounded important determinants of economic growth. The model was adopted from the literature, [7], [4] and adjusted in accordance with the subject and period of study, as well as the availability of data. The model can in its simplest form be written as:

$$Y_{it} = \alpha_i + \beta' X_{it} + \varepsilon_{it}$$

where  $Y_{it}$  is the annual growth rate of real GDP,  $\alpha_i$  is the fixed effect of country-specific factors, that do not change in time, is a vector of independent variables and  $\varepsilon_{it}$  is a random error, which is individually and equally distributed in time and units (with a mean 0 and variance  $\sigma_\varepsilon^2$ ). The main characteristic of panel data regression model is a double index on its variables, which denotes the cross-section component  $i$  and time component  $t$ . Vector of independent variables consists of the growth rate of employment  $L_{it}$ , computed as the first log difference of annual aggregate

employment, investment to GDP ratio ( $\frac{I_{it}}{Y_{it}}$ ), computed as gross capital formation as a percentage of GDP, the growth rate of inward  $[(IFDI)_{it}]$  and outward  $[(OFDI)_{it}]$  FDI, both calculated as the first log difference of FDI stock, acquired in US Dollars at current prices and current exchange rates in millions and converted into constant prices using GDP deflator, the trade openness ( $OPEN_{it}$ ), computed as the sum of aggregate exports and imports to GDP, and the gross domestic expenditure in R&D  $[(GERD)_{it}]$ , computed as the R&D percentage of GDP. The final equation to be empirically estimated can consequently be written as:

$$Y_{it} = \alpha_i + \beta_1 (L_{it}) + \beta_2 \left(\frac{I_{it}}{Y_{it}}\right) + \beta_3 [(IFDI)_{it}] + \beta_4 [(OFDI)_{it}] + \beta_5 OPEN_{it} + \beta_6 GERD_{it} + \varepsilon_{it}$$

The decision for using fixed effects model mainly follows from the previous literature, especially due to the fact that the NMS-10 are at the similar level of economic development and are experiencing similar initial conditions, which are not in the primer interest of the research, and are therefore traded for country-specific factors. Furthermore, fixed effects model is chosen as a way of eliminating omitted variable bias. [4], [7] Finally, the decision for the use of the fixed effects model is supported by the results of the Hausman test, which pointed out statistically significant differences between random and fixed model and therefore justified the use of the latter.

**Table 1** Summary statistics

	Mean	Std. Dev.	Min.	Max.
DGDP	0,047256	0,028409	-0,046904	0,115409
DL	0,010333	0,029617	-0,088586	0,095068
I/Y	-1,380075	0,214141	-1,947613	-0,906538
DIFDI	0,177668	0,163597	-0,247898	0,630471
DOFDI	0,286596	0,426807	-2,379783	1,950894
OPEN	0,215444	0,271197	-0,548583	0,666586
GERD	-0,345387	0,481064	-1,413697	0,500775

## 4. Econometric Results

Regression results are presented in Table 2, which includes coefficient estimates and p-values. The results indicate a statistically significant positive effect of employment rate, investments to GDP ratio and inward FDI stock growth on GDP growth, with especially high value of the coefficient of employment rate. The coefficient of FDI growth with the acceptable level of significance indicates, that

one percentage point increase in the growth of inward FDI causes approximately 0,04 percentage point growth of GDP. The indicated effect of trade openness on GDP growth is statistically insignificant regardless to the exclusion of FDI component from the regression model. The fact that the coefficient of gross domestic expenditure in R&D indicates a statistically significant negative effect, can with the respect of previous research be attributed to the fact, that the NMC-10 have already reached a threshold level of human capital stock. [4]

In addition to the regression analysis using fixed effects model, we also run regressions using ordinary least square method, random effects model, AR(1) disturbances, cluster and robust estimation procedures, which have shown similar results. Even with the use of heteroscedasticity and autocorrelation robust estimators, growth of inward FDI still expresses a statistically significant positive effect on GDP growth. Correlation analysis was also performed showing a mild correlation between gross domestic expenditure in R&D and investments to GDP ratio, which can be attributed to the fact that both variables are computed as a part of GDP. Regression model also passed the Jarque-Bera normality test at 5% significance level.

Results of empirical analysis partially confirm the results of previously cited researches, with the respect differences due to sampling and observation period.

**Table 2** Regression results

<b>Fixed effects model</b>	
DL	0,235** (0,016)
I/Y	0,072*** (0,007)
DIFDI	0,039** (0,017)
DOFDI	-0,007 (0,272)
OPEN	0,032 (0,305)
GERD	-0,051*** (0,002)

Note: Coefficients marked with \*\*(\*) are statistically significant.

## 5. Conclusions

The paper analyses the economic growth of NMS-10 countries in relation to internationalization of their economies. The degree of internationalization of economies is measured by inward and outward FDI and international trade. The paper also analyzes the effect of investment risk diminution, caused by adjunction to the EU regional integration.

The research model is based on an extended traditional growth theory and includes the growth rate of employment, investment to GDP ratio, growth rate of inward and outward FDI, trade openness, and gross domestic expenditure in R&D as determinants of economic growth, measured as annual growth rate of real GDP. Explanatory variables are summed in a fixed effect regression model, previously used in literature and adapted to the specific characteristics of NMS-10 and analyzed years.

The regression results indicate a statistically significant positive effect of inward FDI stock growth on GDP growth, with a statistically insignificant effect of trade openness, which persists regardless to the exclusion of FDI explanatory variable from the model. The negative effect of gross domestic expenditure in R&D on the GDP growth, which does not interfere with the effects of FDI and therefore rejects the findings of some previous studies, can be interpreted as a consequence of the fact that the NMS-10 already achieved a threshold level of human capital stock.

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# Linking Factual and Normative Cross-National Cultural Values with Entrepreneurship

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It has been assumed that certain cultural beliefs encourage entrepreneurial activity; however the results of many studies are mixed. This article investigates the links between cultural values and entrepreneurial activity in different countries, which are disputed in the current literature. Given the inconsistent results regarding the culture-entrepreneurship link, we argue that previous studies have ignored an important distinction of cultural values: the duality of normative values and factual practices. By introducing the double nature of values into the research on the link between culture and entrepreneurship, we aim to fill the existing gap and contribute to clarifying the link. The current study firstly differentiates between normative values and factual practices of culture, and tests hypothesis on the relationship between them and entrepreneurship in 20 countries represented in the Global Entrepreneurship Monitor (GEM) and Global Leadership and Organizational Behavior Effectiveness (GLOBE) databases. The current study demonstrates that introduction of these two different aspects of culture, may help resolve the inconsistency in previous results.

Our findings clearly demonstrate that normative values (should be items in the GLOBE study) exhibit significant relationships with each of the entrepreneurial variables that were explored: uncertainty avoidance, individualistic values, assertiveness, performance-orientation and future-orientation. In contrast, the factual attitudes (as is items of the GLOBE study) do not exhibit significant relationships with the entrepreneurial variables in the regression after controlling for GDP per capita and Gini. We found that normative culture is more important than factual culture for determining entrepreneurship, and the significant dimensions of normative culture are future-orientation, collectivism and assertiveness. Overall the findings may suggest that entrepreneurs tend to refer to future order rather to the current one.

## Keywords

Cultural orientations, entrepreneurship

## 1.Introduction and hypotheses

The potential for and frequency of entrepreneurship has been shown to be associated to some extent with the occurrence of certain culture specific variables [1]. Studies linking culture to entrepreneurship exist, but show no consistent pattern. Moreover, current knowledge is relatively eclectic and not gathered in a comprehensive, concise form [2]. Most of the studies that have been skewed towards cultural values and entrepreneurial behavior stemmed from Hofstede's research [3]. Particularly, previous studies that used Hofstede's dimensions of cultural differences failed to consistently demonstrate correlation between various cultural dimensions and measures of entrepreneurial activities [4],[5].

Given the inconsistent results regarding the culture-entrepreneurship link, we argue that previous studies have ignored an important distinction of cultural values: the duality of normative values and

factual practices. By introducing the double nature of values into the research on the link between culture and entrepreneurship, we aim to fill the existing gap and contribute to clarifying the link. The theoretical foundation for our distinction between factual and normative values of culture dates back to the seminal works of sociologists Talcott Parsons [6] and David Lockwood [7] who both suggested that every social situation consists of a normative order, an factual order, or some substratum of the former. Normative and factual values are part of the exterior constraining the social world. Parsons' sociological theory was concerned with the "should be" as this normative stance affects social and psychological processes, social structure, and the conditions of human motivation and actions [7].

This study aims to investigate the links between cultural values and forms of entrepreneurial activity in different countries. It uses two multinational databases, one of cultural variables, the Global Leadership and Organizational Behavior Effectiveness (GLOBE) database and the other relating to entrepreneurship, the Global Entrepreneurship Monitor (GEM).

Perceptions of factual practices vs. normative values are available in the GLOBE database for individualism/collectivism, future orientation, assertiveness, performance orientation and uncertainty avoidance. Our study examines whether each of these various cultural values, in both their factual and normative forms, correlates significantly to different patterns of entrepreneurial behavior. This study first distinguishes between factual practices and normative values, and then explores to what extent factual and normative aspects of culture interact with various manifestations of entrepreneurial activity across 20 countries.

Based on theoretical consideration, which we will describe below, we would expect factual practices ("as is") and normative values ("should be") to be associated with entrepreneurial behaviors. We claim that the reason past research did not find consistent results on the impact of national culture on entrepreneurship is due to a persistent focus on the factual elements of culture, rather than the normative aspects that influence intentions.

For Parsons [6], the social system as a system of action was made up of the interactions between individuals that are not random but rather mediated by common standards of evaluation. Most important among these are moral standards, which may be called norms. The regularity, or patterning, of interaction is made possible through the existence of norms that control the behavior of actors. According to Parsons, the dynamic processes with which the sociologist is concerned are those which function to maintain social structures, or, in other words, the processes by which individuals are motivated to act in conformity with normative standards.

In criticizing Parsons' book *The Structure of Social Action*, Lockwood emphasized the non-normative elements of social action that were ignored by Parsons, because he concentrated on the normative elements of social structure and process [7].

## 1.1 Hypotheses

Based on the literature reviewed our *general hypothesis* expects that

Hypothesis 1. Cultural values on both the factual and normative levels are expected to be related to entrepreneurial activities.

From this general hypothesis, we develop several specific hypotheses, looking at subsets of cultural values.

- Hypothesis 2a: Future-orientation (FO) values are expected to be related with entrepreneurial activities; e.g. individuals who express the value of planning for the future tend to be more entrepreneurial.
- Hypothesis 2b: Individualistic values are expected to be more related to entrepreneurial activities than collectivistic values.
- Hypothesis 2c: Assertiveness values are expected to be related to entrepreneurial activities.
- Hypothesis 2d: Performance-orientation (PO) values are expected to be related to entrepreneurial activities.
- Hypothesis 2e: Uncertainty avoidance (UA) societal values are expected to be negatively associated with entrepreneurial activities.

## 2. Method

To examine our hypotheses we used two major data sources: 1) the Global Leadership and Organizational Behavior Effectiveness (GLOBE) Survey, and 2) the Global Entrepreneurship Monitor

(GEM). The GLOBE research program is a long-term, multiphase, multi-method research program consisting of three phases of three related empirical studies that were conducted between 1994-1996 (House et al., 2004). The GLOBE study has nine cultural dimensions, each with separate versions for "as is" (or factual, practice) and "should be" (reflecting ideals, values, normative). The GLOBE sample included countries from North and South America, Asia, Europe, the Middle East, and the Pacific Rim. A total of 17,370 middle managers from 951 domestic organizations (excluding multinationals) in three industries completed the culture and leadership questionnaires.

The 2007 cycle of the GEM database that was used for this study collected data of respondents from 39 countries. Using population samples, the GEM project estimates the prevalence rates of nascent and new businesses in different countries. In each country, a standardized survey was administered to a representative sample of adults (18-64 years old) [8]. To test our hypotheses, we used data from 20 countries that were included in both the GLOBE and GEM surveys.

Using the two separate databases to examine our hypotheses enabled us to avoid the common method bias that frequently characterizes studies where the same respondents provide data both for the independent and the dependent variables. In contrast, our research design can strengthen the validity of the findings.

## **2.1 Variables**

### **2.1.1 Dependent Variables**

GEM identifies three different stages of the process of creating and sustaining a business. *Nascent* entrepreneurs are individuals who are in the process of trying to start a firm and have done something tangible towards this end during the 12 months preceding the interview. Individual in this category plan to become an active owner-manager of a start-up but have not paid salaries to anyone for more than three months. *New (or early-stage) entrepreneurs* are owner-managers of entrepreneurial start-ups, as defined above but have been in existence for more than three months but fewer than 42 months. *Established entrepreneurs* are owner-managers of entrepreneurial firms that have been in existence for at least 42 months. Finally, *Total Entrepreneurial Activity (TEA)* includes both nascent and new entrepreneurial activities. It indicates the percentage of the adult working-age population (18 to 64 years old) in a country who are classified as either nascent or new entrepreneurs, (including self-employment attempts), as defined above.

### **2.1.2 Independent variables**

The six cultural dimensions in GLOBE have their origins in the dimensions of culture identified by Hofstede [9]. The GLOBE measure of collectivism vs. individualism is derived from a factor analysis intended that resulted in two dimensions: Institutional Collectivism and In-group Collectivism reflects the degree to which people have pride and loyalty in their families and organizations [10]. Future-orientation was derived from [11] past, present and future-orientation dimension, which focuses on the temporal orientation of most people in the society and is similar to Hofstede's Long-Term Orientation [9], [12]. Assertiveness is a measure developed by GLOBE that is similar to Hofstede's Masculinity dimension. Performance-orientation was derived from McClelland's work on need for achievement [13], however the GLOBE measure was measured on a seven-point Likert scale. One score was calculated for each value/attitude variable and each GEM entrepreneurial variable for each of the 20 countries included in our sample.

### **2.1.3 Control variables**

*Gross domestic product per capita* (GDPPC). The relevance of the GDP per Capita to entrepreneurship was displayed by GEM examinations [14] and in particular to control for economic effects in studies of entrepreneurship and culture [15]. *Gini Index* (Distribution of family income): GEM data have shown that there are pervasive differences in entrepreneurial behavior in different global regions and countries according to the different income distribution.

### 3. Results

To test the hypotheses, we ran a series of OLS regressions of which the dependent variables were the 4 entrepreneurial activity variables (TEA, nascent, and young & established firms). We introduced the GLOBE scores in their factual form as independent variables in each of the 4 regressions. To avoid the multi-colinearity bias, we did not include the factual and the normative indices in the same regression. GDP per capita and Gini of the countries were added to each of the regressions as control variables.

The results of the four regressions show that none of the GLOBE scores in their factual form exhibits a significant relationship with the entrepreneurial activity variables after controlling for GDP per capita and Gini, thus refuting Hypothesis 1 regarding the factual variables. In contrast to the factual variables, normative values (“should be” items in the GLOBE study) exhibit significant relationships with each of the entrepreneurial variables with relatively high Adjusted R squares. (See Table 1).

Specifically, in the first regression with the Total Entrepreneurship Activity (TEA) as dependent variable, four values out of the six that were entered to the regression were significant, except performance-orientation and uncertainty avoidance. Together with the two control variables, the Adj Rsquare was 0.38. Of the four significant normative values future-orientation had the highest marginal impact on TEA and was the only normative value that had significant negative marginal impact on TEA.

In the second regression, using nascent entrepreneurship, four values out of the six were significant, (assertiveness and performance-orientation were significant at  $P < 0.1$ ). In this regression, institutional collectiveness had the strongest marginal impact, followed by future-orientation.

In the third regression that related to young firms only three out of six values were significant. (Group collectivism was significant at  $P < 0.1$ ) and future-orientation had the strongest marginal negative impact. Finally, in the fourth regression for established firms, only one out of the six normative values showed significant impact, group collectivism.

In all four regressions there was a consistency between the directions of each the coefficients. For example, all the future-orientation coefficients had a negative significant impact. The exception was institutional collectivism that had positive impact in three out of the four regressions. Its only negative impact was on regression for established firms.

The regression of the established firms was found to have only collectivism in group as significant independent variable. This finding may suggest that normative values are more related to early-stage entrepreneurial firms rather than to established firms. Furthermore, this finding corroborates our conceptual framework that values are related to entrepreneurs as change agents.

#### 3.1 Specific Hypotheses

Hypothesis 2a that expected future-orientation (FO) values to be related with entrepreneurial activities is refuted (see Table 1), meaning that future-orientated values are negatively related to entrepreneurial activities. Contrary to our expectation (2b) our results showed that the collectivistic rather than individualistic values were related to entrepreneurial activities. The expectation that assertiveness would be related to entrepreneurial activities, as expressed in 2c is clearly supported by our findings.

Hypothesis 2d that performance-orientation (PO) values will be related to entrepreneurial activities was not confirmed uniformly, other than marginally for nascent enterprises. Finally, 2e that predicted uncertainty avoidance (UA) values would be negatively associated with entrepreneurial activities was not confirmed.

**Table 1** Cultural variables and entrepreneurship (OLS regressions)

Dependent variables	TEA	Nascent	Young firm	Established firm
C	-40.81*	-41.78**	-3.62	8.53
FO (SB) Future Orientation	-7.32**	-3.77*	-4.10*	-2.86
CI (SB) Collectivism	3.47*	1.69	1.95+	4.31**

Dependent variables	TEA	Nascent	Young firm	Established firm
in-group				
CII (SB)	5.54*	4.66*	1.52	-1.68
Collectivism institutional				
AS (SB)	2.26*	1.26+	1.04*	0.40
Assertiveness				
PO (SB)	3.88	3.81+	0.50	0.17
Performance Orientation				
UA (SB)	2.5	3.1	2.3	2.1
Uncertainty Avoidance				
GDPPC	-9.16+	-3.69	-6.11+	1.68
GINI	0.31**	0.17*	0.16**	-0.02

\*P-value<0.01 \*\* P-value<0.05+-value<0.1

## 4. Conclusions

Our findings clearly demonstrate that normative values exhibit significant relationships with each of the entrepreneurial variables. In contrast, the factual attitudes do not exhibit significant relationships with the entrepreneurial variables. Overall, the findings suggest that entrepreneurs tend to refer to the future order rather to the current one.

Furthermore, out of the four significant normative values, future-orientation was found to have the highest marginal impact on total entrepreneurial activity (TEA) and was the only normative value that had significant negative marginal impact on TEA. This may suggest the presence of a paradox. On the one hand, our results show that normative values (“should be”) rather than factual attitudes (“as is”) are consistently correlated with the entrepreneurial activity variables. On the other hand, the negative coefficients of the future-orientation with all the entrepreneurial activity variables seem to contradict the former findings.

These contradictory results may be interpreted by the tendency of entrepreneurs to emphasize the “here and now” especially in their early entrepreneurial stages. The unpredictable and ever-changing environment in which entrepreneurs live, leads the actors to shorter-term strategies and improvisations. In contrast, future-orientation is the basis of formal organizational strategies that by definition involves the planned future action of a firm [16]. This interpretation may obtain support from another finding. While each of the three variables of early-stage entrepreneurship showed significant associations with the normative attitudes, future-orientation did not have a negative coefficient with older entrepreneurial activities.

Following formal theory-driven models of intentions such as Ajzen’s Theory of Planned Behavior [17], we can argue that entrepreneurs have salient attitudes and values that are not necessarily shared with the non-entrepreneurs. Entrepreneurs do not aspire to the factual order. They develop conceptions and intentions for the “should be” or normative order. Later on, as shown by Bygrave’s model [18] of the entrepreneurial process, precipitating events are part of the process, but the intentions are important dimensions in the entrepreneurial process.

We found that group and institutional collectivism were both positively associated with the entrepreneurial activity variables, refuting our hypothesis that individualistic values should be more related to entrepreneurial activities than with collectivistic values. These findings corroborate the *cushion effect*, described above. This concept, borrowed from the literature on finance, contends that a collectivist society provides the individual with a safety net, making the individual less risk-averse. This explains why collectivism values rather than individualistic ones were found to be positively and strongly related with entrepreneurial activities. These results suggest that the link between individualism and entrepreneurship that is commonly assumed in the United States (e.g [19]) is not necessarily universal.

As Thomas and Mueller [1] state, perhaps influenced by Weber and McClelland, the ideal profile of the entrepreneur continues to reflect the characteristics of Protestantism and achievement, was primarily developed and tested in US settings. As a consequence, the US culture of individualism and

achievement has dominated the world view of entrepreneurship. Our findings regarding the relationship between collectivism and entrepreneurship question this contention.

Our findings refuted the hypotheses that uncertainty avoidance values in a society would be negatively associated with entrepreneurial activities. Uncertainty avoidance was not significant in any of the regressions.

Performance-orientation and uncertainty avoidance were deemed important to entrepreneurial activities, in general, both in their factual and normative forms. It might be that the cultural characteristics of performance-orientation (PO) and uncertainty avoidance (UA) need to be perceived as culturally context-dependent variables. Previous research leaned heavily towards US-based contexts and samples reflecting a singular orientation, while our results represent a more heterogeneous sample of 20 countries.

Arenius and Minniti [20] found that perceptual variables had an impact on new business creation across all countries using GEM 2002 samples from 28 countries. They stated that perceptual variables are powerful predictors of the likelihood of being a nascent entrepreneur. Our findings corroborate their findings and refine them, because normative values, such as assertiveness were found to be associated with the early-stage entrepreneurship but not with the activities in established firms. Moreover, Arenius and Minniti [20] also showed that the introduction of country-specific effects, though significant, did not reduce the cross-country importance of perceptual variables. In this vein, we also found that the introduction of our control variables of the GDP per capita and GINI index to the regressions did not reduce the cross-country importance of the cultural variables. Together, these findings may suggest that normative, cultural values could be determinants of entrepreneurial activities or at least encourage them.

Finally, methodologically this study benefits from using independent data sources for cultural practices and values, and for entrepreneurial activities. The independence of the measurement of cultural practices and values from the measurement of entrepreneurial activities lends credibility to arguments regarding linkages between these two areas of cultural values and entrepreneurship.

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# Engagement of Management and Employees in Enhancement of the Quality

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**“Undoubtedly one of the most challenging aspects for every manager is the dedication to the quality. In this article we will provide a research presentation which emphasizes some of the factors that influence the development and improvement of quality in management of human assets. Our approach will be oriented on presenting the ideas and results from the research that we have done. The reason for determining the necessary resources of an enterprise is done to achieve the necessary quality of the enterprise. The analysis process is imperative for identifying the readiness and the need for the requests that we can have for the human resources so that the enterprise can be ready to achieve the desired goals”**

## **Keywords**

Quality, improvement of quality in management, human assets, analysis process

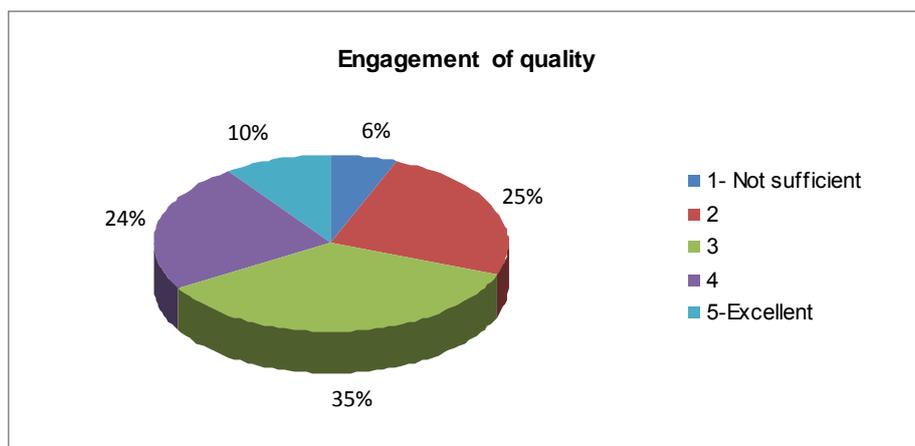
## **1. Preface**

Management of human resources is a process for securing that the appropriate people are working in a appropriate place and time. Management is about achieving the goals of the enterprise in an efficient and effective way through planning, leadership and control of the enterprise resources. Research of individuals and society that will be engaged during the process of production and economy is primary for a quality. Target groups in economy are clients where the purpose of the economy is to reach them. But, it cannot reach them if the production process doesn't function properly where the recombination of the different resources will be done towards achieving the final goal. Which individuals or which society is going to work with sources of limited natural resources? Here rise many problems and alternatives that the economy takes into account before it starts working with its business activity. In order to accomplish the objectives, enterprises or institution should secure not only material and monetary sources but also human sources, i.e. its personnel. Human sources have a vital importance for the success of the activity of every organization. Economy researches human sources because through that it achieves the increase of quality in all enterprises. Important economy ratings should be taken into account during the detailed and real analysis that we do in economy. We should choose the ways on how to attain the organization and planning of economic development. If we choose the wrong ways we will be stuck for a long time in the situation that we are now, i.e. with unorganized and non-functional economy.

## **2. Dedication to Quality**

The issue that is related to the concepts and principles of organization/institution is dedicated to its quality. Regarding this issue the relatively neutral image was presented in answers of the surveyed persons.

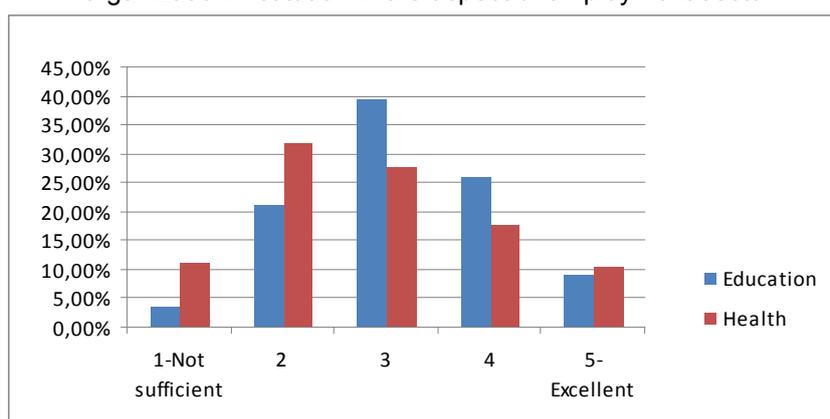
**Figure 1** Distribution of answers in engagement of the quality



Source: Survey of year 2009

In the aspect of the size of organization/institution, more positive answers are presented from the surveyed persons whose institution has 50 employees (80,0%) and 201-500 employees (70,0%). On the other hand, employed in institutions 51-100 employees and 101-200 employees only 28,4% and 26,0% respectively, have given the positive assessment of dedication to quality in their work environment. The highest negative assessment percentage for dedication to quality is presented to the employees in institutions with over 1.000 employed (56, 0%). This is followed by the category of surveyed persons employed in institutions with 501-1000 employees, where the percentage of negative answers was 63,7%. The small percentage of surveyed individuals that gave negative answers, are employed in institutions with 201-500 employed (2,0%) and the surveyed in whose institutions are less than 50 employed (10.0%). If we continue to compare the general answers with cyclic life of the institution where the surveyed persons are employed, we may notice some deviations. It is interesting to emphasize the high percentage (63,4%), of positive answers (modality 4 and 5) of the surveyed whose institution is 16-30 years and very low percentage (1.7%) of negative answers. The following results have been taken in proportion with employment sector:

**Figure 2** Distribution in percentage of answers for assessment of engagement of quality of organization/institution in the aspect of employment sector



Source: Survey of year 2009

From given results we can see that the highest percentage of negative opinions for engagement of the quality is in the answers of the surveyed persons employed in health institutions. If the answers of the surveyed from the education sector are intercrossed with type of institution in accordance with the level of education we will see that the surveyed persons employed in institution of high education have higher results for engagement of the quality comparing with the employees in secondary schools.

### 3. Influence of Changes in Quality

It is up to the managers to decide when and what changes and controls should be made. These kinds of decisions are completely normal and unavoidable part of the managerial responsibilities, since no event or strategic plan or review can foresee in general all the problems or events that may happen. The time will come when every organization must change its action directions, to review and modify the strategy in order to find the way for more efficient application and functioning of the enterprise as entirety.

The process for implementation of changes depends on the concrete situation. In crisis situation, the approach of typical leadership includes gathering of main information, identification and assessment of different possibilities and preparation of many prior actions which are relevant for existing situation. Strategic directors usually meet with their subordinates and other individuals from lower levels and make a long discussion trying to build a quick consensus amongst members regarding their responsibilities and the common way of implementation.

If the agreement is not achieved, then the manager's task is very difficult to impose responsibility and to ensure support for their realization. When the situation allows the managers to decide easier what changes to make, then they are dedicated completely in planning each individual action part. Process through which the managers pass when they decide for changes, is the same whether it is about active or reactive changes and in general consists of: collection of basic information, wider and more detailed consideration and understanding of the situation, development of possible options and their detailed elaboration, offering of suggestions for ways of implementing the actions, building management consensus and in the end by achieving the complete agreement for manner of implementation of planned strategy.

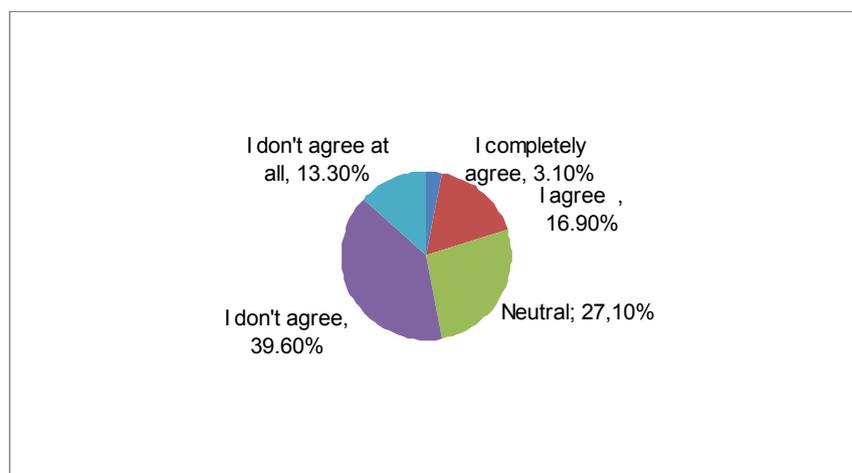
Time needed to decide on changes of vision, strategy, ability, ways of implementation and application may include few hours, days, weeks or months depending on how complex is the situation for decision making. The success usually depends from complete analysis of situation and right justification for business.

A good test on how efficient is implementation of changes is considered when the organization has a good strategy and is carried out in a right way. If these two conditions are fulfilled then there are high chances for excellent financial and strategic results as well as for effective application of changes.

### 4. Improvement of Quality

When asked if in the institution / organization the team work is being encouraged in the last three years, we have got the below shown results.

**Figure 4** General distribution in percentage of opinions regarding the collective work in institution / organization in the last three years



Source: Survey of the year 2009

Based on answers, team work was not developed entirely in public institutions. When we compare the general distribution of answers of those that were surveyed regarding the team work, with earlier

answers that were given about the encouragement of engagement with the clients and existence of responsibility in decision making processes, it looks like the employees attitudes about the basic objects based on which the general situation is established it is mainly in accordance. More precisely, constantly in their last attitude, they decide to choose a negative state of public institutions that do not fulfill reference points of excellence in the management of the organization and service offering.

## 5. Conclusion

In regards to the employment sector, answers of the surveyed that were employed in the health institutions were followed in the last three questions, meaning that the frequency of the answer with negative emphasis continues and they specifically express categorical disagreement (27.9%) regarding their chance of expressing ideas in their organization. From the gained answers about the stance that "Management values the ideas of the employees" we can conclude that, again, negative attitude of the employees regarding this statement is prevalent. This opinion is undoubtedly connected with the idea that the majority of the employees in the public sector are completely aware about the negative working conditions, but in fact, until now, reforms in this field were done to end the negative trends. Taking into consideration the possibility for expressing the ideas and their acceptance by the management is seen as negative, the surveyed are left in the attitude and statement that the atmosphere in the work where they accomplish their duties is unfavorable. Continually, more than half of the surveyed or 58.9% claim that the management doesn't value their ideas. Also a considerable number is undecided (28.9%), whereas positive answer gave only 12.9% of the surveyed.

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# Methods and tools for product innovation

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**Tools for innovation come in many different shapes and sizes. There are many useful tools such as mind-maps, collaboration software, modeling software, knowledge and idea management systems, etc. These all have a role in the innovation process but they are not innovation tools as they implement generic activities. Their usefulness is directly dependent on the methodologies employed, not on the tool itself. The tools of most interest to the innovator are those that directly enable, support and direct the right methods and practices for the innovation process. These are the tools that directly lead to the knowledge necessary for understanding the community, technology and solution domains from which value can be derived.**

## Keywords

*innovation, motivation*

## 1. Introduction

Globalization of competition and the evolution of financial markets have taken economic activities under a different framework than the one we knew as the establishment for the last decades.

Traditional methods of local development have left behind protectionism and artificial barriers to the world trade have been lifted long ago. The financial needs for global marketing, as well as mass production able to meet global demand, underlined the significance of the financial markets, transforming the production and distribution system into a credit system [1].

The incorporation of digital electronics with their accompanying software to all, products, distribution systems and production itself, under the umbrella of the financial markets, namely the “new economy”, gives the impression that things have drastically changed. From another point of view, there are no differences, since consumers are still seeking the maximum satisfaction from whatever they give their money for and remain producers themselves either as workers or as entrepreneurs, trying to maximize their revenue, in other words their source of money [2].

On the other hand, savings are the only source of capital that covers the expenses of enterprise creation and evolution, are driven to the most profitable destinations, taking into consideration the risk involved.

Widening the borders of capital movement, increasing the size of the enterprises and incorporating fast and secure communication, seem to make the economic activities more sophisticated and complicated. The intrinsic relations between the various factors remain the same, while the instability of the international financial markets gives enough ground to the reconsideration of development, seen as the local creation of wealth.

## 2. Nature of Innovation

Various definitions of innovation concentrate the attention on the various aspects of innovation or its use, so there is not a standard definition, which may have a universal application.

Common, in all definitions, is the aspect of something new, either a natural characteristic of a product, a production procedure, a sales network or technique, a new use of an established product or service, or even a new combination of product/service ensample?

The Webster dictionary indicates that innovation is:

*“The act of innovating; introduction of something new, in customs, rites, etc*

*A change effected by innovating; a change in customs; something new and contrary to established customs, manners, or rites”*

It is necessary to distinguish other similar terms, in the sense of their content and usual application.

Invention, seen as the original construction of something that did not exist before, is a part of innovation. Invention is the usual starting point of innovation [2].

Innovation is a marketable commodity, service or know-how. It can be examined as having separate or accumulative characters of:

- New products
- New production procedures
- New organization systems
- New methods of Selling
- New financial procedures

The purpose of innovation is profit creation by all parties involved, the result is the increment of local wealth, thus improvement of the living standards. Innovation has always been the driving force, the locomotive of progress, being the perpetual vehicle of both prosperity and civilization [1].

### **3. The need for Innovation**

Competition, on one hand and the chaotic infinity of human needs and desires on the other, describe the environment in which economic subjects operate and live.

Competition is congenital to human nature (to all living organisms, as theorized) which is a satisfactory explanation of the economic cycles, as well as the life cycle of a product or service. Every economic subject is trying to perform better than others and it is beyond the limits of the present to examine why (there is a vast collection of literature, from Freud to Argyris).

Enterprises, in their competitive framework, are trying to innovate their products, in order to gain the consumer's attention presenting an alternative way to get more satisfaction by consuming them, their services, trying to convince the users that theirs are better than other available, their production procedures, trying to diminish costs and increase quality and so be cheaper, better or both, their marketing methods, trying to better meet the consumer desires, their financial scheme, in order to exploit the credit system and their organization, for a better performance[2].

Thriving to perform better than competitors, enterprises are seeking as much innovation as it is not risky for their established products, markets and profits. This is usually represented as a reaction to change, common to all profitable operations. Changes are not necessarily innovative, while innovation means a change itself. Reaction to change includes all parties, entrepreneurs, financiers, workers and managers alike. Reaction to change is obviously also reaction to innovation, since any change means to take the risk of failure, everyone is trying to avoid it. In the same time, any change is a turbulence of the equilibrium of conflicting interests with unpredictable results.

The market forces, even under protectionism, are feeding ambitions and drive innovation to competition with the establishment. Business ideas are created continuously, either as an imitation of success cases or as innovations. Investors are trying to balance between the risk of innovation and the security of the establishment. The less an investment comprises risk the lower are the expected revenues. The more an investment is based on speculations about the market reaction, the higher are the expected revenues, while this speculation is not based on documented forecasts but just on a hypothesis which may or not be verified. Uncertainty is not attractive to common investors, so speculation, when it is successful, brings back as high profits as much as the risk of failure, because of the lack of competitors in the initial phase. When it proves to be successful, many imitators follow, but innovators still have an advantage, having already created an establishment.

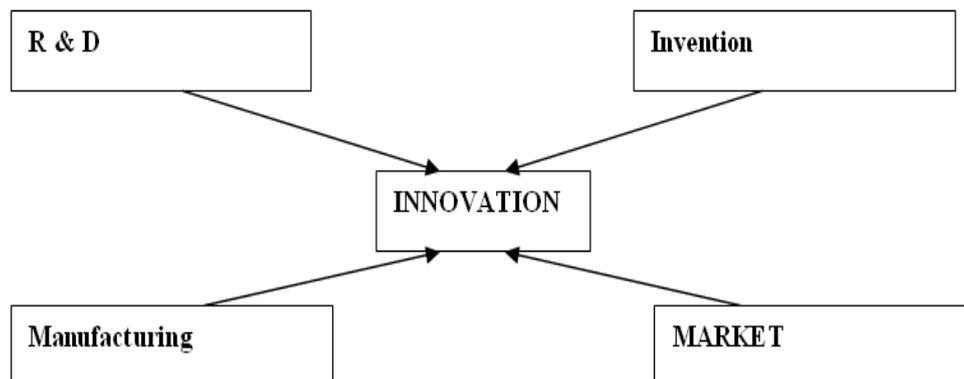
### **4. Innovation creation procedures**

- Established firms use several methods of innovation creation, such as:
- They also buy innovation, instead of creating it, wherever it is available, using methods such as:

Research and Development is concentrating attention of businesses, as well as the government, as the source of innovation, because innovation is widely connected to technology.

Inventions are certainly necessary to the innovation of products and production systems, yet innovation is closer to a new use of existing knowledge, than the application of newly created knowledge. It all starts from a business idea, in the sense of an expected number of economic units (consumers, enterprises or public authorities) ready to pay in order to get the new product or service, obtain it in a new way, with unusual terms of payment, in a faster delivery time or with most desired standard characteristics, otherwise called quality.

Employees, managers, engineers, external collaborators, researchers and academic personnel are all individuals coming across innovative ideas. In spite of their connection or bounds to the enterprise, research institute or education unit, they all have the primary will to exploit the innovation which their brain has created. Some of them obtain a patent in order to safeguard their intellectual property and then start to market their idea. Most of those market ideas are never applied, for reasons that exceed the purposes of the present.



## 5. Application of innovation procedures in innovation creation

Innovation is a product of human activity. It is brainpower and knowledge that permit its creation, while “dreaming” of it is the real generating procedure. Being a product it has a commercial value, its commercialization means risk to lose the invested time and effort together with the money needed to finance expenses of going into detail, write proposals, meet the potential investors (or receivers) or obtain a patent and risk taking means expecting profits[4].

A “bottoms-up” approach of innovation creation may start from the fact that innovation is a product, so producers are the offer side, while investors are the demand side. This is applicable in all cases, from company employees to public servants, from politicians to academic researchers, from students to company managers and from housewives to academic teachers.

Traditional methods of innovation creation and implementation may need a revision using the same procedures, which are being used for the creation of innovative products and / or innovative production and marketing methods. Innovation as a result of creativity is now the major concern of management. In the traditional authoritative approach, it is the manager’s ability to promote the innovation concept among the people working under his guidance. It is his responsibility to assess the innovative ideas and adopt or drop them. Creativity and innovative orientation is then a result of leadership, effective in some extend[4].

Innovative business ideas need their own marketplace, which cannot be simply invented. The market rules derive from bridging the conflicting interests of the offer and demand sides. The demand side is always in search of better offers, while the offer side is advertising, in order to convince the demand side to buy, highlighting the most convincing characteristics of their product or service. Both sides are trying to make a profit out of these transactions. Sellers are trying to establish long-term maximum margins, while buyers are trying to maximize their long-term margins with optimal provisions[4].

Although the marketplace operates under formal and ethical rules, agreements that satisfy both the giver and the receiver sides are eligible, whatever their content. Public authorities and non profit organizations, as well as enterprises, have to create a marketplace of innovation. The creation itself of this marketplace may be considered as an innovation. If it will be limited by bridging offer and demand, then innovation vanishes after its creation. Looking back at the innovation creation procedures of the

enterprises, it would be rather a continuous innovation creation if the same methods were used, instead of a static act, even if it is a breakthrough[4].

Innovation, when examined as a product, has consumed human effort and money, put at a risky venture with the hope of a corresponding profit. Procedures that bring to surface and thus make evident the potential opportunities for the prospective receivers the creativity results of the individuals need the participation of the interested parties, givers and receivers, in order to adapt to the ever-changing expectations.

Brainstorming is an example of such a way of usage of the methods of innovation creation, which may lead to innovative procedures. Research is another way of obtaining similar results. Steering committees are used by social organizations and local authorities as an instrument of determination of development strategy. They may be used as the organizers of brainstorming and research about the procedures of creating innovation in development actions.

Firms should be aware of the value of the procedures of innovation creation, without confusing technology and development with it, just because in many cases technology is needed in order to apply it.

## 6. Conclusions

It is imperative to create awareness about innovation to peripheral enterprises; otherwise economies will end up with complicated logistical problems, if enterprises flourished only in the central points of the Regions.

Globalization, knowledge based economy, electronic society and all other components of what is being called "new economy" are promoted in order to create wealth and subsequently prosperity to the citizens. These components have at least two aspects; technological and economic. Basic research is needed as the platform of future technology. Applied research is needed as the platform of the creation of new products and / or services, as well as new manufacturing and organization methods.

Peripheral economies should concentrate their efforts to innovation rather than invention, based on laboratory research executed in the appropriate Institutes. Enterprises and local authorities in these less developed areas, if they try to create technological breakthroughs are in a great disadvantage against central economic entities. Enterprises are after profits and local authorities are after prosperity and social welfare. Their interests are common as common is the way of reaching their goals; take innovative actions for innovation creation.

Higher education institutions have a crucial role to play. They have attracted and recruited most of the peripheral brainpower, which has been driven to basic research motivated by academic incentives. It is not surprising that the academia personnel is motivated by economic incentives, while academia itself creates bureaucratic obstacles. This happens because academia is uni-disciplinary and concentrated in the scientific aspect, which has to be controlled otherwise academia, the compass to the future risks to lose credibility, if control of its personnel actions is lost. Once the innovation content and process is clear, it becomes evident that it is multidisciplinary, with an equilibrium between scientific coherence, feasibility compromises, profit expectations, cost/benefit consideration, social impact and collaborative in terms of scientific fields, personal, scientific and institutional authority, authenticity and superiority.

Involved parties will be rewarded according to their degree of acceptance of the contribution of all the others.

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# The Impact of Tourism Innovation on Visitor Expenditure – A Case Study from Eastern Finland

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Tourism has gained an increasing amount of attention as a development tool, especially in rural areas where the conditions for success are relatively weaker for many other economic activities. Previous studies indicate that tourism can bring significant or at least fair amounts of outside expenditure to the local economy, thus revitalizing the local economic structure. Similarly, innovations are considered to be a crucial factor affecting the growth of regions. However, the research on tourism innovation has been relatively scarce up until the very recent years and the local economic impacts of innovation in tourism studies remain largely unexplored. This study aims to make a contribution to the field of tourism innovation and their impacts. The case addresses the innovative ICT application (a mobile game) in the Museum of Pielinen in Lieksa, one of the more peripheral towns in Eastern Finland. According to a pilot survey conducted in the summer of 2010 it, however, seems that the impact of the mobile game on the local economy is not as substantial as desired, because it is not well-known enough to draw in large numbers of tourists. Therefore it would be of utmost importance to develop the marketing of the innovative service due to the potential it can offer to meet the needs of tourists. However, the location itself in the Museum of Pielinen, has had a more positive effect than was expected on the tourist expenditure in Lieksa.

## Keywords

Attraction, Innovation, Nordic Model of Tourism, Tourism, Tourism Expenditure

## 1. Introduction

The aim of this study is to examine the local economic impacts of an innovation in the field of tourism by using the expenditure method of the Nordic Model of tourism (NMT), a commonly used methodology in the Nordic countries. With the NMT the expenditure of tourists in the local economy can be estimated. The case study location is the innovative ICT application (a mobile game) in the Museum of Pielinen in Lieksa, one of the more peripheral towns of Eastern Finland. Mobile games are not new to the world, but the case in hand matches the description of an innovation as a market-based application of a new product. The town itself is suffering from outmigration and unemployment. Thus for Lieksa, as well as for many other rural and peripheral areas, where the possibilities of employment with another means are limited, tourism represents one of the few remaining economic options that has realistic growth prospects. The main research questions of this study are:

- Does the Museum of Pielinen have a significant impact on the local economy of Lieksa?
- Does the mobile game work as a significant tourist attraction?
- Does it have an impact on the tourism income of Lieksa?

## **2. Conceptual Framework**

### **2.1 Tourism and Rural Development**

Although, the notion has also received some criticism [1], tourism is commonly considered to be one of the fastest growing sectors in the world, mainly due to increased leisure time and standards of living for more people [2-3]. Thus, as the economic impacts of tourism are growing steadily and as the role of traditional livelihoods has decreased, tourism has been increasingly viewed as a tool for local development, especially in peripheral and rural areas [4-6]. At the local scale tourism is used to diversify the economic base of communities through the creation of positive income- and employment impacts. However, tourism can also have undesirable impacts on other local sources of livelihoods and detrimental environmental and socio-cultural impacts [7-8]. Thus, sustainable planning is needed to balance the benefits and costs of tourism [9-10].

As already mentioned above, tourism is extremely valuable for rural and peripheral areas, where the possibilities of employment with another means are weak and, where the services are not maintained only with the purchasing power of the local inhabitants. Indeed, in many remote or underdeveloped regions tourism represents practically the only form of viable economic activity which can bring realistic growth prospects for the future [11]. Still, not every rural locale in need of employment and income generation is a candidate for tourism [12-13]: there has to be something in way of locational assets to lure the tourists to the region i.e. attractions [14-16].

### **2.2 Innovation and Tourism**

It is commonly acknowledged that innovations play a crucial role in the productivity and growth of firms, industries, regions, etc. [17], as demonstrated by the research on innovation which has boomed over the last few decades. Still, many authors have noted that there is a lack of academic empirical research on the innovation of the service oriented tourism industry [18-19]. One factor is the lack of data availability - commonly used indicators of innovation, such as patents, are not feasible in tourism [20]. However, the lack of innovation in tourism is more down to the fact that the service sector only innovates differently compared e.g. to manufacturing sector [21]. Therefore, the innovativeness of the tourism sector has gained an increasing amount of attention from academics in the recent years (for an extensive overview on the subject see Hjalager [22]).

Innovations in tourism are predominantly linked to innovative efforts undertaken in other sectors i.e. tourism businesses in general have been the main imitators and adaptors rather than innovators [23-24]. Still, tourism firms operate in a competitive sector: firms' competitiveness depends on their innovativeness in achieving higher quality outputs to meet the needs of potential customers and to introduce new products [25]. Furthermore, Mattson et al. [26] argue that in fact just the making of a scene is in itself an innovation. Innovation, thus, holds great potential for tourist destinations to attract tourists and to create tourism income [27].

In light of their various definitions, innovations are treated here as the market-based application of new processes, products or forms of organization [28]. The innovation in this study, as is usually the case in the tourism sector, is an application originally invented in other sectors, successfully adapted to meet the needs of tourists. Thus, although mobile games are not new to the world, they do fit the definition of an innovation as a market-based application of a new product.

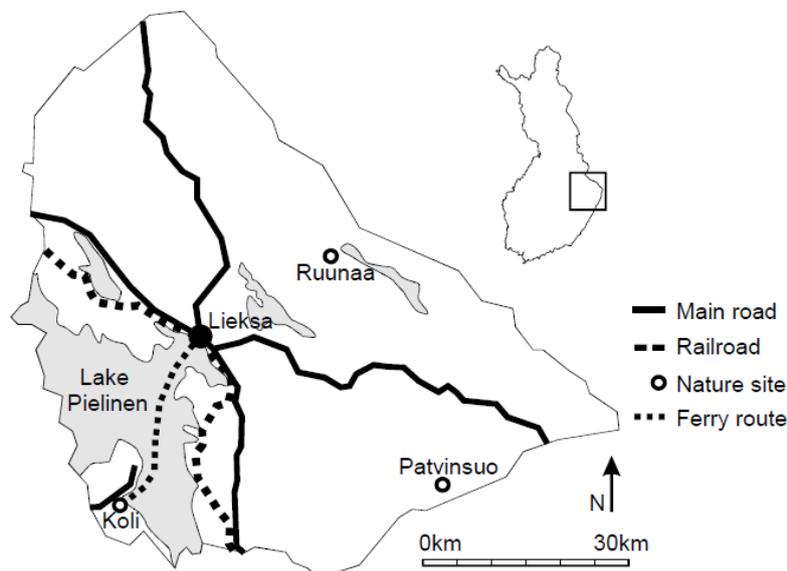
### **2.3 The Nordic Model of Tourism (NMT)**

Probably the most commonly used method for estimating the local economic impacts of tourism in Finland, is the NMT. In 1983 the Finnish Tourist Board published instructions for the utilization of the model, and since then many studies on the impacts of tourism in Finland have applied and reapplied the model. The NMT can be divided into two discrete parts, which can be used separately or together as complementary to one other. The expenditure method is used to survey the spending of tourists in a region with the help of questionnaires (or interviews) distributed on site and; using questionnaires, the receipts method is used to estimate the share of tourism revenue and employment of firms who benefit from tourism in the study region. Examples of the NMT's application can be found in e.g. Saarinen [29] and Rinne and Saastamoinen [30]. In this study the expenditure method of NMT was used. However, although the NMT has proven to be a valuable tool for evaluating the economic im-

pacts of tourism, the results attained are based on numerous variations that raise further questions about their reliability, repeatability and comparability [31-32].

### 3. The Case Study Location

Lieksa is a small, rural, and sparsely populated (population, 12 788; population density, 3.74 inhabitants/km<sup>2</sup>) town in the eastern part of Finland, in North Karelia (Figure 1). The town is suffering from structural changes and levels of unemployment (unemployment rate 17.2%) and outmigration are high (a negative net migration of 50–250 person per year). Tourism has a prominent role to play in the economy of Lieksa, which is home to the annual Brass Week music festival, Patvinsuo national park, Ruunaa hiking area and one of the most popular Finnish national parks in Koli. Previous studies, conducted in Ruunaa and Patvinsuo, on the economic impact of nature tourism in Lieksa have estimated that an average visitor spends about 50 € when visiting Lieksa [33-34]. In addition, the economic impacts of the Brass Week was studied in 2007 [35], and the results indicate that the visitors spent from 35.7 € up to 71.8 € per day in Lieksa (for a description of the evaluation tool used see Pasanen et al. [36]).



**Figure 1** The map of Lieksa (main roads, railroads, ferry routes, and nature sites)

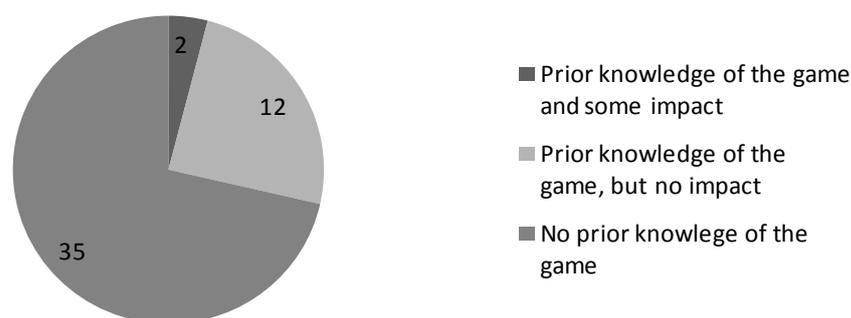
Situated in the centre of Lieksa (see Figure 1 above), the Museum of Pielinen, depicting the rural way of life and peasant culture in Eastern Finland, is the second largest open air museum in Finland. The museum had about 8 200 visitors in 2009 of which 16 % were foreigners. The museum offers an opportunity to use a mobile game to learn about the local history and everyday life of Finnish peasantry i.e. the purpose of the game is to bridge the physical- and virtual worlds to offer a new and exciting way of learning things with two story based games. The first storyline, situated in the end of the 19<sup>th</sup> century, challenges the visitor to learn about the daily chores of a housewife named Anna and the second, situated in the 1930s, offers an extensive view of the life of Jussi, a lumberjack working on a nearby logging site [37]. The mobile game has been developed by UbiqueLab team from Educational Technology Research Group at the University of Eastern Finland. A wireless web has been set up at the museum to allow the game play and visitors are provided with mobile phones, with the game installed, for loan during the summer season.

### 4. Results

A pilot survey was conducted in the end of the summer of 2010 to test the survey form and to get a preliminary overview on the impacts of the Museum of Pielinen and the purported benefits of mobile game to Lieksa's local economy. As mentioned above the survey form was constructed using a simpli-

fied version of the NMT's principles of the expenditure method and it also included specific questions about the mobile game. The personnel of the museum collected 50 answers from the visitors. About 60% of the respondents were female and the average correspondent was aged 42. The majority of the correspondents were mainly from other parts of Eastern Finland or from the Helsinki metropolitan region. The average group size of the respondents was about 4–5 persons and the average duration of the trip to Lieksa was about 2–3 days.

The Museum of Pielinen was the primary target of the trip for 11 visitors. Most commonly the museum was a planned site to visit during the trip (25 respondents), but not the only one, and for some the museum was an indiscriminate visit decided on the spot (14 respondents). What was discouraging is the fact that only a minority of the respondents had heard about the possibility to try out the mobile game in the museum. And what's more, from the handful of visitors who actually had a prior knowledge of the game, only a few acknowledged that it had had even a slight impact on the choice of destinations to visit (Figure 2).



**Figure 2** The impact of the mobile game in the choice to visit the Museum of Pielinen (n=49)

The average visitor to the museum spent about 62 € during their stay in Lieksa. This result is in line with the previous surveys, but expenditure is slightly bigger than expected in comparison to the 50 € estimated by Eisto [33] and Heikkilä [34] and on the upper margins of the estimation by Mikkonen and Ristolaiinen [35]. Most of the expenditure was spent on groceries, retail trade and in cafes and restaurants (Table 1).

**Table 1** The average expenditure of correspondents in Lieksa (€/person)

Refuelling and other station services	11
Local trips (e.g. bus, taxi, ferry)	5
Groceries and retail trade	19
Cafes and restaurants	14
Accommodation	7
Program- and recreational services (e.g. admission fees)	5
Other expenditure (e.g. equipment rents)	1
<b>Total</b>	<b>62</b>

As this is only just a preliminary study based on small sample we do not analyze the larger economic-multiplicative, and employment effects that the museum or the mobile game may be having on the Lieksa's local economy. The survey will be repeated on a significantly larger scale during the whole of the 2011 summer season. Subsequently, with a more extensive sample of visitors we assume that it will be possible to draw broader conclusions about the true economic impacts of the museum and the mobile game.

## 5. Conclusions

According to the results it can be concluded that, as a standalone tourist destination the Museum of Pielinen makes its own important contribution to Lieksa's local economy. The average visitor expenditure was higher than would be expected when compared with the previous studies about Lieksa's nature sites. However, on the other hand the mobile game had a negligible effect on the destination choice of visitors. Thus, according to our modest sample at least, it cannot be seen to have any widespread impact on the local economy. The reason for this is, according to the respondents, that the mobile game is simply not widely known enough to attract them to the museum. Thus, to maximize its impact, further developing the marketing of the mobile game seems obvious next step to us. As of now the mobile game has been without a larger audience, and therefore the potential which it offers, underutilized.

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# **Governmental and regional policies on entrepreneurship and innovation - Partnerships between municipalities, NGOs and local government partnership**

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Sanitation presents even more problems than drinking water. Sanitation coverage in urban areas is almost the same as drinking water coverage. Urban areas have mostly combined sewage and storm water collection networks that discharge into near bay surface water-bodies. About 40% of the urban population has a sewer connection. In rural areas, only a small portion of the areas with piped water supply is equipped with sewer networks. Most rural areas have individual household wastewater collection systems, principally simple pit-latrines with no drainage pipes. Upgrading of sewer networks hasn't kept pace with the general development of infrastructure, and the materials and technology used haven't been improved. Presently, there's no treatment of wastewater in Albania; its discharge in water bodies, especially in coastal tourist areas and delicate ecosystems, is a major environmental concern for the government/business/community/wide public.

Albania faces a water distribution problem, not a water production problem. Studies indicate that available sources of supply could provide more than enough to satisfy the country's overall water demand. In many cities, water availability at the source is about 500-700 litres per capita per day, but leaks and waste mean that only a small fraction of water produced is consumed. Almost everywhere problems of water scarcity can be considerably mitigated through metering, leakage detection and reduction, network improvements, disconnection of illegal connections, and optimization of storage and supply patterns. The distribution problem also has a seasonal aspect: much more water is needed during the summer growing season; when rainfall is scarce, rural drinking water is often misused for irrigation; and the tourist resort areas use large amounts of water.

The main issues handled out in this presentation are: strengthening local government leadership and initiative; partnership between municipalities and NGOs; concluding all of these in the community-based approaches to infrastructure services and neighbourhood revitalization.

## **Keywords**

Municipalities, NGOs, Urban Areas, Drinking Water, Social Leadership.

# 1. Community Drinking Water Treatment for Emergencies and Remote Locations

Almost everywhere problems of water scarcity can be considerably mitigated through metering, leakage detection and reduction, network improvements, disconnection of illegal connections, and optimization of storage and supply patterns. The distribution problem in Albania also has a seasonal aspect: much more water is needed during the summer growing season; when rainfall is scarce, rural drinking water is often misused for irrigation; and the tourist resort areas use large amounts of water.

On average, water is available only 3-4 hours per day, with certain areas receiving water only once in three days.

Blue future Filters introduces our latest offering slow sand and roughing filters: our patented SSF/x drinking water treatment technology in a flexible, shippable, storable tank. The SSF/x has been reliably treating surface water to potability worldwide for many years. This new version of the tried and tested technology makes clean water for small communities available literally out of a box. The filters come in a carton, weigh 39 lbs. They can be stocked for ready deployment without taking valuable storage space. They can be transported in numbers by truck, mule, on the back of a motorcycle or even a backpack. Once on site, they are loaded with 30 cubic feet of local sand and water from any surface source, immediately eliminating common pathogens. Water gravity feeds into the filter and can produce up to 1800 gpd, enough for a small village. Multiple units in parallel can accommodate hundreds of people within days or hours.

## 2. Climate Change and World View

The Earth's climate is changing and its atmosphere is warming. What might this mean for freshwater resources?

- *Rising water demands.* Hotter summers mean thirstier people and plants. Temperature increases will likely contribute to higher water demands. In addition, more evaporation from reservoirs and irrigated farmland will lead to faster depletion of water supplies;
- *Increased drought.* Scientific evidence suggests that rising temperatures in the southwestern United States will reduce river flows and contribute to an increased severity, frequency, and duration of droughts;
- *Seasonal supply reductions.* Many utilities depend on winter snowpack to store water and then gradually release it through snowmelt during spring and summer. Warmer temperatures will accelerate snowmelt, causing the bulk of the runoff to occur earlier—before crops can use the water—and potentially increasing water storage needs in these areas;
- *Long-term water supply reductions.* Many communities depend on seasonal water runoff from glaciers. Although shrinking glaciers create higher runoff (and thus more water) in the short term, the longer-term disappearance of glaciers threatens this important water resource.

*Thinking about your local reservoir may conjure visions of water sports, fishing, or picnicking, but reservoirs serve a much more vital purpose. Reservoirs, or man-made lakes, are typically created by building dams across rivers (some also occur naturally).*

*Reservoirs even out the fluctuations in a water supply by storing water when it is abundant and releasing it later, especially when a water supply diminishes during drought.*

*Identify advances in detection, monitoring and modelling, analytical methods, information needs and technologies, research and development opportunities, and communication strategies that will enable the water supply industry and other stakeholders to further reduce risks associated with public water supply distribution systems.*

Water towers, a familiar sight along nearly every highway in America, help to make sure that water deliveries remain relatively constant even during peak water use times. Their main purpose, however, is to elevate the water level high enough to supply adequate water pressure throughout a distribution system.

- *Water quality problems and issues are both local and regional as evidenced by a variety of reports included in, (Hydric Management, London 1989, 2003).*

Water quality assessments are in charge of the Department of Environmental Protection (PADEP), and testimony received by the committee. Some of these water quality problems are associated primarily with urbanization vicinity; some are associated with activity in the Allegheny River basins; still others are common to the predominantly rural counties.

Large differences exist among the sources of problems, their potential effects on Albanian public health and environmental quality, and their likely solutions.

Further, resolution of water quality issues is affected by other regional issues such as transportation, land use, and governance of the metropolitan area.

Small hydro is gaining ground across the Balkans. The small (municipal) Albanian investor is looking for medium-size hydro and dam companies who know how to tap special funds. This has been traditionally the arena of big players such as Siemens or *Alstom* with specific staff to handle the World Bank, the European Investment Bank and the EBRD. The Balkans show small funding is happening. Brussels and USAID also have small technical funds in the agricultural sector which can mesh nicely with reservoir building for irrigation and domestic water projects. American banks are also very active in Albania.

The extensive use of reservoirs for fish production as part of food security is expanding exponentially. There is a market for expertise on protecting big volumes of fish at the turbines, as well as fish ladders and other bypass schemes. Reservoir stocks for the market attract EU funding and may be worth tens of millions of Euros. Food ministers want clean river basin waters reaching the sea which will not damage high value shellfish beds and fish breeding grounds.

*The significance of this is reflected in tensions between Italy, Croatia, Slovenia and Albania over their coastal stocks. One side of the Adriatic is only about 148km from the other, so the potential for pollution from the land is very high. In 1993 fertiliser land runoff coated 600km of the Yugoslav to Italian coastline with toxic algae. This cost several billion Euros in today's money through lost fish and collapsed tourism.*

The existing pattern of water supply and water quality services in the region is highly fragmented, with more than 1,000 providers operating in the multicounty region area, like many other metro areas in the United States, large-special purpose authorities such as the Allegheny County Sanitary Authority (ALCOSAN) can achieve substantial economies of scale through joint management agencies.

Although private organizations may not have direct voting power in what mix of organizations is chosen to implement the plan, they could very well influence how the public and its elected and appointed representatives make these choices.

### 3. Conclusions and Recommendation

Planning for water quality improvement, especially where capital investment is substantial, must therefore reflect regional planning goals concerning economic development and demographic character, such as impacts of urban sprawl and (re)development.

Although no single unit of government has all the necessary power to implement the Three Rivers Comprehensive Watershed Assessment and Response Plan (CWARP) recommended and discussed in, (*Studies & Center of Economic CESS,2001;2004*) it is desirable to have some mechanism to facilitate continued oversight of regional progress (or lack thereof) toward clean water and its relationships to other regional goals and activities, and to help realize the benefits of cooperation.

The three poorest zones in Ecuador, with 80 percent of the canton population of 35,000 living below the poverty line mostly in rural parishes and scattered remote settlements. Lack of access to land and the ongoing process of fragmentation of family holdings have led to widespread poverty, prompting out migration.

To meet these daunting challenges, the canton democratized its planning and management procedures. This process allowed the canton to build consensus, prepare a development plan, allocate municipal funds equitably leverage additional resources and improve infrastructure and living conditions. The participatory municipal management improve infrastructure and living conditions.

The participatory municipal management process was institutionalizes ensuring representation of women and marginalizes groups.

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# Intrapreneurship: Challenge or new way of Working for Existing Organization?

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Francis Bacon (1561-1626) said: "He that will not apply new remedies must expect new evils: for time is the greatest innovator". In the latest time there is a growing need for innovation in the whole business world due to the rapid changes caused by globalisation. The dynamic nature of existing organizations, especially those competing in global market and the volatility of the existing organizations in our country setting make it imperative that organizations and their managers remain receptive to new ideas, approaches and attitudes.

According to Gifford Pinchot III and Ron Pellman (1999, p.11), innovation is necessary to differentiate one's offering, to find and fill unoccupied spaces in the market and to keep up with the soaring productivity of competitors. Rapid and cost-effective innovation is the primary source of lasting competitive advantage in the twenty-first century, leaving organizations no alternative but to innovate well or cease to exist. Pinchot III said: "Creativity and innovation are fuelled by the intelligence of people who have the freedom and right to express their ideas". The key components of entrepreneurship are creativity and innovation, which are often confused with each other. Some believe that they are synonymous, but in fact they are different. Creativity is a solitary, individual process and refers to the generations of new ideas. These ideas may have very little value to anyone else except to be creator. In fact, creativity can be defined as a process of being sensitive to problem, deficiencies, gaps in knowledge, missing elements, disharmonies etc.

Innovation refers to the process that follows the conception of a novel idea, and often involved many people who each offer different suggestions and contributions. With the increased emphasis on creativity and innovation in the world of work, existing organizations face the challenges of nurturing new ideas and effectively transforming this creative new into innovating products/ services.

Intrapreneurship can be seen: as a process by which individual inside organizations pursue opportunities without regard to the resources they currently control. Intrapreneurship includes the set of activities required to move a concept or idea right through to implementation. Existing organizations are looking for people who do more than thing of new things to do, but actually do new things.

An analogy for the intrapreneur would be the chess player, who may make a bold move yet understand the parameter of the game and anticipates the possible counter-moves. They are willing to take calculated risks because they have come to terms with the possible ramifications of the innovation. In fact, they feel comfortable with the uncertainty of the changes they are making. Intrapreneurs constantly seek innovative, even experimental, ways to watch, evaluates, sense, interact with, respond to, and anticipate customers. In this way, intrapreneurs not only are learning from marketplace but also are constantly educating it.

Pinchot III said that intrapreneurs are the "dreamers who do". In most organizations people are thought to be either dreamers or doers. Both talents are not generally required in one job. But the trouble with telling the doers not to bother about their dreams is that they dream anyway. When they blocked from implementing dream of

how to help the existing organizations they are dreaming dream of revenge. A mind is meant to imagine and then act.

It is not right to separate the dreamer and the doer. The important tasks of organizations, is to restore the place for vision in everyone's jobs. The intrapreneurs are people who are working very hard to realize the vision into profitable reality like new product/ service. New product/ service refer to the development of a product, from its initial idea until it becomes a commercial product available for public use. It will be usually use the term "venture" in lieu of the more lengthy "new product development project". A venture refers to the development project than to the new product itself.

Survival of the venture in the organizational environment is not easy. Often in the best of the conditions, venture is usually created within a culture that supports innovation and intrapreneurship. Even in the best managed organizations, intrapreneurs are facing with a number of obstacles and barriers, such as resistance to change, the inherent nature of large organization, lack of entrepreneurial talent etc. Intrapreneurial venture is completely different from the real practice at existing organizations. For surviving in organization it should be followed this set of rules: being innovative and resourceful in obtaining approval, finding and using allies, forming coalitions, persuading management to relax polices and procedures. It is therefore clear that organizations have the possibility to do things differently and better than they are being at the moment. Developing the intrapreneuship in organizations result in several advantages, including the development in the size and/ or diversity of the product and service range, and helping the organization to expand and grow. It also assists in the creation of workforce that can help maintain its competitiveness and promote a climate conducive to high achievement.

## Keywords

existing organization, intrapreneurship, innovation, intrapreneurs, intraprise.

## 1. Introduction

Often in theory for term intrapreneurship can use synonyms: corporative entrepreneurship, corporative enterprise, intra corporative entrepreneurship, strategic reformation and etc. In fact, it means creation of new entity within existing organization, venture.

Intrapreneurship is a concept related with entrepreneurial orientation of organization. In fact, intrapreneurship is important for organizational existence, growth, profitability and reformation of existing organization. Innovation is common theme for all form of intrapreneurship. The use of innovation like mechanism for redefine and reformation of organization is forming essence of intrapreneurship. Intrapreneurship become term that it's use all the time in world of the business to describe organization that it's ready to recognize opportunities and then continues develop, initiate action and produce new product and/or service. These organizations can be corporations, non-profit organization, factories, schools and universities. The road of successful intrapreneurship is full of risks and difficulties. Like always, potential benefit in term for future successful organization indicates that it's worth to risks and hammer at. Involving the spirit of intrapreneurship in existing organization include changing of organizational culture across establishing goals, feedback and rewarding system oriented to results. Employees have to be encourages and supported in these efforts to develop and implement intrapreneurial projects. Actually, the organization needs to find ways for measure and reward intrapreneurship.

In 1985 Pinchot coined the term "intrapreneurship", short for intra- corporate entrepreneurship, whitin the organization. Intrapreneurship is increasingly becoming a term used in the business world to describe organization that are willing to pursue opportunities, initiate action and emphasize new, innovative products or services.

Due to the dynamic nature of modern organization it is imperative that organization and their managers remain receptive to new ideas, approaches and attitudes. It is therefore the belief that rapid and cost- effective innovation is the primary sources of lasting competitive advantage in 21-th century, leaving organization no alternative but to become intrapreneurial of case to exist. This thesis focuses

on this need and examines way in which intrapreneurship can be measured in organization in order to provide a benchmark for further organizational development.

New principles of organization are needed to produce an organizational brain that functions in a very different way from bureaucracy's vertical communication in a chain of commands. The structure of intelligent organization is not set by those in charge during periodic recruiting; instead, order emerges as a result of every one voluntary connection and more democratically determined direction. After research made on organizations in Republic of Macedonia there are data that enables to get a real picture about functioning and influencing of intrapreneurship in large organization. The new principles of working are dictating the new way with is different from the way bureaucracy works. According to the needs of the market large organization must be innovative, and open for innovating new products/ services. Therefore, this thesis is designed for developing intrapreneurship in large organization.

## 2. What does mean intrapreneurship?

There are many definitions for intrapreneurship. The basic definition for intrapreneurship gave Gifford Pinchot III who introduce this term. According to him: "Intrapreneurship is a method of revitalization entrepreneurial spirit, where is the best people and resources- in organizations".[1]

Jarna Heinonen argues that innovation wider defined is something that relates all forms of intrapreneurship. She also argued that using the innovation as a mechanism for redefining or reinvention the organizations, its position in the market and industry or competitive environment, it form the essence of intrapreneurship.

Nielsen, Peters & Hisrish (1985) argued that: "Intrapreneurship is development of internal markets within existing organizations and relatively small and independence unit designed to create, to make internal tests of the market and develop, to improve or innovate personal product/service technologies or method. In other words, this authors point out that intrapreneurship is organizational effort to improve internal working through internal market. This is a different way of working from the way that organization to do to improve and increase profitability.

But Antoncic and Hisrish (2001) describe four intrapreneurial dimensions that follow:[2]

- New business intraprise.
- Innovation.
- Self- renewal of the organization.
- Proactive.

New business intraprise is defined as a: creation of new business within existing organization no matter of the level of autonomy. According to them, it is meaningful dimensions of intrapreneurship because it evolves new business creation. New knowledge (new methods of working) creates possibilities for making new things in a new ways, which make old ways of working unusefull. New efficiency in creating and bringing knowledge means that we are living in time in which ability to innovate efficiency becomes primary determinant for success of the business. This means that organizations should give freedom to its employees which are more close to the entrepreneurs. Experiment in intrapreneurship has shown in many organizations which becoming new and more effective models for team working. Model through which organizations understanding and manage with the complex of the time. Intrapreneurship is original mix of managerial and entrepreneurial skills to accomplish innovation within organizational lining. Intrapreneurs have to be able for innovating within organizational culture, to govern with process and employees that it's result at environment of innovation and change. Innovation is process not just idea and also searching organizational support at senior management level, mentoring and team work for accomplish successful results. For example: at university can include enriching of student or academic community, public agreement or new development of technology, culture or organization. Intrapreneurship is risk but it's has to start somewhere. Consider it, intrapreneurship like concept for developing entrepreneurial spirit in existing organization has own advantages and disadvantages (shown in table 1). [3]

**Table1** Advantages and disadvantages of intrapreneurship

Dynamic innovation is a key for long-term success of organization.	Possible conflict and dissatisfaction from relationship between colleagues.
Improving of individual or group performance.	Possible outfall of organizational resources (time, workforce, capital) if they are not managed appropriately.
Effective conclusion for change of market and unusually business environment.	Loading with work result with heavy innovation effort.
Quality of interpersonal relationship   cooperativeness between colleagues.	Stress reactions, hierarchical conflict between employees obligations.
Attitudes with acquisition in direction of working.	Undefined environment for innovation.

The role of organization is:

- Establish framework that it's encourage, facilitate and support intrapreneurial process.
- Qualify a development of intrapreneurial skills.
- Incorporate outputs for develop business of organization.

Intrapreneurship is broad concept that it's consist of generating, development and continuing with implementing of innovating ideas within existing organization. This innovation can be new product, process or accomplishing goal, new service, system related with organizational business model. In fact, intrapreneurship is set of formal and non-formal activities in order to form business opportunities within organization across product/service, process, or develop of new market. All these activities can take place anywhere level of organization, business department, functional or project level with end goal, improving organizational performance and creating competitive advantage in front of all competitors in the market. Intrapreneurship is process in which every individual or group employees within existing organization create new organization or accomplish change or innovation.

## 2.1 Phase of intrapreneurship

During establishing venture exist different phase: [4]

- Solo phase.
- Project phase.
- Bootleg phase.
- Phase of formal team.

*Solo phase.* At the start intrapreneur establishes own vision. It is delicate thing to make decision when vision is complete for starting share with others. When idea is not form and fluid, the others who give suggestions for help often feels like striking. If it's let ideas to be coopting from others to fast maybe it's will be lost interest for them. Later, when idea become enough strong for intrapreneur, he face with suggestion of others without change it. It often help them to write before show the others and save discussion focused on desire direction and establish own authorship on idea.

*Phase of project.* When general idea is clear, most intrapreneurs share with friend at organization and with several customers. Form their reaction they learn more for strength and weakness of concept. In this phase, intrapreneur still does not lead the others in action but give them feedback and causal help. Surprisingly it is easy to get other together to take part in venture. To start, it is necessary to tell them they are respected experts.

*Bootleg phase.* Continuing the phase of the project some people gravitate in direction of helping with other rather than with words and facts. As far as, someone does not officially specified of venture, he start with develop of product or researching of market. This is crucial phase because it is happening different things. That is:

- Un-formal team is forming around idea. Intrapreneur is not alone anymore.
- Intrapreneur has a followers and than he has a responsible for leadership.
- Intrapreneur work with people and test them who can be member of officially team.
- Idea and skills for leadership are being tested without organizational background. Then advantages of idea and leadership are understood.
- Intrapreneur does something from creative work what will be does at venture. Team lending time and show productivity in simplifying of ideas.
- Intrapreneur creates micro-culture in venture. People learn how to act like team.

*Phase of formal team.* Some business can start with one smart individual who need army of people for executive his plan when business is growing. This model was represented in traditional way of working. Business that is creates entrepreneurs and intrapreneurs need complex accomplishment for one thinker and many work performers. Intrapreneur needs intrapreneurial team, member which complement vision and help for it execute.

### **3. (Not) enough identify conditions for development of intrpreneurship in organization**

During different debate about intrapreneurship often is mentioned the word bureaucracy in existing organizations. Every organization has built "immunity system" against intrapreneurship, so it is necessary a lot of time and strengths to crush that immunity system and to start with realizing different projects. Most of the organizations are made on that bureaucratic model of working where there is routine activities and strong vertical hierarchy. It was different world, world of mass markets, uniformed products/ services and long term production process. But it is very clear that that kind of working doesn't work today. Today marketplaces need organizations which are creative and innovative. For that kind of work organization need intrapreneurs. And on the other hand for intrapreneurs is necessary to know the opportunities of organization if he/she wants to stay and t work in that organization. Intrapreneur should discover that part of the organization where exist conditions for execute different project. Furthermore, every organization integrates factors which will transform organization to become intrapreneurial.

Individuals in existing organization may give their contribution without becoming managers, through innovating. Many innovative organizations on this way creates second career path, where creative employees give their best. Intrapreneurs and entrepreneurs are not necessary for new products/services. Their involvement is in taking new ideas, even working on prototypes as well as their realization in profitable reality.

But, one thing is very important for organizations. They need to direct heir efforts toward generating new ideas and opportunities for development. It is necessary knowledge, creativity and innovation to put in a first place on the business agenda.

This research is focused on question for identifying of venture opportunities in organizations where can be implemented intrapreneurial activities.

So, in organization it is necessary to discover those parts where exist condition for establishing intrapreneuril activities, and it is also necessary for intrapreneurs to be empowered to realize their ideas to become business reality. Passing away from traditional to innovative organizational culture and developing organizational process of venture will ease way for establishing intrapreneurship in organization and in that way will bring the development of business and profitability of organization itself.

### **4. Identifying of the key elements for implementation of intrapreneurial activities in organization**

It is suitable for the organizations which establish intrapreneurship to know which intrapreneurial activities will integrate in organization itself, to estimation of conditions for organization to become innovative. The necessary things that need to be done from the organization are to implement innovative process which will support innovation and intrapreneurship. Process of innovation is extremely detailed and complex. If organization wants to be successful in innovations, it is necessary to have its own model of innovation. In that direction collective actions of every participant will be coordinated, even people who resist will change.

In fact researching is directed toward identifying of input for intrapreneurship (resources, reward system, sponsors) for rational use and testing of transformation process in leadership, organizational structure, organizational polices, organizational culture, individuals and tasks which are in interaction and like that impact in improving innovativeness and inventiveness of organization.

According to the context explained before about intrapreneurship it was designed model which basics hypothesis for organization to become intrapreneurial is introduce innovation approach on individual and organizational level. Development and implementation of intrapreneurial activities needed rational and productive allocating of those input which are important to increasing of efficiency and effectiveness and improving the quality of working. For implementing intrapreneurial activities it is necessary to be establishes vision for "doing the new things on new ways." Vision regards to

introducing new products/ services, processes, business model and/or improving of existing products/ services. To accomplish that it's needed to reach degree of awareness for importance of innovation in organizational elements: leadership, organizational structure, organizational policy, organizational culture, individuals and tasks. All of those elements are interdependent to each other and toward development of intrapreneurship is necessary to be incorporated all of them together. In fact, it is necessary for innovation to be constituted in:

- Leadership,
- Organizational structure,
- Organizational policy,
- Organizational culture,
- Individuals
- Tasks.

Development of intrapreneurship in organization leads to development of innovativeness and inventiveness of organization, where will be generating opportunities for new ideas, exist vision for development and/ or improving new products/ services, processes, business model and realization of vision from beginning to profitable reality.

With designed methodological instruments were measured variables:

- Development of innovativeness and inventiveness of organization (*dependent variable*),
- Leaders characteristics of visionary and flexibility, strategic plan for accomplish vision, decentralizing of organizational structure, flexibility of organizational hierarchy, reward system for intrapreneurial behavior, polices that encourage creative and innovative approaches, independence of employees and teamwork, level of awareness for accepting opportunities and take risks from employees, demonstrate initiatives from employees, intrapreneurial qualities of employees, employees attitudes toward to change, risk and failure (*independent variables*).

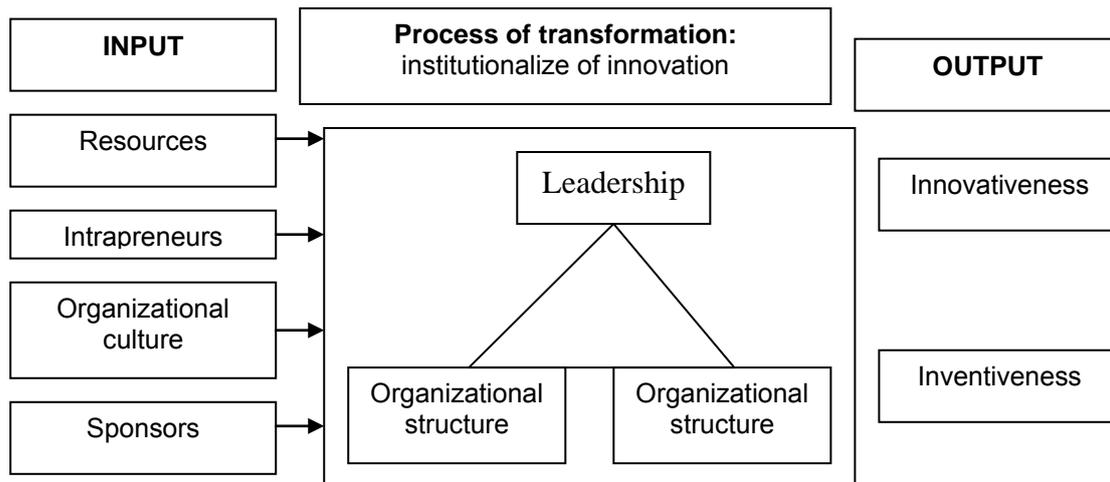
Development of innovativeness and inventiveness of organization (*dependent variable*) was measured through:

- Launching of new products/ services,
- Dividing "firm in firm",
- Changing the existing firm in innovative.
- Independent variables were measured through:
- Innovative tasks,
- Employees- intrapreneurs,
- Flexibility and decentralization of organizational structure,
- Planed polices which encourage creativity,
- Intrapreneurial leadership,
- Intrapreneurial culture.

## **5. Interpretation of results in function of model for identify the key elements of intrapreneurship In Republic of Macedonia**

Summarized results got from thesis led to interpretation of general thesis: If in the organization exist rational using of components of intrapreneurship (resources, reward system, support from manager) through institutionalize of innovation in elements of: leadership, organizational structure, organizationao polices, organizational culture, individuals and tasks then will be created conditions for implementation of intrapreneurial activities which means: innovation and invention in organization.

Which mean that is accept in a part of institutionalize of innovation in elements: leadership, organizational polices and organizational structure and it is declined in tasks as element. That is result from knowledge that individual level of tasks refers to the way individuals work. Furthermore, organizational culture and individuals they are input of basics determinants of intrapreneurship. In fact, organizational culture diagnoses level of innovativeness of organization, and individuals are carriers of innovation. Organizational culture and individuals in theoretical model are identified as elements where it's necessary to be institutionalized innovation, but empirical researching declined as elements and identifies as inputs or determinants of intrapreneurship. This data shows that it is necessary transformation of theoretical model in model which is appropriate in the practice in existing organizations in Macedonia.



**Figure 1** Practical model for development of intrapreneurial activities in existing organizations

## 6. Conclusion

Existing organizations manage of resources necessary for completing the job and working in organization. But it is necessary for employees to be rational in using resources able to the organization in a direction to generating and researching new ideas. Organization has employees which possess creative potential, knowledge and skills to do something new and useful for the organization. Intrapreneurs develop their own vision for new products/ services and vision how to realize idea in profitable reality. Intrapreneurs (may have experience in other organization) knows that every organization is unique. It is fact that employees will change themselves first, rather than organization itself. Intrapreneus must known well impact of organizational culture in organization where works. According to the attitudes, values and norms of behaviour accepted from employees in organization, intrapreneur must adjust its intrapreneurial behaviour. Organizational culture play very important role in development of intrapreneurship. In fact, organizational culture which support innovation, provide identity of intrapreneur, loyalty to ownership and organizational mission. According to organizational culture attend to explain and strength standards of behaviour.

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# Intrapreneurs create a new business within existing organization

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**Intrapreneurship is a method of working which will allow people to express their own potential more fully. Much of this potential is trapped within the hierarchy layers of organizations. Intrapreneurship is a step toward freeing individuals and organizations to build more meaningful and more productive lives. Intrapreneurs take responsibility for creating innovations of any kind within organizations. He/ she may be creator or inventor but is always the dreamer who turns an idea into a profitable reality. Intrapreneurs should research and find out the proper part of organization where exist the conditions for realize the venture. Working on the idea for the new product/ service is a first step in a building a new business. Furthermore, the idea develops in a business plan and then he/she realize that business plan into a profitable reality.**

**As an intrapreneur, the employee will act as owner of his/her own business. An intraprise is a business still legally owned by the larger organization but operated and controlled internally by one or more employees of the organization. An intraprise may serve internal or external customers or both. The new intraprise liberates the energy and intelligence of the employees. In that kind of organization, employees who have an idea are free to sell their idea as a product or service. The intelligent organization where creativity of the employees is important and respected is staying competitive at the global market.**

**Intrapreneurship is more actual in modern organization. Basicly, it means taking risk in developing new products/services. The risk is taken by employees who are so called intrapreneurs. There are differences between traditional managers and intrapreneurs. Intrapreneurs are known as: visionary, creative people and people who develop new products/services.**

**They are also taking venture and work at intrapreneurial teams. Opposite of this the traditional managers are protecting themselves and their workplace. They think that their work is good enough and there is no necessity for introducing innovation. If organization wants to become intrapreneurial it must encourage intrapreneurs and traditional managers must change their attitudes, and way of working. Peter F. Drucker said: "Every organization- not just in business- needs one essential competence: innovation". Entrepreneurship as a characteristic of human activity is known as well a human society. The man has to develop its ability for entrepreneurship, for providing his own existence. Entrepreneurship is often related with forming and starting new business. When we talk about who is entrepreneur, we can say that there is no person who doesn't want to have his own business once in his life. Every person wants to have freedom in decision making, be successful, have a lot of money, but those reasons are not enough for some person to be successful entrepreneur.**

**Entrepreneurs are people of new era they establish and develop their own business. But, when we are talking about intrapreneurship, this term is coined in 1985 from Gifford Pinchot III. He thinks that with establishing intrapreneurship in productive and**

unproductive organization, they become more effective in their work. Intrapreneurs find out new ideas and make them in profitable reality. Intrapreneurship is a method of using intrapreneurial spirit where are the most good people and resources: at organization.

New knowledge (new methods of working) create possibilities for creating new things in a new way which makes the old way of working not effective. The new efficiency in creating and giving the knowledge means that we live in time where abilities for innovations are becoming determinant for the success in business. When competition makes innovations- it creates new product/ service or processes- one must innovate or die. That means that organizations have to give freedom to their employees and more close relationship and communication with entrepreneurs. There are many examples for organization and companies who use intrapreneurship as a method and a way of working like "Johnson& Johnson", "3M", "Citibank" etc. In competitive environment, it is necessary for the organizations to identify and search new business, ideas and possibilities. But researches show that organizations are facing with difficulties. Intrapreneurs want to achieve something but they have many obstacles in the organization itself.

There can't be innovation without taking a risk. Mostly, organizations don't want to take the risk. It becomes from managers who think that every mistake and failure is losing of precious time. But, mistakes have to be understood as a way of improving product/ service. That's why the success of intrapreneur is in his experience form which they are learning. They learn from their own mistakes. They are not afraid they are facing and looking for the ways how to solve them. The nature of intrapreneur is to research. They are doing that on the market with their own researches. The product/ service are giving to the customers who gave them feedback.

Intrapreneur is the person that has to find his own way in organization and to prove the managers that mistakes and failures bring improving the product/ service. Intrapreneur has to be flexible because he must realize his own idea. He realizes the idea with the help of the team members. All the aspects are important for realizing the idea from production, relation with customers and suppliers, different opportunities for sale etc. which is important for success of intrapreneurial effort for realizing innovation.

## **Keywords**

Intrapreneurship, intrapreneurs, intraprise, new organization, venture.

## **1. Introduction**

Intrapreneurship is often connected with existing organizations which lately puts great accent on intrapreneurial activities. Those organizations are directed onto creating an environment in which creative employees will continue with new way "of doing things", which will lead do generating new ideas for new products/ services in the organizations. Intrapreneurs sometimes are known as innovators, innovators which promote new products. Intrapreneurs carry out new processes with which are generated new products for markets. The reason for that is the fact that they are creative and they take risk so they left the traditional role in business. Intrapreneurs have courage to let their imagination and decisions to show them which directions should be taken.

Intrapreneur is employed in existing organization. In fact, intrepeneurs are happy when works in small teams with people with passion which have different abilities and skills. The key of whole working is in building the team. With appropriate training and organizational support, most of people are able to develop intrapreneurial mindset.

In existing organizations may be found many people which possess skills for mindset of entrepreneurs, which have desire to solve the challenges, results and difficulties till opening its own firms. They are very talented employees which haven't standard profile of employees, because their personal profile and working style are unusual. That's why they are named as intrapreneurs.

## 2. Who are intrapreneurs?

Often is indicated the question why is intrapreneur? There are too many definitions from different authors which give their own point of view on intrapreneurs.

One definition explains that intrapreneurs are:

“Persons who are focus onto innovation and creativity. They transform dreams and ideas in profitable venture, through acting in organizational environment.”

One of the reasons of existing of this definition in this paper is the meaning of the author *that intrapreneurs are visionary*.

Today workforce is consist from many un satisfied employees which are frustrated in working which is routine, not spiritual, not inspiring. They have necessity to be given to them opportunities which will hire their imagination, will connect their set of skills and will direct their creativity. Intrapreneurship is one of the ways to do that.

Gifford Pinchot III gave the definition in which are given the comparison between intrapreneurs and entrepreneurs:[1]

*Intrapreneur*: All “dreamers that do.” All of them take responsibilities for creating innovation of different kinds inside organizations. Intrapreneurs may be creators or innovators, but always they are dreamers who discover how to convert idea into profitable reality.

*Entrepreneur*: Somebody who make the role of intrapreneur outside organization.

Intrapreneurs found new ideas and convert them in profitable reality, so intrapreneurship can be diffined as process in whom: “are developed innovative products or processes through creating of entrepreneurial culture in already existing organization.”

Furthermore it will be explained how different authors define entrepreneurs. Some of definitions are:

“Intrapreneurs are persons who focus on innovation and creativity and it tries to transform his dream in profitable venture, through acting in organizational environment.”

Intrapreneurs have set of entrepreneurial skills which use it in organization rather than starting their own business. Mission that lead intrapreneurs in developing new products/services or processes give better explanation for previous definition. Intrapreneur is a person who accurately plans his work or career and believes that it is its own life mission.

There are some definitions from different authors.

“Intrapreneurs are employees who works in business with entrepreneurial capacity, creating innovative new products/ services and processes for organization”

“Intrapreneurs in organization promote innovative activities and minimizing negative effects of structure and system. It needs to be noticed that innovation that undertake means creativity as well as ability for realization and profitability of project.”

“Intrapreneurs are inside entrepreneurs which follow the example of founder of organization.”

Intrapreneurs constancy search innovative or experimental ways to look at, evaluate, feel, respond and forecast customers.

Similarity for intrapreneur is chess player which can do brave moves besides understandable parameters in the game and forecast possible opposition moves.

## 3. Characteristics of intrapreneur

Intrapreneur is included in process of intrapreneurship, which refers to developing new business inside organization, starting from initial idea till it become visible business. Intrapreneurs create new business and different ways of performing of things which results in innovative possibilities for organizations. They are pioneers and have a plan which needs to be followed. They can get the idea from different unconnected subjects and themes, and integrate them in their area of working in a way to bring the organization in direction of new managing. Intrapreneurs must be careful how they “move” inside organizational culture. If they are in a conservative culture, they will attract people or they will confront with them. They will attract those who have similar point of view with them and likes changes. They will confront with the people that don't like the changes and are satisfied with status quo. Intrapreneurs are people that are not favourite in organizations, and if behavior is not corresponding to the culture, they easily may become undesirable.

Many of their characteristics, which will be famed if they been entrepreneurs, but often they are not respected and organizational environment did not understand them. They are just “employed”, in specific time they can be seen from others as an impatient, unpractical, arrogant, unfounded, and aggressive.

There are many characteristics which are typical for intrapreneurs. Some of key characteristics are: [2]

- Entrepreneurial thinking. They are capable to see “what it can be”. They are focused of founding new solutions without searching explanation for the problems. They are inspired from the obstacles. They use creativity for generating new ideas for solving problems.
- Visionary leadership. They help others to see further from their typical aspects of thinking and go much further then they want. They are able to make relationship outside their departments for successfully making the projects. They are able to pass through organizational policy just to make things that are given to them.
- Passion. When they are obliged to something they do not except NO as an answer. They have huge level of energy... which is infectious or backwash and it depends from the organizational culture in which they work.
- Accelerator of changes. Always look how to capitalize opportunities for improving. Favorite question is “why not”. They are directed toward changes through connecting with others and simplifying the processes.
- Generator of values. They build bridges between theory and practice. They are able to use limited resources for accomplishing important results. They understand key business fundamentals and how to use solutions which helps the organization to make money nad how to keep money.

It is well known that intrapreneurs enabling ideas to become reality inside the organization. Intrapreneurs can be champions or team leaders. Lately it is known that everybody can be intrapreneur. Some author think that intrapreneurs should combine characteristics from entrepreneurs as well as from traditional managers because they have positive set of values, are directed and they should be loyal to the brand and business too.

According to Giford Pinchot III intrapreneurs have this attributes:

- They want free access to the resources of the company,
- They are self- motivated,
- They “manipulate” with the system,
- Have courage and self- confidence,
- Focused on customers,
- Wants modest risk,
- Do their own researches,
- Minimize risky projects
- Learning from mistakes.

It is clear that traditional managers are different from entrepreneurs because entrepreneurs use their abilities, its funds, building their own business design their own set of values and behavior.

intrapreneurs are some were in the middle as it was explained in the upper part of this paper. They need characteristics from entrepreneurs for as well as characteristics from traditional managers for easily handling with barriers in traditional organization.

Some of attributes of intrapreneurs are:

- Compact visionary and creators,
- Brave and with a lots of self- confidence,
- Flexible and innovators,
- Intellectual and curious,
- Have technical skills and knowledge for the market,
- Aim- oriented and self- motivated,

Intrapreneurship as a method for working in existing organizations require from intrapreneurs to have energy, self- confidence, optimism, courage, speed, clear vision, flexibility, persistence, enthusiasm, business, technical and knowledge for market, communication skills and ready all the time to use their hands for work. But there is another question here: How those characteristics may be developed?

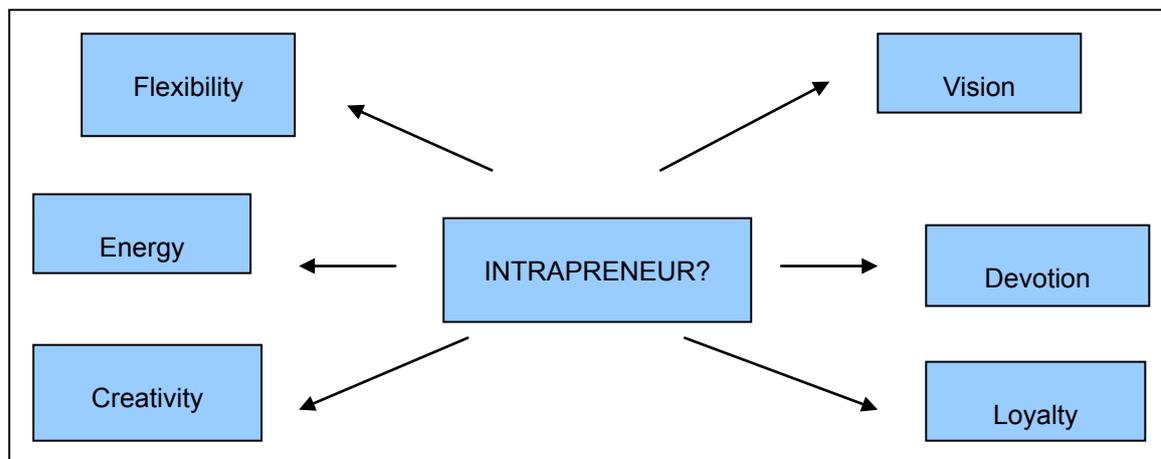
The answer is that that is not easy, but it can be developed with openness and awareness. That is the way for people to understand more for themselves and for others, and in that direction they will establish and use better network.

At the figure 1 are shown important characteristics that are necessary for intrapreneurs, need for carry responsibility in their way of working.

It is possible different way of explanation on the individual qualities and characteristics for intrapreneurs. Those qualities are complemented with the characteristics shown in figure 1. Individual

quality of intrapreneur always comes out during his/hers working in organization. There are some qualities that are important for intrapreneurs like: [3]

- believing in innovation,
- creative, but pragmatic imagination,
- psychological safety,
- independent nature,
- vision oriented,
- self-motivation,
- oriented toward success,
- interpersonal skills,
- energy,
- sense for time



**Figure 1** Characteristics of intrapreneur

Last three qualities are named as “killer instincts”, where intrapreneurs know where to go or when to stop. Combination of vision, self- motivation and “killer instinct” provide interesting image of secure, personalized, energetic, and pragmatic intrapreneur which will be proactive, but not forced from the managers or others employees in existing organization. intrapreneur of corporative entrepreneur, lately is seen as new business hero. Furthermore intrapreneurs their attention direct toward individuals and processes which produce new products/services in the organizational dedication.

There are many authors who explain different or similar characteristics of intrapreneurs which describe nature of intrapreneurs. People who are identified as intrapreneurs in organization usually show characteristics as activity and taking risk. Their behavior is characterized as clear breaking of existing practices in organization. Accenture identifies 5 key behaviors of intrapreneurs:

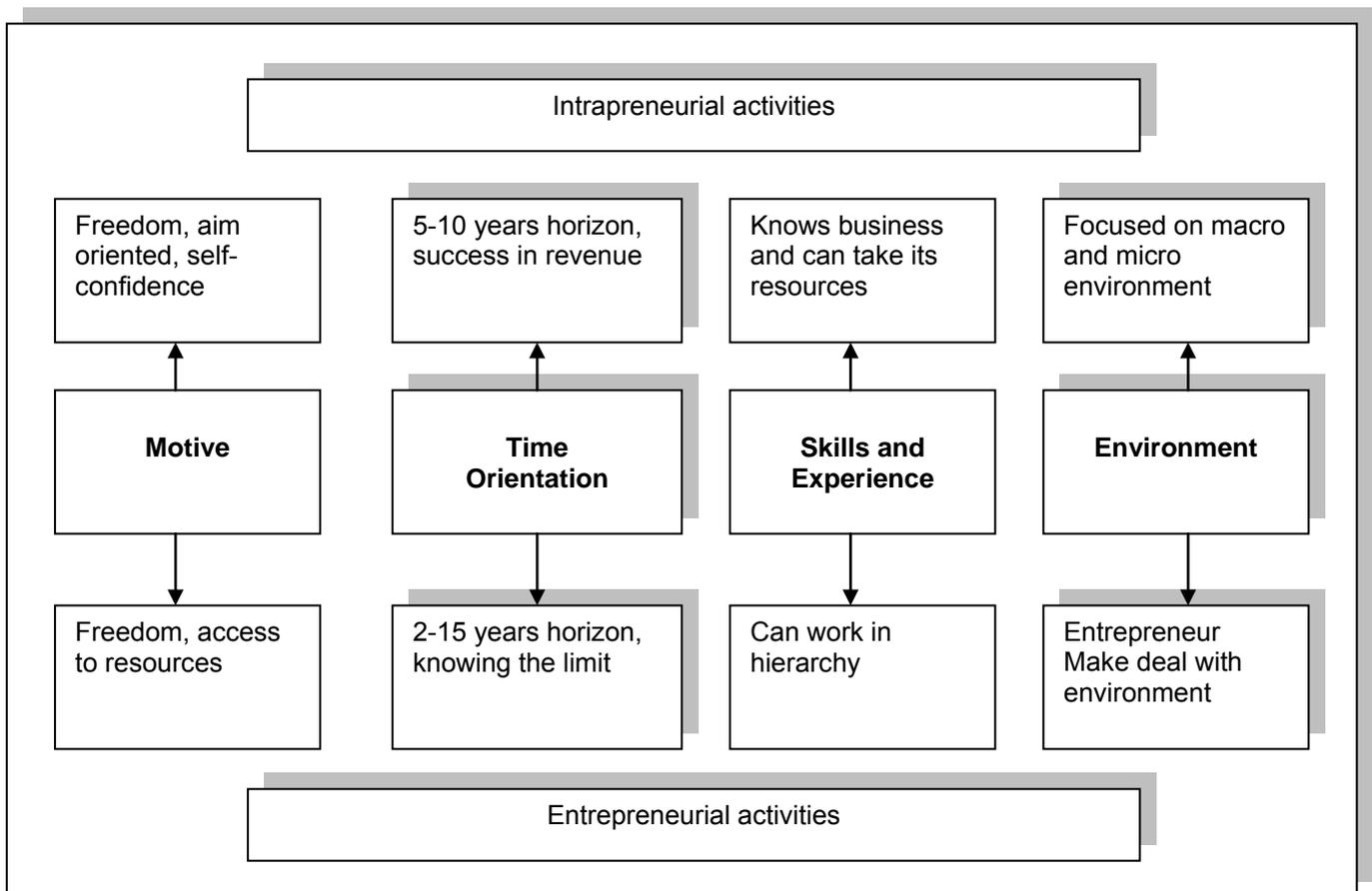
- Creativity and innovation,
- Ability to use creativity,
- Directed,
- Focused on creating of values,
- Taking risk.

#### 4. Intrapreneurs v.s. entrepreneurs

Often intrapreneurs ask themselves: “Should I stay or should I left organization?” In the answers of this questions are showing intrapreneurship. If someone is intrapreneur, what he need to do? Should he/she take a risk? Intrapreneurship has a chance to help the organization to direct the future and it’s existing. intrapreneurs should think about:

- reaching the moment,
- leaving opportunity, leaving the organization and becoming intrapreneur?

If decision of intrapreneur is to "catch the moment" is because he/she feel empowered, contrary from other employees which doesn't feel empowered. People from outside aren't connected with the quantity and quality of their work for success of whole organization, or for enlarging of payment. Nobody in organization isn't obligated to sell ideas to made profit, but intrapreneurs do that. Jack Raiton in its researches about intrapreneurship, makes comparison between characteristics of intrapreneurs and entrepreneurs. It is about differences and similarities in their motives, time orientation, skills and experience, behaving in environment, resources, mistakes and failures etc. This is explained in figure 2. In his researches intrapreneur is described as person who makes atmosphere for succeeding innovation. It's work is directed toward market through different approaches and different researching. It integrates in a small flexible firm but, it is well known interactive learning and hiding his work or so called "shunkworks".



**Figure 2** Comparison between entrepreneur and intrapreneur [4]

It is important to understand that entrepreneur as well as intrapreneur is directed toward innovation and both are ready to risk taking. Intrapreneur is directed to make innovation in the organization itself, different from entrepreneur who takes risk to start its own business with its own resources. Intrapreneur has harder work comparing to intrapreneur. Entrepreneurs have control over environment, especially internal environment. Financial risk has the organization where intrapreneur works, and on the other hand the financial risk has entrepreneur itself. Failure means bankrupt for entrepreneur and for intrapreneur means returning in the organization. Entrepreneur is a boss, but intrapreneur must cooperate with manager, must find sponsors, especially when he faces with internal criticism and resistance. Important for the style of behaving of intrapreneur crucial element is success. The best for organization is to be lead by intrapreneurs which will follow principles of entrepreneurship. Intrapreneur as well as entrepreneurs has potential to mobilize innovations and resources in some important projects.

## 5. Conclusion

Organizational climate must motivate individuals to take risks and then to be awarded those individuals. For this it is necessary policies and practices to be built in intrapreneurial atmosphere. The key is in reseating of rigid bureaucratic form in organization with all its rules and procedures which inhibits innovation and taking risks. That's why it is necessary for organization to look inside and find those people who has potential to develop business inside organization. It is also necessary to be included of employees in processes of thinking in organization, then empowering employees, giving them information about business and changing the system for rewarding.

To become intrapreneur is a state of mind. For that reason it is necessary to let own imagination and thinking to show the direction for researching. Those steps describe "birth" of intrapreneur in organization.

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# The impact of practical entrepreneurship project (SBIC) on future entrepreneurial intentions: views from the University of South Africa students

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Entrepreneurial activities are arguably effective contributors of economic growth, survival and stability of national economies. As such, educational institutions are directed at developing entrepreneurship curriculum that encourages entrepreneurship behaviour. University of South Africa (UNISA) which is an Open Distance Learning (ODL) institution unfortunately does not provide experiential learning to all their students. In contrast to the post graduation reality, skills and experience or lack thereof deprive graduates of available opportunities. Employment and poverty levels in Africa, particularly South Africa, calls for relevant interventions such as encouraging entrepreneurship behaviour. Indeed, the act of entrepreneurship behaviour lies in the formation of the intention to behave entrepreneurially. Whilst acknowledging the underlying determinants of entrepreneurship intentions in literature such as individual's human capital, individual's cognitions and motivations, and perceived self-efficacy, this study examines the impact of practical entrepreneurship project, the Student Business Initiative Challenge (SBIC) on future entrepreneurial intentions. The SBIC program is an initiative started by UNISA's College of Economic and Management Sciences students to encourage entrepreneurship behaviour. SBIC suggests that entrepreneurial empowerment to the students at tertiary is long overdue. SBIC also reports that students taking part in the program do not only benefit through exploring and learning entrepreneurial traits but also enhance their employability. In this paper we hypothesise that practical projects can intensify intentions of engaging in entrepreneurship. We also provide results in terms of student's experiences, key lessons, and aspirations that influence their future entrepreneurship intentions.

## Keywords

Entrepreneurship; entrepreneurial intentions; experiential learning & SBIC

## 1. Introduction

Although it is widely accepted that entrepreneurship provides opportunities of economic growth, job creation and financial stability, and although Universities worldwide are constantly improving towards a contemporary entrepreneurship curricula, little understanding is known about the factors driving and affecting entrepreneurial intentions among students and distinctions between entrepreneurial intentions [48] & [48], attitudes and behaviours of students in different backgrounds such as culture, ethnicity, norms, family backgrounds and societal grounds [33]; [34]; & [42].

South African entrepreneurship education has focused more on offering education about entrepreneurship which is traditionally focused instead of offering education for entrepreneurship which produces entrepreneurs [4]. For economic growth; South African universities need to start producing entrepreneurs not just entrepreneurship graduates. [17] state that literature on experiential learning of entrepreneurs is limited. Moreover, they indicate that research on entrepreneurship itself continues to neglect the relationship between learning and entrepreneurship. They further point out

that more insight is needed in the experiential learning of entrepreneurs. [26] argue that real entrepreneurs should start businesses not look for jobs. Experiential learning can produce entrepreneurs the same way it produces nurses [5]. Even though entrepreneurship education can be encouraged by experiential learning ([2] & [8]), doing so poses many challenges ([5]; [10]; and [23]; [1]; [25] & [13]).

The purpose of this study is to determine the impact of Student Business Initiative Challenge (SBIC) on the future entrepreneurship intentions of South African students. SBIC is an initiative started by University of South Africa (UNISA)'s College of Economic and Management Sciences (CEMS) students. The purpose of SBIC is to instil practical entrepreneurship experience on students who participate in different initiative. SBIC fulfil this purpose through two approaches. These are: Actual Business-plan and Business Implementation Approach (ABBI) and Entrepreneurship Seminar Series Approach (ESSA). With ABBI, students who participate are given limited resources such as finance to draft a business plan and implement it. But, with ESSA, SBIC organises entrepreneurship seminars wherein people who are entrepreneurs are invited to speak about their practical experience. Students will then be invited to attend the seminars. The focus of the study is on the ABBI approach of SBIC.

The main objective of the study is to report on the impact that the SBIC challenge had in intensifying the future entrepreneurial intentions of students. Results are provided in terms of key lessons learned, the relevance of SBIC challenge and the confidence levels pertaining from SBIC challenge participation. This paper contains a literature review which summarise the logic behind SBIC challenge, the concept behind entrepreneurship, what it entails being an entrepreneur, their behavioural requirements and how entrepreneurs are categorised. The body of knowledge underlying entrepreneurship intentions with developed and tested models are acknowledged. The literature review is concluded by highlighting experiential learning and its impact on entrepreneurship education. The rest of the paper reports on limitations of the study, findings and conclusions.

## **2. Literature review**

### **2.1 SBIC**

As stated on our introduction, SBIC is an initiative started by University of South Africa (UNISA)'s College of Economic and Management Sciences (CEMS) students. The purpose of SBIC is to instil practical entrepreneurship experience on students who participate in different entrepreneurship initiative. SBIC fulfil this purpose through two approaches. These are: Actual Business-plan and Business Implementation Approach (ABBI) and Entrepreneurship Seminar Series Approach (ESSA). The focus of this study is on the ABBI approach of SBIC.

ABBI is a 5 weeks entrepreneurship practical project. This is an action oriented project. To be part of this project, students must write a motivation indicating why they would want to participate in the project. The selecting committee comprising of corporate sector professionals choose students with enough motivations. Selected students are then invited for face to face interview. The purpose of the interview is to determine entrepreneurship traits of the students. Through the face to face interview, the final candidates are selected. The final candidates are grouped into five (mixing them according to field of study and personalities) and candidates will undergo the mentorship sessions where reputable professionals provide guidance and business tips, followed by submission of business plan and then implementation. After the mentorship session, each group is required to draft a business plan. The groups are then given R500 to implement their business plans. And thereafter, a team of a panel consisting of entrepreneurs, academics, professionals assess and choose the best 3 teams for the award ceremony where certificates and prizes are presented.

### **2.2 ENTREPRENEURSHIP**

Entrepreneurship is relatively new and flexible [19] and scholars are finding it difficult to define it due to its relation to economic and behavioural dimensions [23]. However, many scholars who have attempted to define entrepreneurship concurs that it enables individuals to develop their talents and creativity to achieve their dreams, to acquire more independence and a certain feeling of freedom ([6]; [18]; [15]; and [12]). Other scholars view entrepreneurship as a complex process [24] in a daily part of life [3] which involves pursuit of opportunities ([27]; [22]; and [16]), innovation [31], taking risks beyond security, and having the tenacity to push an idea through to reality combine into a special perspective that permeates entrepreneurship [16].

### 2.2.1 The entrepreneur

Defining the entrepreneur is a great challenge [13] and as a result there remain no agreed definition of an entrepreneur [12]. Having followed the origin of the term, which stems from the French verb “entreprendre” meaning to undertake; [12] went on to simply define an entrepreneur as someone who undertakes to make things happen, and does. Other authors ([25] and [19]) view an entrepreneur as someone with an entrepreneurial spirit, takes calculated risks, embrace innovation and takes judgemental decisions.

### 2.2.2 Behavioural requirements of entrepreneurs

[30] Suggest that there are 14 behaviours that are required by the entrepreneur, depending upon the situation in which he/she is to be found. They indicate that these behaviours can be learned. These behaviours are: (1) total commitment, determination and perseverance; (2) drive to achieve and grow; (3) orientation to goals and opportunities; (4) taking initiative and personal responsibility; (5) veridical awareness and a sense of humour; (6) seeking and using feedback; (7) internal locus of control; (8) tolerance of ambiguity, stress and uncertainty; (9) calculated risk-taking and risk sharing; (10) low need for status and power; (11) integrity and reliability; (12) decisiveness, urgency and patience; (13) learning from failure; and (14) team builder and hero maker.

### 2.2.3 Categories of entrepreneurs

[19] categorises entrepreneurs into three: (1) novice entrepreneurs: inexperienced individuals with no prior business ownership interests, and who currently own an equity stake in an economically active firm; (2) serial entrepreneurs: currently own an equity stake in a single economically active firm, and had previously sold or closed down similarly owned businesses; and (3) portfolio entrepreneurs: simultaneously own equity stakes in two or more economically active firms.

### 2.2.4 Entrepreneurship intentions

An entrepreneurial intention is the initial step in the evolution and in most cases process of venture development, the intention to start a business is a preceding element that drives the behaviour to engage in such activities [35]. The aim of intentions is that they focus a person's belief, attention, experience and behaviour towards a specific object or method of behaving [36]. Entrepreneurial intention is defined as the state of mind that guides and directs the actions of the entrepreneur towards the development and implementation of the business concept [37]. Also, [47] & [39] define entrepreneurship intention as a commitment to start a business once the opportunity is recognised; other authors agree that it is also a positive commitment of actions for future entrepreneurship engagement. Intentions are also influenced by personal factors such as skills and abilities and intentions are the single best predictor towards behaviour of executing the [38]. According to [38] such behaviour is often affected by the needs, values, wants, habits and beliefs.

The underlying determinants of entrepreneurship intentions in literature has been identified as namely individual's human capital, individual's cognitions and motivations, and perceived self-efficacy. *Self efficacy* is a person's belief in his/her capability to perform a task. It's an enthusiasm that drives decisions, goals, emotional reactions, attempt, managing and determination [39]. Self efficacy persuades whether individuals are optimistic or pessimistic or will either engage in self hindering or self fulfilling activities [40]. Studies by [41] revealed that increase in self-efficacy leads to an increase in identifying opportunities, thus entrepreneurship becomes a planned behaviour that is influenced by intentions [46].

*Individual's human capital* refers to the skills, attributes, qualifications that individuals possess. This human capital determines the individual's motivation and interest in following an entrepreneurial career path. Human capital has a direct influence on behaviours and attitudes of persons. *Individual's cognitions and motivations*: cognitions and motivation are generally rooted from the individual's societal norms, values, culture, ethnicity and background and involves influential variables of behaviours such as needs, growth, aspirations and motivations and other psychological attributes.

#### 2.2.4.1 Emergence of entrepreneurial intentions

The interest of research in entrepreneurial intentions was influenced by the general aspiration that entrepreneurship will address the problem of unemployment and contribute to economic development

.The psychological literature of entrepreneurial intentions has classified intentions as the theory of planned behaviour from the two models of intentions were developed and tested in the literature namely Azjen theory of planned behaviour (TPB) and Shapero's model of entrepreneurial event (SEE).

#### **2.2.4.2 The Theory of Planned Behaviour (TPB)**

The theory of planned behaviour suggests that most of the human attitudes are intended and engaging in entrepreneurship activities is usually intended by the individual [42]. The hypothesis of planned behavior was proposed by Icek Ajzen in 1985. According to the theory of reasoned action, if individuals evaluated the suggested behavior as affirmative, and if they believed that peers behavior are recommending such behavior, this results in a higher intention and motivation and they are more likely to do so. Notably, there is an elevated relationship of attitudes and personal norms to behavioral intention. In essence, Ajzen argues that intentions generally depend on awareness of delicate personality, societal norms and opportunities.

Given the above literature review [42] concludes by noting that the theory of planned behaviour affirm that the intention to become entrepreneurial relies entirely upon the attitudes of aspiration of entrepreneurial occupation path, societal norms including apparent family anticipations, belief to perform the behaviour, maintain control and the ability to implement the actions of entering into the entrepreneurship career. And this aspiration were measured from the exposure to entrepreneurship education [43]; [33] & [34], exposure to entrepreneurship through family and direct experience [47 &44], and the role of ethnicity which was hypothesised that students belonging to different ethnic groups will possess dissimilar attitudes, societal norms and behavioural control [45].

#### **2.2.4.3 Shapero's model of Entrepreneurial Event (SEE)**

Shapero contends that entrepreneurial intentions are based on the perceptions of personal desirability, feasibility and propensity to act [46]. The models of entrepreneurial event clearly suggest that intentions are derived from perceptions of attractiveness and viability, and a tendency to act upon opportunities. In this model, perceived desirability is defined as the attractiveness of starting a business, perceived feasibility as the degree to which the individual feels capable of starting a business, and propensity to act as the personal disposition to act one one's decisions [48].

A counterargument against the high relationship between behavioural intention and actual behaviour has also been proposed as results of some studies do not show that behavioural intention always leads to actual behaviour because of circumstantial limitations. Namely, since behavioural intention cannot be the exclusive determinant of behaviour where an individual's control over the behaviour is incomplete, Ajzen introduced the theory of planned behaviour by adding a new component, "perceived behavioural control." By this, he extended the theory of reasoned action to cover non-volitional behaviours for predicting behavioural intention and actual behaviour.

### ***2.3 Experiential learning in entrepreneurship education***

There has been a rise in experiential learning (student learning by doing) in recent years (Daly 2001:204) and this is also evident in entrepreneurship education [5]. Experiential learning is said to be the teaching method that produces entrepreneurs [5] and it does so the same way it produces nurses, drivers and teachers. [31] define experiential learning as a process of constructing knowledge that involves a creative tension among the four learning modes. [24] views experiential learning as an experiential process in which knowledge develops through experiencing, reflecting, thinking and acting. Furthermore, many authors ([6]; [28]; [11]; [25]; and [1]) have concluded that experiential learning through venture start-up, real life learning, projects, practical experience, simulation and apprenticeship is the solution to the pedagogical problem in entrepreneurship education. Experiential learning provides many benefits to students, faculties and educational institutions, firms/owner/manager, researchers and government policy makers [11]. According to [21] experiential learning provides learners with fun, exciting and entertaining way of learning. Experiential learning gives students an opportunity to be real not pretenders [30]. In addition, experiential learning create the right atmosphere for learning, put value on students' knowledge, skills and experience, enforce sharing of ideas and increase synergistic learning of participants [25].

### 3. Research Methodology

#### 3.1 Research design

The aim of the study was to examine the impact of practical entrepreneurship project, the Student Business Initiative Challenge (SBIC) on future entrepreneurial intentions. The sample was drawn from a pool of students and represented only a sample of 35 students. This sample arises from the following activities: The advertisement was placed all over for students to participate in this project. All applications were critically scrutinised against a set of qualifying criteria and up to 65 students were shortlisted. All the shortlisted candidates had to go through an interview whereby they had convince the panel that they has to be selected based on personal goals, motivation to run a business, personal initiative,. The shortlisted candidates amounted to a total of 25.

After critical assessment, the 25 students were selected and divided into groups of five representing 5 groups and formed groups whereby they had to initiate a business idea, implement it and earn revenue given a specified budget. This business initiative was converted into a competition at a later stage whereby the best group was evaluated through, profitability, business strategy, marketing, leadership, team work and business plan.

Approximately after six months of the competition, candidates who participated in the SBIC challenge were invited to participate in this study by completing a self administered questionnaire. The questionnaire consisted of both open-ended and closed-ended questionnaires. The first part of closed-ended questions represented student's demographics and the second section represented questions on a 3 -5 point likert scale, questions explored and summarised the overall experience from participating from the SBIC challenge. The questionnaire also covered pre-SBIC questions which included students stating their exposure to entrepreneurship experience prior to the challenge. Open ended questions allowed to do an exploratory study on future entrepreneurial intentions and included questions of whether students had intentions of starting the business in the next two years after participating from the program, and state if they acquired skills, knowledge and abilities to pursue the business in future and also to highlight key lessons, experiences and activities which stood out from participating in this program

Only 22 usable questionnaires were returned and the results are reported as follows:

**Table 1** Students learnt something valuable from the SBIC challenge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	12	54.5	54.5	54.5
	Strongly agree	10	45.5	45.5	100.0
	Total	22	100.0	100.0	

**Table 2** The level of confidence in attending the SBIC challenge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	4.5	4.5	4.5
	Agree	10	45.5	45.5	50.0
	Strongly agree	8	36.4	36.4	86.4
	Not applicable	3	13.6	13.6	100.0
	Total	22	100.0	100.0	

The results clearly indicated that more than half of the students learnt something valuable from participating in the SBIC challenge and 36.4 % strongly agreed that they developed more confidence in attending the workshop.

**Table 3** SBIC Challenge relevance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very relevant	12	54.5	54.5	54.5
	Relevant to some degree	10	45.5	45.5	100.0
	Total	22	100.0	100.0	

About 54.5% students agreed on the relevance of SBIC challenge with the remainder 45.5% students agreed to some extent. 0% of the results indicated the irrelevance of the SBIC program.

**Table 4** Increase in the level of motivation from the participation in the SBIC challenge

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Average	2	9.1	9.1	9.1
Good	9	40.9	40.9	50.0
Excellent	11	50.0	50.0	100.0
Total	22	100.0	100.0	

More than 90% of the students believed that their motivation level increased whilst only 2% were on average not sure of their motivation levels given the experience from the challenge.

**Results from future entrepreneurial intentions.** More than 72% intend on starting their businesses in the next two years and reported that the SBIC challenge intensified their intentions in starting a business. The 22% percent highlighted that life circumstances in future will determine the need to open a business. This group was deemed as uncertain to participate in the study.

**Key lessons learned from participating in SBIC project.** Most of the skills, knowledge and ability acquired from this challenge were reported as communication skills, interpersonal skills, planning skills, business skills, marketing skills, sharing ideas, team work, research skills, time management skills, good relationships, patience, business plan drafting, risk taking, customer service skills, administration skills, professionalism and marketing intelligence.

#### 4. Limitations of the study

All participants who participated in the SBIC challenge are from the black population however results of this study cannot be generalised to the whole South African population. Furthermore, it could be argued that the University of South Africa student statistics is majorly represented by the black students. The small sample size is also seen as a limitation as it provides minimal basis for analysis. However, the strict process in selecting candidates to participate in the SBIC challenge also provided a reliable sample frames as interviews were conducted prior to the SBIC challenge.

#### 5. Conclusions and recommendations

From the results of the study, it can be concluded that indeed practical business project can intensify the entrepreneurial intentions of students in engaging in future entrepreneurship activities. Furthermore the practical business project identifies the necessary skills, and unknown skills of the students become exploited. It is therefore recommended that University adopt this initiative to encourage and intensify entrepreneurship intentions among its students.

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# Information sharing in the digital enterprise: RFID and ERP system integration

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Modern manufacturing enterprises are coping with an increasingly complex, dynamic and competitive environment thanks to globalization and rapid development of information and communication technologies (ICT). Manufacturing enterprises have to achieve sustainable competitive advantage through greater integration, information sharing, customization and flexibility. The purpose of this paper is to illustrate the model of just in time coordination and integration of internal supply chain (SC) activities based on radio frequency identification (RFID) in a digital enterprise. The innovation in RFID is not in the technology itself, but in its deployment in real-bussines situations. RFID implementation is a way to improve efficiency and effectiveness of enterprise. Integration of RFID technology with enterprise resource system (ERP) enables fully integrated enterprise system and improved information sharing and supply chain visibility. Thus a more effective and efficient business processes and real-time information about product movement visibility through enterprise system for management support in digital enterprise will be attained. Methodology applied is a review of the available literature about RFID, as well as practical experience. Research limitation is that validation of the proposed model is required through practical implementation in manufacturing sector.

## Keywords

Enterprise resource planning system, Digital enterprise, Integration, Radio frequency identification

## 1. Introduction

Globalization and rapid development of information and communication technologies (ICT) have resulted in an increasingly complex, dynamic and competitive environment. Facilitating of efficient and cost-effective responses to the uncertainties in a global market is a major problem coping manufacturing enterprises. Information sharing can be considered as a source of competitive advantage and, for that reason, sharing information through enterprise and whole supply chain is very important. Enterprises tend to improve competitive advantage through greater integration, information sharing, customization and flexibility. Information must be timely, accurate, complete, adequate and reliable. It is necessary to share real-time manufacturing information and to coordinate all activities of business processes. Lack of accurate real-time work-in-process information may adversely impact the effectiveness, especially of just in time manufacturing (JIT) and supply chain planning. Using Radio Frequency Identification (RFID) technology physical objects (raw materials, parts, products, equipment, shipments and personnel) could be integrated by assigned identity (which is typically a number unique to each object) with the enterprise resource planning (ERP) system in the real time and that is very important for information visibility and information sharing in a digital enterprise. Thus a more effective and efficient business processes and real-time information about product movement visibility through enterprise system for management support in digital enterprise will be attained. The innovation in RFID is not in the technology itself, but in its deployment in real-bussines situations. Integration RFID with ERP is very important to the successfully sharing of up-to-date information throughout whole enterprise and the supply chain.

## 2. Problem description

Manufacturing enterprises of developing countries like Croatia are coped with problem of quality of production logistic with aim to increase capabilities for competitive response to demands of market or supply chain partners. Today, products become more complex with the increasing number of variants, shorter duration of production and product lifecycles. It becomes necessary to reduce production volumes and introduce a make-to-order production system in order to make products that satisfy customer specific needs. This can only be achieved by the application of production management information systems aimed at coordinating different manufacturing units. Enterprise application as ERP system provides managers with information and enables them to make the effective decisions. Also, ERP system has an important role in supply chain management.

Business processes of manufacturing enterprises are more and more information intensive. Control and monitoring of these processes is not easy. Coordination, integration and especially sharing information in real-time about resource constraints, plans and schedules through whole enterprise and supply chain partners is very important [1]. Variation in production affects downstream member of supply chain (e.g. supply of parts to assembly line). Without accurate real-time work-in-process information the current shop floor control and tracking process can not be efficient [2]. Croatian enterprises mostly use labor-intensive methods (enter data manually and using bar-code systems) for products-related data acquisition. Due to limitations in data acquisition and data interchange between shop floor and ERP system, data is often unreliable and uncomplete and needed production status information are unavailable at the right place and at the right time to make effective decisions. As a consequences of problems in existing methods of identifying and tracking parts and products, mislay of parts or products, schedule delay and late deliveries occurs and costs increase.

Automated data acquisition and integration of RFID and ERP system is necessary to enable real time information sharing, meaning delivery of the required information timely and to everyone whose need them through integrated enterprise system and supply chain.

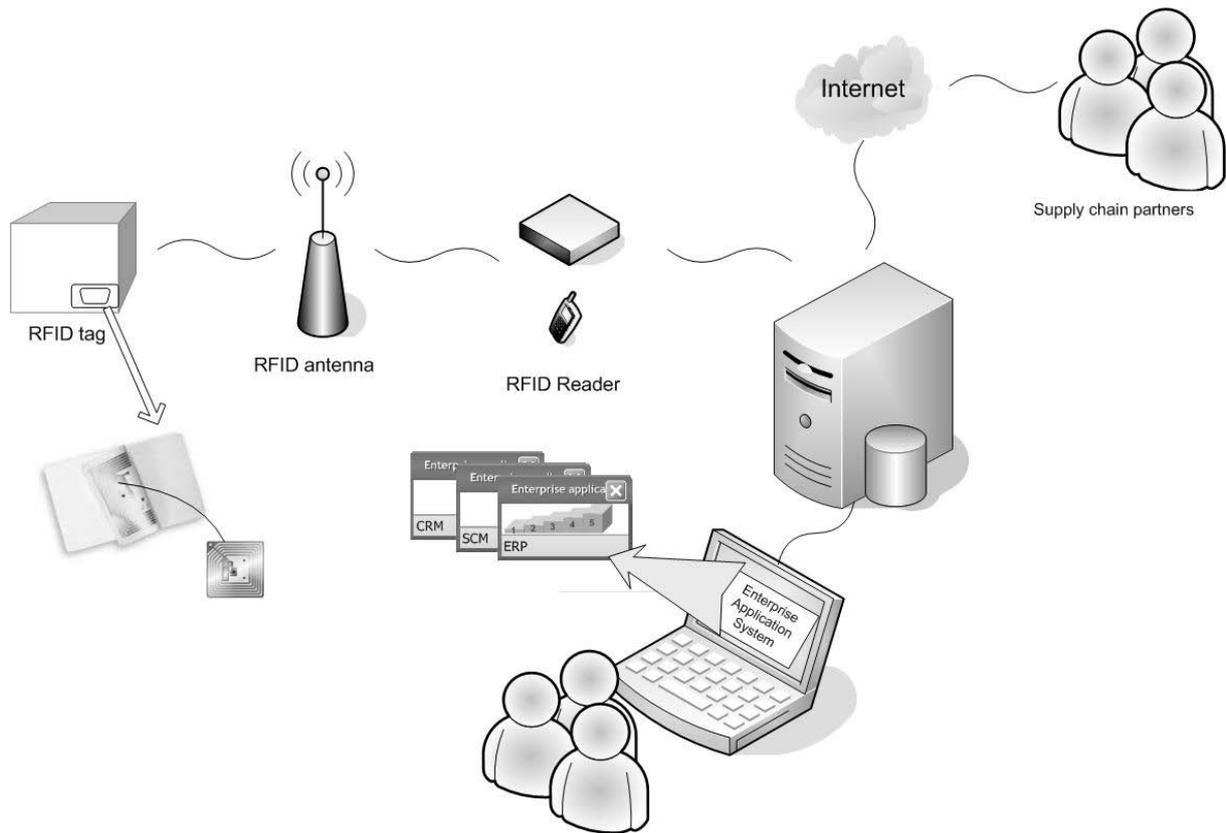
## 2. RFID technology

Automatic identification and data capture technologies include barcodes, RFID, optic character recognition (OCR), magnetic stripes, smart cards and biometrics. RFID have advantages compared with others automatic identification technology: long reading ranges that enable automatic identification at varying distances, real-time read/write capabilities, data storage on the component, do not require line-of-sight for reading, enduring in harsh environment [3,4]. Radio frequency identification (RFID) is an automatic identification method that use radio waves to acquisition and transmit data from an integrated circuit tag attached to object through a wireless interchange to a host computer.

Basic elements of an RFID system are (Figure 1):

- RFID tag,
- a tag reader with an antenna,
- a computer.

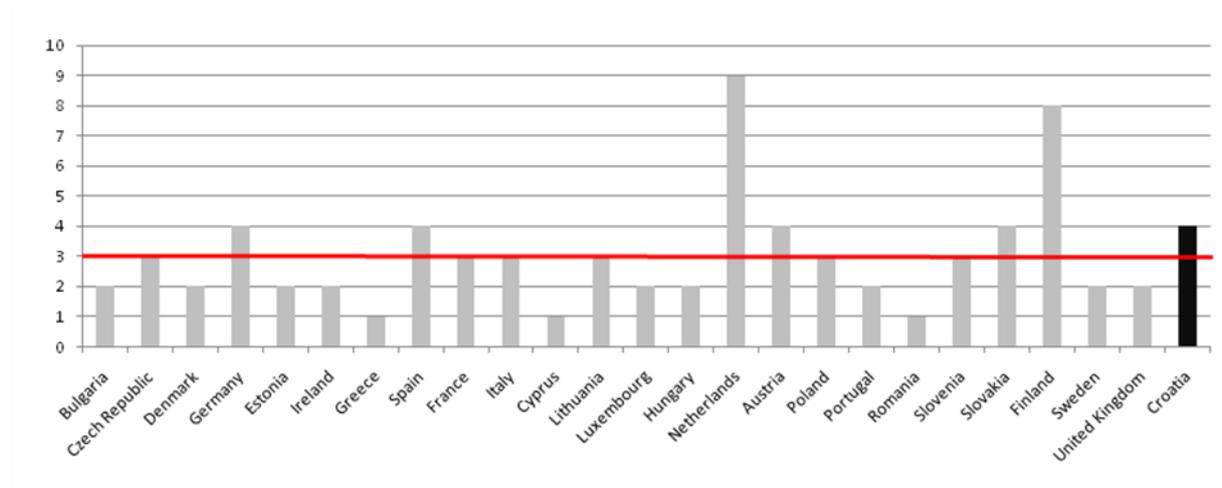
The RFID tag includes a small microchip and an antenna. Data are stored in the tag, as a unique serial number EPC (Electronic Product Code). The RFID reader functions as a transmitter/receiver. The reader provides the tag with power required for operate. The tag transfers data to the reader via the antenna and then reader transfers data to a server. RFID automatically identify objects that are within given range and transform the physical flow of materials into the information flow. There are wide variety of applications of RFID technology (e.g. person identification and service control, supply chain and inventory tracking, payment application, product identification, monitoring and control of industrial production), e.g. [5, 6, 7, 8] and there is continuously growth in usage of RFID technology in different areas, according to IDTechEx Report the value of the entire RFID market will be \$5.63 billion in 2010., up from \$5.03 billion in 2009 [9].



**Figure 1** Components of RFID integrated with enterprise application system

The most of available literature about RFID technology is focused to application of RFID technology for warehouse management and supply chain, e.g. [10, 11]. Applications of RFID in EU enterprises are still relatively limited, 3% of enterprises on average used RFID in 2009. The highest shares of enterprises using RFID had the Netherlands (9%) and Finland (8%) and the lowest shares of enterprises had Greece, Cyprus and Romania (all 1%) [12].

According to the Croatian Bureau of Statistics for first quarter of 2009, there are 4% of all enterprises in the Republic of Croatia that use RFID technology (Figure 2), and that corresponds to the EU average [12, 13].



**Figure 2** Enterprises using RFID in January 2009 [12]

## 4. Proposed Model

On the basis of practical experience and review of available published literature, the conceptual model that can facilitate the collection and share of information through whole manufacturing enterprise and supply chain was developed to support just in time delivery. The conceptual model is based on integration of ERP system and RFID technology.

The basic purpose of ERP system is shorten the duration of production preparation and production itself, reducing costs, flexibility compliance with market requirements and capability of readily alliance at new jobs and information sharing during realisation, that becomes indispensable in globalisation requirements [14].

Our model is based on just-in-time principles (produce and deliver products or services as needed by customer or required by hierarchically superior level in the right quantities, just in time and right place and avoiding storage, whenever possible or using minimal inventories).

Conceptual model of integration RFID with ERP system includes hierarchical planning model that integrates sales planning, assembly planning and production scheduling and generates plans which respond to the dynamic nature of the manufacturing system [15, 16]. The main goal in connecting three levels of planning by the application of just-in-time principle is increasing effectiveness of production, timely delivery of finished products/services to the customer or parts and subassemblies to a product assembly according to hierarchically superior level of plan.

In order to provide a just in time environment, status information of manufactured parts should be available to all who needs that information in enterprise in real time. Placing RFID tags on objects (as a parts, subassemblies, products, case of products, pallet, or shipping container) enables effective tracking of items in the production process. RFID technology enables fast data acquisition and transfers of data to databases as a part flows through shop floor and also across whole internal as well as external supply chain. There is a need for efficient and effective transformation of RFID data into congruently reports, and share information both internally within the enterprise and with supply chain partners.

The model of information sharing (Figure 3) includes the processes from customer orders through manufacturing and product assembly to delivery of the product to the customer. The hierarchically superior levels and subordinate levels of planning are interdependent in terms of the Japanese just-in time principle and coordination between the three levels of planning. One of the main objectives of hierarchical planning model is to keep the due date equal to the required date in order to meet customers' demands. The solution of a subordinate planning/scheduling level must meet the requirements at the superior planning level. Integration of RFID and ERP systems enables capturing data about real-time production status directly from production (e.g. accurate information about inventory levels, about start time and finish time of operation - then system calculates total real operation duration). That enables dynamic and real-time control of production and constantly adjustment of the production schedule to any disturbance.

The coordination of internal supply chain is completely realized when parts from manufacturing are transferred to the following phase (product assembly) right after it has been finished depending on the date required by the hierarchically superior plan at the level of assembly activities planning or sales department planning, respectively. Thus, integration of ERP system and RFID technology enables real-time information sharing, data accuracy, real-time tracking work orders, parts and products through internal and external supply chain.

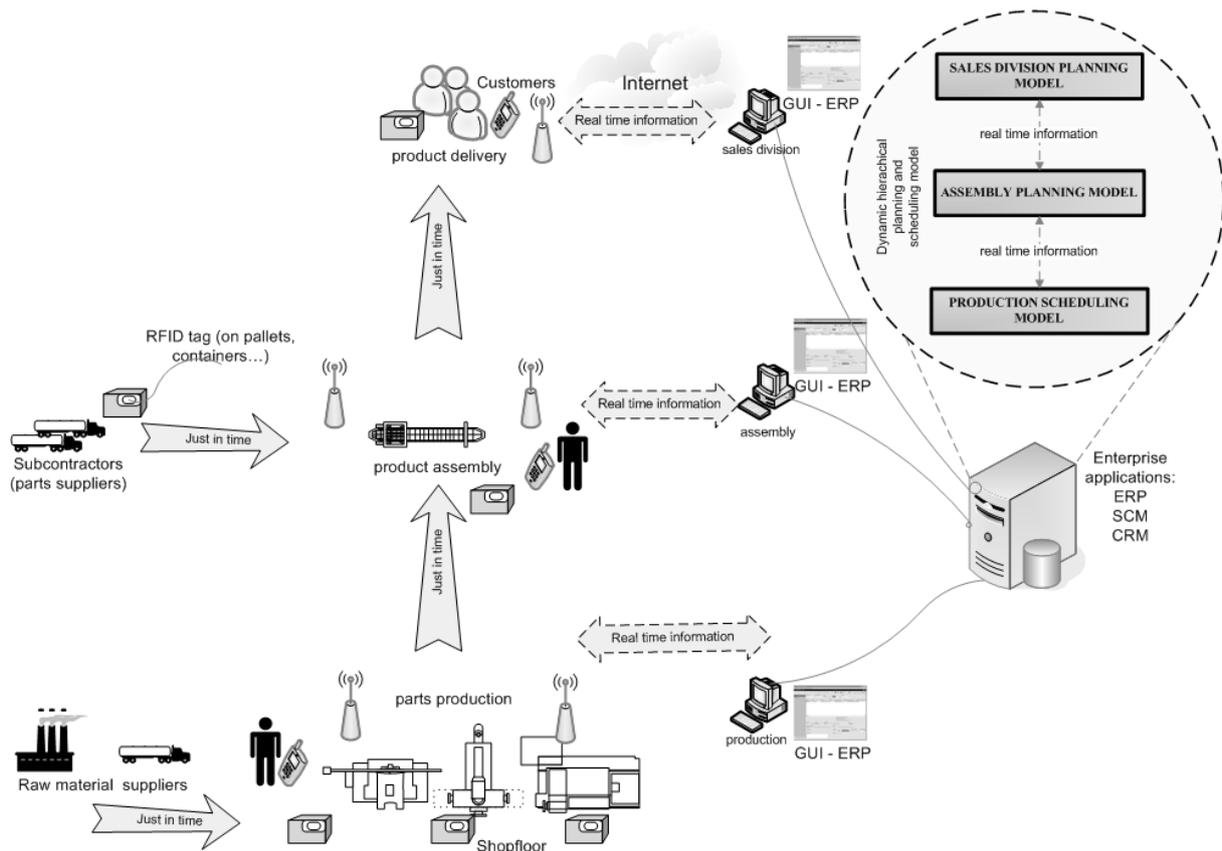


Figure 3 Model of information sharing enabled with RFID and ERP integration

## 5. Conclusion

Manufacturing enterprises by using modern automated identification techniques, like RFID, and by integration of RFID with ERP system, can now produce variants of a product, with small batches, down to a batch size of one piece. Integration of RFID technology with enterprise resource planning system enables fully integrated enterprise system and improved real time information. The main purpose of integration of RFID and ERP systems is to use real-time production status directly from production (e.g. ensure accurate information about inventory levels, about start time and finish time of operation - then system calculates total real operation duration). Thus a more effective and efficient business processes and real-time information about product movement visibility through enterprise system for decision making support in digital enterprise will be attained. Validation of the proposed model is required through practical implementation in manufacturing sector.

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# Entrepreneurial Finance and Venture Capital – case of Italy and Slovenia

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**Entrepreneurship and financial sources usually go hand in hand, especially when speaking about innovative, technological, potentially fast growing start-up companies. Lack of financial sources at the very beginning of the entrepreneurial growth, the so called “death valley”, is a common weakness of majority of the start-up companies.**

**Venture capital is one of the financial sources, taking place on the path from the early stage to the maturity. However, there are several limitations and misunderstandings connected to the idea behind the Venture capital industry. This “equity gap” is caused by a number of interrelated factors: lack of information, a weak incentive structure for early stage investments, unwillingness to take risks, unfavourable tax provisions, lack of exit possibilities, etc. As a result of the “equity gap” fewer innovative enterprises are founded in Europe, and their prospects for growth are inhibited. Many bright and innovative European ideas end up being developed in the United States or elsewhere, where capital, know-how and the business environment are more conducive to their development and success.**

**In the paper we will present some theoretical and practical points of the Venture, and Seed capital industry as well as our own practical cases of managing public-private venture capital funds in Italy and, more recently, a new fund in Slovenia. This will present an initiative, interesting for the region of South-east Europe for leverage entrepreneurship and developing novel tools in the field of early stage financing. It will in addition represent a potential opportunity for local global born companies, entering Italian or Slovene market, looking for finance, partnerships and/or new opportunities.**

## **Keywords**

Financing, Knowledge-based entrepreneurship, Public-Private Partnership, Seed capital, Venture capital.

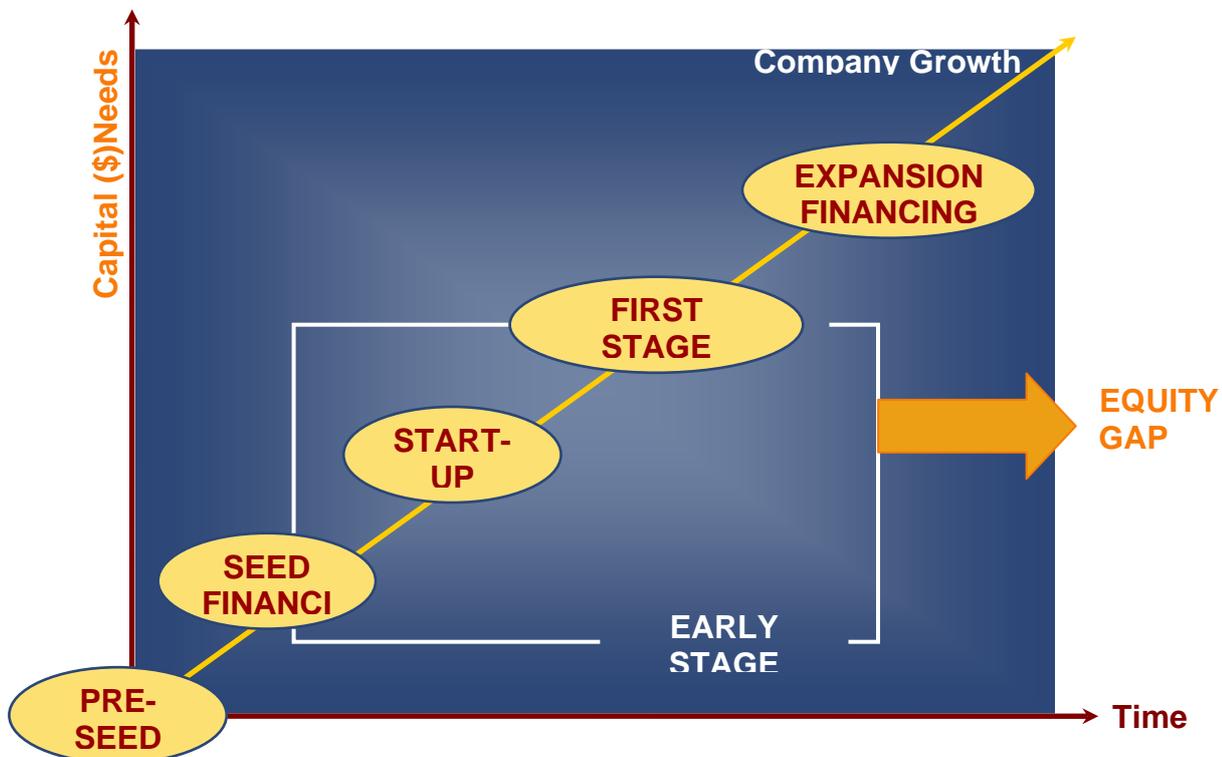
## **1. The Equity Gap**

Private investors are known to be important sources of financing for Knowledge-Intensive Start-Ups (KISs). However, little has been documented about the nature or impact of financial and non-financial contributions that informal investors provide to businesses.

The way in which the issue about early stage finance is posed in much of the literature is that on the one side there is an entrepreneur seeking finance and on the other there is an investor seeking to employ capital profitably. The entrepreneur has ideas and, often, human skills, and the investor has money. The investor does not simply sit back and wait for returns to appear, there is active involvement in the development of the idea. Without that active involvement, investors perceive high risks and low returns from investment and entrepreneurs find themselves unable to raise capital. Entrepreneurs are therefore discouraged from applying for finance and costs of finance appear high. Therefore entrepreneurs and finance are apparently both in short supply.

Uncertainty and informational asymmetries that characterise “traditional” companies are amplified for KISs making it more difficult for them to access financing. First, the returns to really innovative

entrepreneurial activities are often skewed and highly uncertain. Second, entrepreneurs may possess more information about the nature and characteristics of their products and processes than potential financiers. Third, innovative activities are usually intangible thereby making the assessment of their monetary values difficult before they become commercially successful. Thus, financing KISs is very risky and uncertain, making it difficult to come up with a mutually agreeable financing contract.



**Figure 1** Different financing stages

Europe has witnessed a strong upward trend in early stage investments in Knowledge-Intensive Companies (KICs) during the last decade. Compared to the United States, however, the equity gap in early stages is still considerable in many European countries.

Too few new business ideas are developed. This “equity gap” is caused by a number of interrelated factors: lack of information, a weak incentive structure for early stage investments, unwillingness to take risks, unfavourable tax provisions, lack of exit possibilities, etc. As a result of the “equity gap” fewer KISs and innovative enterprises are founded in Europe, and their prospects for growth are inhibited. Many bright and innovative European ideas end up being developed in the United States or elsewhere, where capital, know-how and the business environment are more conducive to their development and success.

The difficulties of new companies to getting early stage financing are due to the inability of this category of firms to provide a sound track record to investors, the low level of guarantee and a long wait (some years) before generating a positive cash flow. All these barriers evidently increase with the degree of innovation involved such as strong presence of intangible assets, not previous managerial experiences of the team, business model not well defined (higher the innovation higher the risks associated).

In spite of there is still a resistance of the supply side in investing in the early stage, in the last years different equity tools are available but nevertheless the demand is relatively low and not qualified, “not investor ready”. The use of debt and equity is not either - or, but depends on the needs, development phase of the enterprise and the level of acceptance of entrepreneurs of third investors in the company. An important cause of the lack of demand is cultural: some business owners see the need to look for external finance as a sign of weakness and they are not ready to accept the control of this new partner. This cultural barrier is very significant in European countries. Networking with informal investors could be the reply to the equity and experience gap [1].

## 2. Early stage financial sources

Knowledge intensive start-ups are due to before mentioned barriers not appealing for traditional financing operators so new tools aimed at supporting the equity component have been created during last year: seed funds, business angels, venture capital funds.

### 2.1 Who are Business angels?

Business angels (BA) are private individuals who invest part of their personal assets in one or more start-up (becoming shareholders of the company) and also share their personal business management expertise and network of contacts with the entrepreneur. Business angels do not have any prior relationship with the entrepreneur. Angel intervention is long-term (so called patient capital) and may take a variety of forms.

Intervention by one or more business angels in a company generally takes the form of active involvement:

- As advisor
- On the Board of Directors
- As part of the management team

Business angels invest €25,000 to €250,000 in individual businesses – up to €400,000 in the United Kingdom. On average in Europe, business angel investment per deal averages €200,000 (by 2 to 3 angels per investment round). In some countries, business angels may invest up to €2.5 million when operating as part of syndicates or by leveraging their involvement through co-investment funds.

By doing so, they fill the so-called “equity gap”, period in which entrepreneurs have the hardest time to find funding for their young innovative company, lacking collateral needed for debt funding and not attractive enough to venture capital funds typically investing over 3 million€ per deal at the moment.

The graph is showing different stages of the capital needs for companies at different time scale of their growth.

Business angels are typically 35 to 65 year-old men and women (only 5% of the investor community) with considerable experience of the business world and the ability to invest time and money in companies. This activity is becoming more widely practiced and new business angel profiles are emerging [2].

### 2.2 What is a Venture capital fund?

Venture capital is the term used when investors buy part of a company. A venture capitalist places money in a company that is high risk and has a high growth. The investment is usually for a period of five to seven years. The investor will expect a return on his money either by the sale of the company or by offering to sell shares in the company to the public.

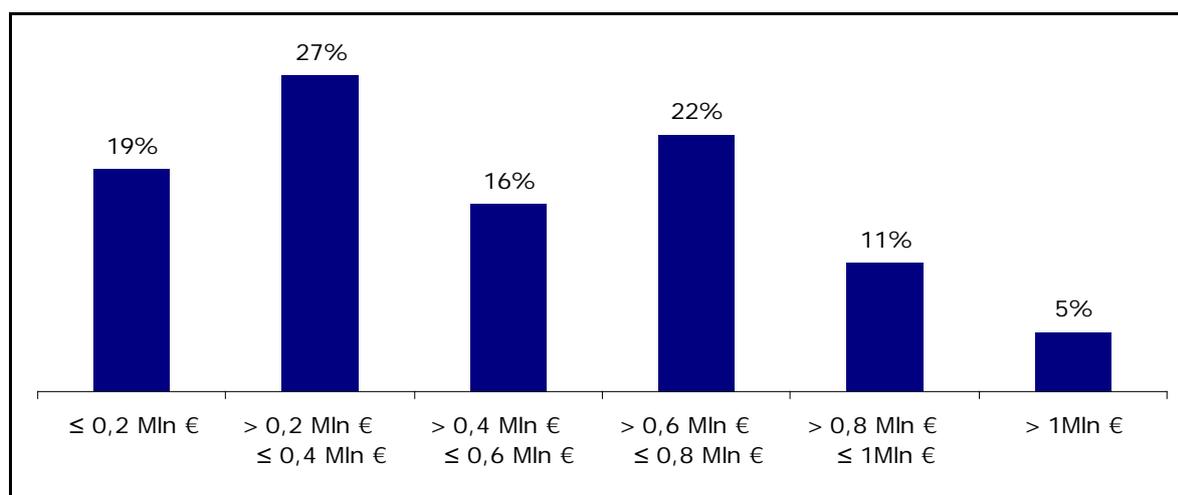
When investing venture capital, the investor may want receive a percentage of the company's equity, and may also wish to have a position on the director's board. Always remember that an investor who agrees to place venture capital in a company is looking to make a healthy return. He can demand repayment by the sale of the company, asking for funds back or renegotiating the original deal [2].

### 2.3 What is a Seed Fund?

Seed Funds are particular investment funds focused on investing in business ideas, projects or start-up companies for proof of concept, market search, or initial product development. Seed Funds are the result of the evolution of the international risk capital market and they represent an attempt of bridging the equity gap that is enlarging over time between angel investments and venture capital investments.

Seed funds are trying to respond to a market gap in the financial chain of players active in the development of new companies characterizing themselves as a separate asset class. The average amount invested by Seed Funds perfectly bridge the equity gap between business angles that generally do not invest more than 200,000 Euro, and traditional venture capital funds that invest on average more than 1,000,000 Euro. In fact, the average amount invested per deal by Seed Funds is aligned to the capital need of start-up companies in their first stages, with the 65% of the investments around 200,000 Euro and 800,000 Euro.

**Table 1** Average amount invested per deal



Another important element of Seed Funds is that they usually have a regional dimension in the scouting of seed initiatives. A physical presence is not only necessary for “finding” the best ideas but also for supporting the entrepreneurs in setting up the strategy of the company and manage the business, similarly to what business angels do.

Moreover, Seed Funds are generally sector agnostic. To be more precise, while traditional venture capital funds are focusing more and more only on ICT, Biotech and Renewable Energies sectors, Seed Funds, thanks to their regional dimension and to the close collaboration with business angels that are typically ex-managers or professionals coming from various industries, are able to ignite fast growing start up also in more traditional industries, still guaranteeing adequate returns for investors. A strong network is important not only for the development of a solid deal flow of initiatives but also to find other private resources that could be used for investing in starts up companies. According to that, in some markets such as France and UK, in order to promote entrepreneurship and stimulate risk capital investments, the public sector created special co-investment funds that invest *pari passu* directly in the target company in conjunction with selected private investors, either institutional or informal, if certain conditions are satisfied. This kind of structure, commissioning the scouting and due diligence phase to private investors, are becoming an effective instrument to stimulate private investors in entering into new businesses.

Seed fund manager have a set of skills that are quite different from those required by a larger VC fund; they relate to the skills needed in evaluating and nurturing a company at the seed phase i.e. a small entrepreneurial team an untested product and a business plan that will probably change many times in the first two years. These skills are clearly biased on the capability of evaluating and supporting the team building plus a clear understanding of the market rather than on financials and technology.

Finally it is important to highlight the structural difference between “seed funds” i.e. funds with a size of 5-25 million € that invest mainly in seed phase and seed investment made by large funds of 50-500 million € dedicating a small percentage of their capital to the seed phase. The first type of funds are normally regional, sector agnostic invest between 0,3-2 million € and represent the average type of EBAN associate while the second would be normally sector specific, invest 3-25 million € and more and would normally be EVCA associate [2].

#### 4. Case of Italy and Slovenia

Six seed funds in Italy and one newly established venture capital fund in Slovenia, all public-private funds, are managed by a private management company - Zernike Meta Ventures (ZMV). This is a financial company authorised by the Italian Exchange Office which operates in the risk capital sector for start-ups.

From 1996 the two ZMV shareholders, META Group Srl and Zernike Group Holding Bv, manage seed funds and start up funds with the aim to support the creation, first, and acceleration, then, SMEs high-growth potential. Building on the experience acquired at international level by the two above

mentioned partners, with around € 180 millions managed and investments in more than 500 start ups, ZMV provides the enterprises in its portfolio also with an extensive array of services for acceleration and internationalisation. The joint fund raising activity targets financial institutions, insurance companies, banks, the representatives of international industries, venture capitalists and institutional investors.

The funds management is based on the evaluation of the market potentials, the quality of the team and the viability of the proposed business model. Over the last 12 year the joint venture between META and Zernike has evaluated more than 2.500 knowledge intensive business projects.

Given the rich experiences of managing such funds, it can be clearly stated that such a financial tool is an important mechanism for enable innovative companies to grow fast, to enter global markets and to contribute to regional development and competitiveness.

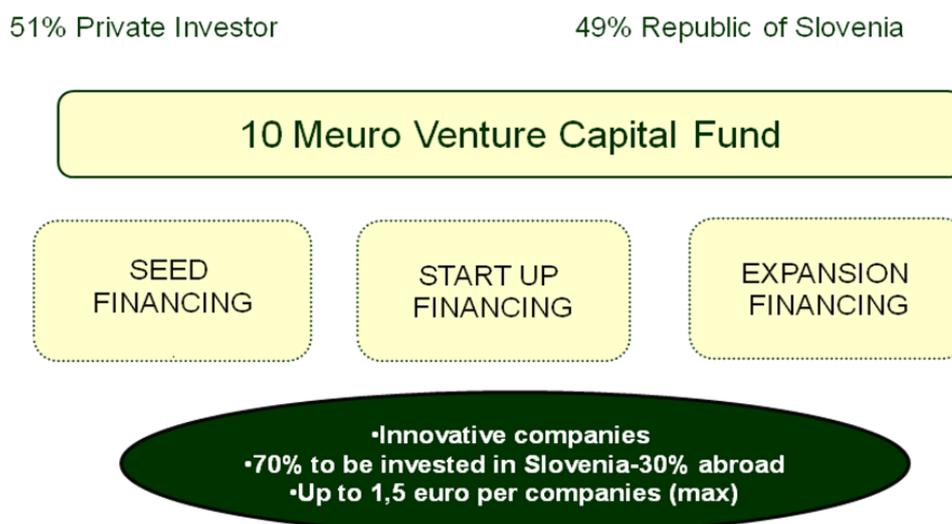
#### 4.1 Investment policy

In general the investment policy of the Funds is similar and based on the following criteria: i) The investments are targeted to projects having an innovative character or/and a high technology content and aiming at international dimension; ii) In the selection of enterprises the Fund prefers enterprises with a strong growth potential; iii) The investments tend to be directed toward the enterprises characterised by significant competitive advantages with a strong growth and development potential, strong professionalism and by a reliable entrepreneur project and potentially able to obtain positive economic results.

Each project must be illustrated by a business plan which allows the evaluation of the technical, economical and financial validity and the suitability with respect to the pre-established objectives. Funds invest in businesses that show a clear competitive advantage, address a demonstrated customer need and are expected to achieve positive cash flow within 18-24 months (as average).

#### 4.2. Venture capital fund - Slovenia

Funds managed by ZMV are all public-private funds, with similar set ups. For example, venture capital fund in Slovenia is composed of 49% of funds provided by Republic of Slovenia through ERDF and 51% of private funds. The aim of Republic of Slovenia to introduce such an initiative was: to increase the VC market in Slovenia; to increase the entrepreneurial culture and understanding of VC investing in Slovenia; to accelerate new start-up and spin-off companies born; to attract foreign investors; to increase portfolio of knowledge based companies; to increase the portfolio/availability of equity financing in Slovenia. Having a more mature venture capital market will increase also the attractiveness of foreign companies to explore the Slovene market as well as foreign investors to scout for good investment deals.



**Figure 2** structure of Venture capital fund in Slovenia (Meta Ingenium)

## 5. Conclusions

In order to overcome the equity gap of knowledge-intensive start ups, such novel financial tools are of great importance for a sound development and competitiveness of the regions. A growing marketplace of early stage financial mechanisms has been stimulated by an increased awareness, Europe-wide, of the activity of early-stage investors and their contribution to the financing of high-growth innovative companies.

With the recent economic and financial crisis, this realisation has increased as both traditional sources of funding (debt funding through the banks) and traditional venture capital funds have either slowed down financing early- stage SMEs or have focused on their current portfolio. In particular, business angels and early-stage funds have been recognised as a vital source not only of seed capital but also of experience and knowledge available to innovative companies [3].

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# Market positioning in the process of design of new product

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**People with cerebral palsy have many problems and difficulties while executing everyday activities. Their wheelchairs are part of their every day to the rest of their life. In order to find a way to make living easier for these people, in collaboration with the Center for orthotics and prosthetics – Slavej extended research was conducted with the aim to design an ergonomic, multifunctional wheelchair which will fulfil and satisfy all requirements and standards for quality, comfort, therapeutic-medical aspects and will result as a reasonably priced wheelchair.**

**In this paper only one small part from the whole research is presented, emphasizing only the analysis of the capabilities of the Center for orthotics and prosthetics – Slavej in relation with the competitive companies and its marketing positioning on the Macedonian market for wheelchairs meant for children with cerebral palsy.**

**This center although is one of the few in R. Macedonia, has strong competition when it comes to production of wheelchairs for children with cerebral palsy from the producers from all over the world, present with their products on the Macedonian market.**

## Keywords

cerebral palsy, marketing positioning, product design, product development

## 1. Introduction

People with disabilities are population which in R. Macedonia is a little bit neglected in every meaning of the word. There are few Centers that provide daily care and services for people with disabilities, on the Macedonian market there is lack of availability of devices for assistance, and still public buildings are not available and the awareness of the whole nation regarding this issue is very low. This is one of the main reasons why more researches, papers and publications of this kind, treating people with disabilities in any manner, are needed.

People with disabilities differ regarding the type of disability. In this paper, only children with cerebral palsy are targeted. Cerebral palsy is damage of the brain which can be represented on the locomotion system with different level of paralysis. This occurs after the birth and it lasts for the whole life. This means that these children are bound to the wheelchair for their whole life. This evokes the need for creating special wheelchair which will fulfill/satisfy all needs of these children in the completion of their everyday activities. An extended research on this issue was conducted in a master thesis with main goal to design multifunctional wheelchair for children with cerebral palsy.

## 2. Analysis

Marketing positioning is a part from the marketing strategy that companies create in order to have successful product. Marketing strategy is in fact company's plan for achieving the goals that have been determined. One step of that process of creating marketing strategy is to position the company on the market which will give nice picture of the moment situation on the market regarding the competition.

This paper presents a marketing positing for the Centre for orthotics and prosthetics - Slavej, in order to understand the situation at the moment and to identify the possibilities for an improved new product. Slavej's core activity is taking care and treating people with disabilities, through therapies and production of different devices for assistance.

The expected result from this research is to develop a completely new product, wheelchair for children with cerebral palsy aged 7-14. Children with cerebral palsy may have additional health problems and to fulfil their specific demands the wheelchair should be adjustable and multifunctional.

Throughout all of the conducted research, few important characteristics of the wheelchairs were analyzed and according to the results a map of marketing positioning was made. The map has the role to assist in defining the needed changes in order to achieve the desired market position. The research was conducted on 50 children. This is a special sample and it was randomly chosen from the whole population of children with cerebral palsy. In this paper 11 producers of wheelchairs for children with cerebral palsy were analyzed. The producers were chosen because of the similarities of their key functions with the new wheelchair that Slavej wants to produce. The propulsion for these wheelchairs is manual. Most of these wheelchairs are not directly sold in R. Macedonia but they are available to order.

### ***2.1 Customer's ranking of the characteristics according their importance***

The first step in the conducted research is to rank the characteristics of the wheelchairs according their importance. For that matter a list of characteristics of wheelchairs was created, and the task of the respondents is to rank the characteristics according importance based on their subjective opinion. The characteristics in the list are not chosen by accident, but according to another research which was conducted only for that matter to see which characteristics of the wheelchairs are most important and have biggest influence on the buyer for purchasing them. Most of the characteristics are regarding the comfort, adaptability and therapeutically effect, given the fact that these children with cerebral palsy spend all day in them.

List of characteristics:

- Comfortable seat,
- Adjustable seat height,
- Adjustable seat width,
- Adjustable seat depth,
- Adjustable height of the back rest,
- Lumbar support,
- Head support,
- Adjustable height of the head support,
- Adjustable width of the head support,
- Leg support,
- Feet support,
- Compartments for storage of spear parts and luggage,
- Table for various activities,
- Reliable,
- Durable,
- Affordable price,
- Additional elements for entertainment,
- Low cost for spare parts,
- Variety of colors and materials.

From this list few characteristics were taken and some new were created which combine few old ones, and these characteristics were used in the research. Here is the list of the chosen characteristics:

- Good design,
- Comfort,
- Reputation of the company/producer,
- Low cost for spare parts,
- Durability,
- Price.

We determined by ourselves the ranking scale in this case we use 7 graded scale, where the number 1 stand for the least important characteristic and number 7 stand for the most important characteristic.

**Table 1** Rank of the characteristics according their importance

Characteristics	Grades						
	1	2	3	4	5	6	7
Good design				7	12	11	20
Comfort				10	20	10	10
Reputation of the company	2	3	10	5	5	12	13
Low cost for spare parts			3	5	5	27	10
Durability						13	37
Price					7	10	33

## 2.2 Calculation of the relative importance

After conducted ranking of the characteristics according to their importance, grades for every one of the characteristics are collected.

Example: Good design  $4*7+5*12+6*11+7*20 = 294$ ;

Where the multipliers (4, 5, 6, and 7) are grades that the respondents gave to the characteristic good design and the other multipliers (7, 12, 11, and 20) represents the total number of respondents which gave points for every characteristic accordingly. In the table 2 total points for every characteristic are given.

**Table 2** Total importance of every one of the characteristics of the wheelchairs

Characteristics	Total
Good design	294
Comfort	270
Reputation of the company	246
Low cost for spare parts	286
Durability	337
Price	326

From this table the relative importance can be calculated for every characteristic. Relative importance is result of the division between the total of some of the characteristics and the total of the all characteristics.

Example: Good design  $297/1759 = 0,167$ ;

Where the dividend 297 is the total for the characteristic good design and the divisor 1759 is the total of the all characteristics, 0,167 is the coefficient of relative importance.

Table 3 shows the total for every characteristic and their coefficient of relative importance.

**Table 3** Coefficient of relative importance of every one of the characteristics

Characteristics	Total	Relative importance
Good design	294	0,167
Comfort	270	0,153
Reputation of the company	246	0,140
Low cost for spare parts	286	0,163
Durability	337	0,192
Price	326	0,185

### 2.3 Rank of the producers of wheelchairs for children with cerebral palsy

Next step in the process of creating map of positioning is ranking of the wheelchair producers according their products. The ranking is done by the respondents according to the characteristics discussed above in the text. Before the respondents start with the ranking they are introduced with the producers, their wheelchairs for children with cerebral palsy and their specifications. The ranking is with 7 degree scale, where number 7 stands for the characteristic which is the most satisfied by the defined wheelchair and 1 stands for the characteristic which is the least satisfied by the defined wheelchair.

In the table 4 are given the average values of the ranking given by the respondents.

**Table 4** Average ranking of the wheelchair producers

Characteristics	Wheelchair producers											
	JCM Seating Solutions	Chunc	Convoid	Drive Medical	Leckey	Sunrise Medical	Sung Seat	Thomasshilfen	Timoteos	O.3. Славеј	Nicecare	Comfort
Good design	7	7	6	6	6	5	7	6	6	1	2	2
Comfort	7	7	6	6	6	4	6	5	6	3	3	3
Reputation of the company	6	6	6	6	5	6	5	5	4	4	3	4
Low cost for spare parts	3	3	2	3	2	1	1	3	4	6	5	5
Durability	5	5	4	5	4	5	4	3	4	6	5	6
Price	1	2	2	3	1	2	1	2	4	7	4	4



JCM Seating Solutions-GB  
Model: Triton Model 0



Sunrise medical - USA  
Model: Zippie TS



Chunc - GB  
Model: Chunc 45



Convaid - USA  
Model: Mountee



Sung Seat - USA  
Model: XPanda



Thomasshilfen - Germany  
Model: Thevo Therapy Chair



Leckey - USA  
Model: Leckey Contoured  
Advance Seat



Drive Medical - USA  
Model: MSS Tilt & Recline



Nicecare Co - Taiwan  
Model: WATC-03



Comfot – Taiwan  
Model: SL-7100C-AE



Timoteos - Finland  
Model: Toimi



Slavej – R. Macedonia  
Model:/

**Figure 1, a-I** Models of wheelchairs considered during the research

### 3. Results

After the conducted analyses, the results are collected and calculated for every wheelchair producer in order to create the map of positioning. The calculation is done by multiplication of the coefficients for relative importance for every characteristic (table 3) and the average values from the ranking of the wheelchair producers (table 4).

Example: Good design (Chunc) –  $0,167 * 7 = 1,169$ ;  
Comfort (Convoid) –  $0,153 * 6 = 0,918$

Where the first multipliers (0,167; 0,153) are the coefficients for relative importance, the second multipliers (7; 6) are the average values from the ranking of the wheelchair producers. The results (1,169; 0,918) are the coefficients for the wheelchair producer (Chunc; Convoid) for the given characteristics.

In the table 5 the coefficients for every characteristic for every wheelchair producer are given.

**Table 5** Coefficients for every wheelchair producer

Characteristics	Wheelchair producers											
	JCM Seating Solutions	Chunc	Convoid	Drive Medical	Leckey	Sunrise Medical	Sung Seat	Thomasshilfen	Timoteos	O.3. Slavej	Nicecare	Comfort
Good design	1,169	1,169	1,002	1,002	1,002	0,835	1,169	1,002	1,002	0,167	0,334	0,334
Comfort	1,071	1,071	0,918	0,918	0,918	0,612	0,918	0,765	0,918	0,459	0,459	0,459
Reputation of the company	0,840	0,840	0,840	0,840	0,700	0,840	0,700	0,700	0,560	0,560	0,420	0,560
Low cost for spare parts	0,489	0,489	0,326	0,489	0,326	0,163	0,163	0,489	0,652	0,978	0,815	0,815
Durability	0,960	0,960	0,768	0,960	0,768	0,960	0,768	0,576	0,768	1,152	0,960	1,152
Price	0,185	0,370	0,370	0,555	0,185	0,370	0,185	0,370	0,740	1,129	0,740	0,740

In order to create map of positioning we need two characteristics of comparison, not six as we have consider in the analysis. This is why we need to classify these characteristics in two groups, and those two groups are: cost efficiency and image.

**Table 6** Division of the characteristics in two main groups

Cost efficiency	Image
Low cost for spare parts	Good design
Durability	Comfort
Price	Reputation of the company

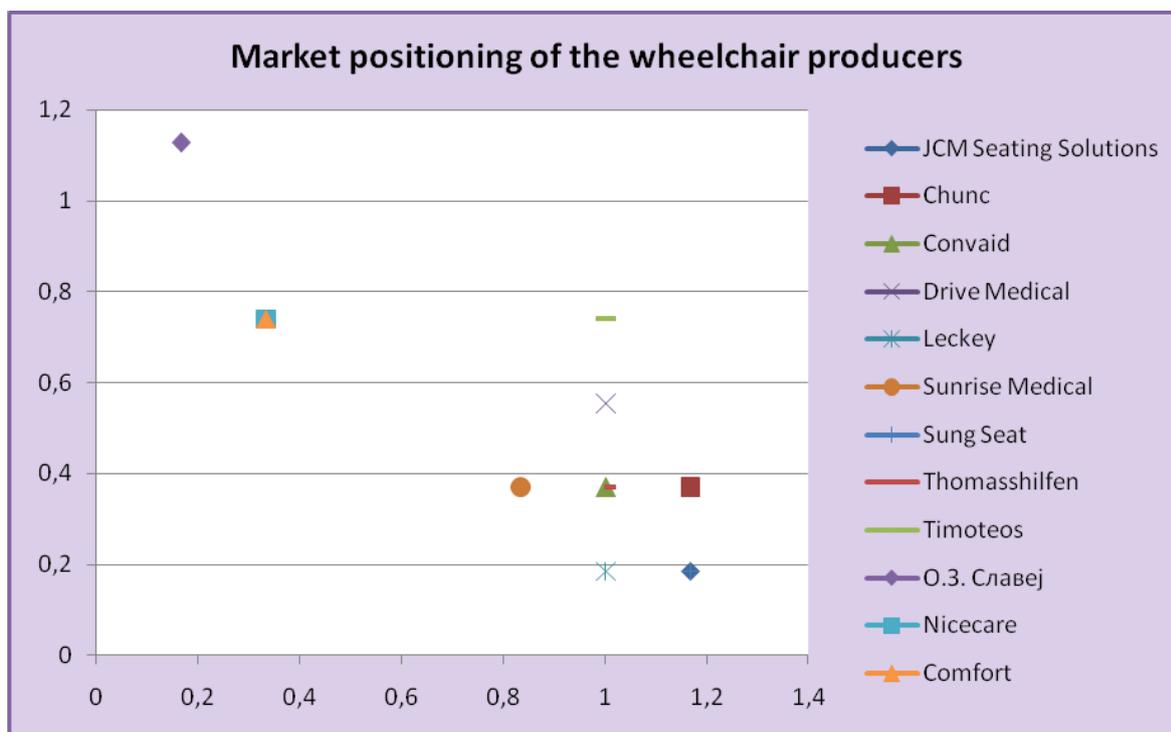
For the creation of the map we need one characteristic from each one of the two groups. In this case the two chosen characteristics are good design from the group image and price from the group cost efficiency (table 7).

**Table 7** Considered characteristic for the positioning of the wheelchair producers

Characteristics	Wheelchair producers												
	JCM Seating Solutions	Chunc	Convaid	Drive Medical	Leckey	Sunrise Medical	Sung Seat	Thomasshilfen	Timoteos	O.3. Славеј	Nicecare	Comfort	
Good design	1,169	1,169	1,002	1,002	1,002	0,835	1,169	1,002	1,002	0,167	0,334	0,334	
Price	0,185	0,370	0,370	0,555	0,185	0,370	0,185	0,370	0,740	1,129	0,740	0,740	

While creating the map of positioning the characteristic of the wheelchair producers, the characteristics of the group cost efficiency are put on the y-axis, and the characteristics of the group image are put on the x-axis.

**Graph 1** Positioning of the wheelchair producers



## 4. Discussion

According to the results from the conducted analysis it may be concluded that the Centre for orthotics and prosthetics - Slavej with the present wheelchair are top ranked according the price or cost efficiency, but when the design or the image is considered, Slavej is on the very end of the list or lowest on the graph. In order for this to change, Slavej has to make changes on the existing model or develop a completely new one, either way the design has to be entirely changed. That way they can try to achieve the top middle of the graph for the beginning, and as the time goes by maybe the top right corner of the graph, which will mean that they will have the most cost efficient and best looking wheelchair on the market in R. Macedonia.

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# Metrics and Optimization of Technology Transfer Channels between Universities and Firms

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In what is often called the “knowledge economy”, two actors, universities and firms, play a leading role in creating new knowledge, products, services and jobs. Through efficient and smart partnering models, firms can now leverage their innovative capacity and access valuable knowledge and insights from Universities. Engaging in Knowledge and Technology Transfer activities has become a must for companies relying on innovation to develop and defend their market share.

We have been studying good practices world-wide [1] in order to define the best ways of managing the main formal channels for knowledge and technology transfer from universities and public laboratories to firms: collaborative research and licensing, including spinning out start up companies.

Despite a world class research activity established decades ago, Switzerland has only recently become a top ranked country in technology transfer. The key elements responsible for such a progression remain the subject of debate but we suggest that carefully selected technology transfer metrics may point out a concomitant increase of licensing activity from Universities to firms, in particular spin-offs, could explain the rise in international rankings. Finally, a parallel increase of staffing level of professional technology transfer agents may be responsible to the observed progression in research partnering ranking, due to improved associated transaction costs.

## Keywords

Collaborative research, Knowledge and Technology Transfer, Licensing, Spin-offs, Universities and Firms partnering.

## 1. Introduction

In what is often called the “knowledge economy”, two actors, universities and firms, play a leading role in creating new knowledge, products, services and jobs. Through efficient and smart partnering models, firms can now leverage their innovative capacity and access valuable knowledge and insights from Universities. Engaging in Knowledge and Technology Transfer activities has become a must for companies relying on innovation to develop and defend their market share.

One central element pertaining to the study of knowledge and technology transfer is the notion of metrics. The goal is to provide more information on the performance achieved by Universities and firms in transferring and developing new innovative products.

Some metrics are subjective and are based on interviews with key stakeholders; others are objective such as counting the number of transfer transactions or patent applications. With such a wide diversity of metrics any attempt to evaluate a particular performance falls short if the results are not benchmarked with similar metrics obtained through other approaches.

The goal of this report is to provide for the first time a comparative study that includes different metrics associated with knowledge and technology transfer performance and their evolution as function of time.

Since most of the metrics are based on the performance at national level, we selected Switzerland as the country for which we based our study. The Swiss innovation ecosystem is well characterized and

as one of the top innovator country it provides a series of interesting metrics data related to knowledge and technology transfer.

## 2. The main channels for knowledge and technology transfer

Knowledge and Technology Transfer channels are multiple and we will focus on the main formal ones, namely the University – Firm research collaboration (research partnering) and the transfer of research results and technology from Universities to firms (either existent or newly generated in case of spin-offs).

- *Technology Licensing* which consists in the transfer through licensing/assignment of research results from the PROs to the firms. The firms (either established or just starting-up) buy new technologies from Universities in exchange of royalties or other financial considerations.
- *Research Partnering* activities which are established through collaborations between a firm and a Public Research Organization (PRO) around a common research project. Through direct interaction, firms can get access to know-how from the PROs and obtain exploitation rights to technologies that may be generated during the execution of the project.

These two channels are often active in parallel in a firm-University relationship. They consist also in the bulk of the work that technology transfer organizations realize for their University. One very important channels of knowledge transfer is the training of young graduates that are hired by firms. It is however very difficult to have any meaningful metrics aimed at measuring its importance and evolution.

## 3. Rankings and metrics of Switzerland in technology transfer

Switzerland is enjoying a particular (but somewhat unknown) success in the worldwide innovation rankings with a 1st place in the latest European Scoreboard Summary Innovation Index (2010). In terms of competitiveness, it ranks 1st in the Global Competitiveness Index (World Economic Forum 2010-2011) as well and 4th in the World Competitiveness Scoreboard (IMD, World Competitiveness Yearbook, 2010).

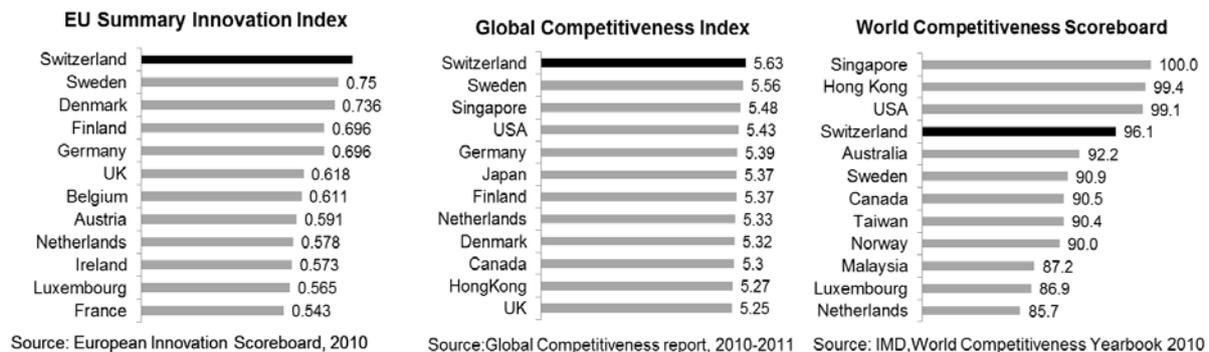


Figure 1 Worldwide Innovation Rankings

In terms of knowledge transfer and research collaboration between firms and Universities, the position is also excellent with a 1<sup>st</sup> and a 2<sup>nd</sup> rank for the IMD, resp. WEF rankings (figure 2).

### Knowledge Transfer between Companies and Universities



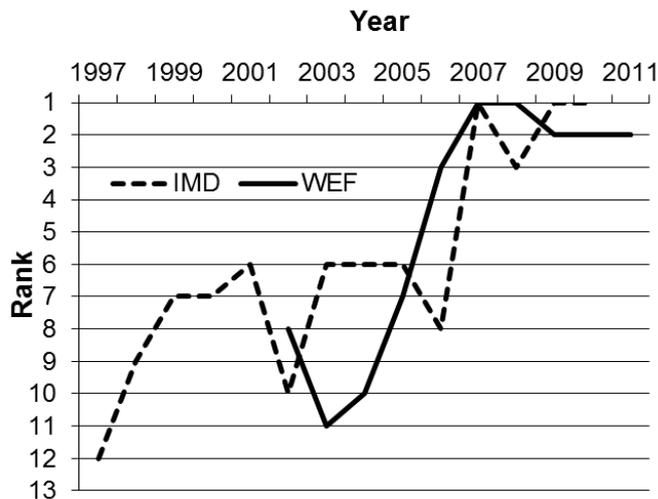
Source: World competitiveness yearbook 2010, IMD

### University - Industry Research Collaboration

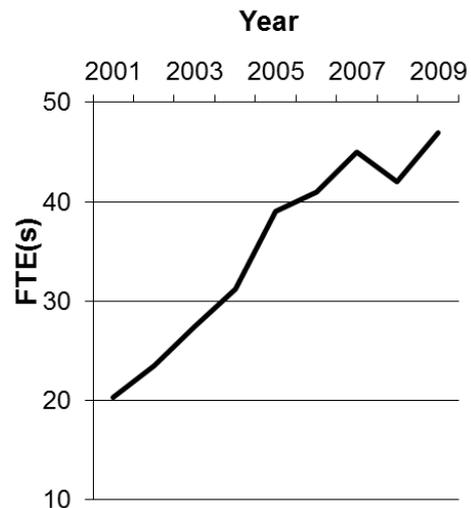


Source: Global competitiveness report 2010-2011

**Figure 2** Swiss rankings related to University-Industry partnering



**Figure 3** Evolution of Swiss rankings related to University-Industry partnering as a function of time



**Figure 4** Evolution of active staff in Swiss Technology Transfer (swiTT)

The progression of the Swiss position within these two rankings is impressive. In about 10 years span, Switzerland progressed from a rank from 10th to 15th to the top spots (figure 3).

What were the main factors responsible for such an improvement? As a practitioner we see a general formalization/professionalization of knowledge and technology transfer that has occurred for the last 10 years in Switzerland mainly through the establishment of dedicated teams working for or within PROs. This is exemplified by the number of Technology Transfer professionals in Switzerland, as shown on figure 4 (in full time equivalent – FTEs).

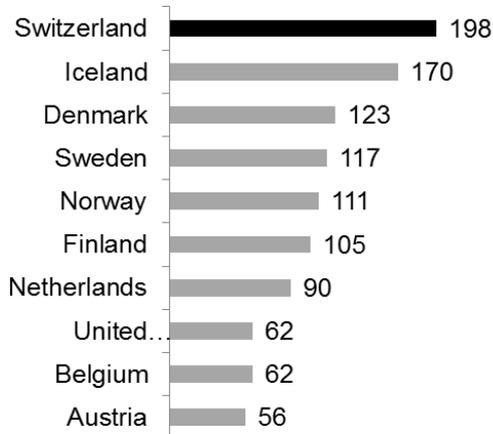
Of course such an increase may simply be the consequence and not the source of the intensification of knowledge and technology transfer but clearly it has played a role in providing a clear path for companies to establish partnerships with PROs and for researchers to get clarity on their institution' guidelines when establishing such partnerships. Of course the quality of such personnel is key.

We now focus on studying the metrics pertaining to each of the two considered knowledge and technology transfer channels.

### 3.1 Research partnering metrics

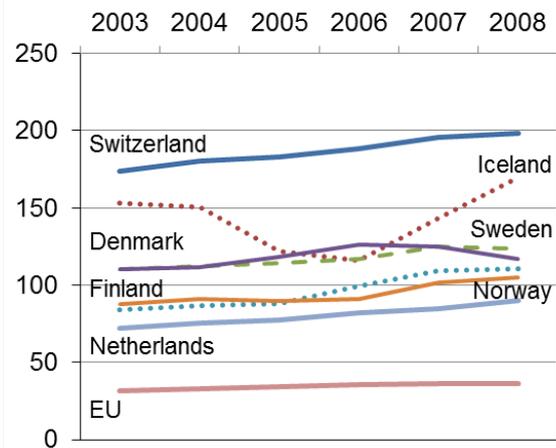
Among the indicators at hand which is related to research partnering is the number of co-publications of firms (located in a chosen country) with PROs, per million of population. As depicted on figure 5, Switzerland ranks first for this metric.

The density of the Swiss research with regards to its population clearly provides an advantage here. It would however be more meaningful to measure the share of co-publications with firms in comparison to the total number of publications in order to control for research intensity. This indicator is however interesting in the sense that it also includes not only technology but also knowledge transfer between firms and PROs.



Source: European Innovation Scoreboard, 2010

**Figure 5** Public-private co-publications per million population (based 2008 data)

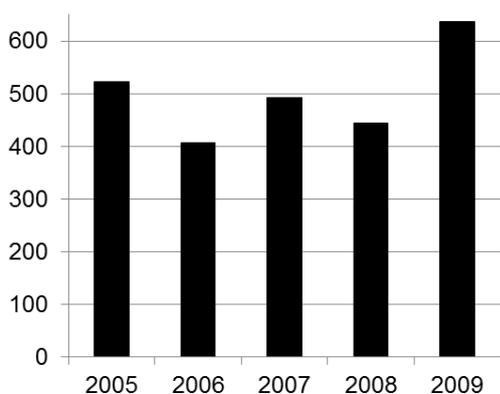


Source: European Innovation Scoreboard, 2010

**Figure 6** Evolution of public-private co-publications per million population

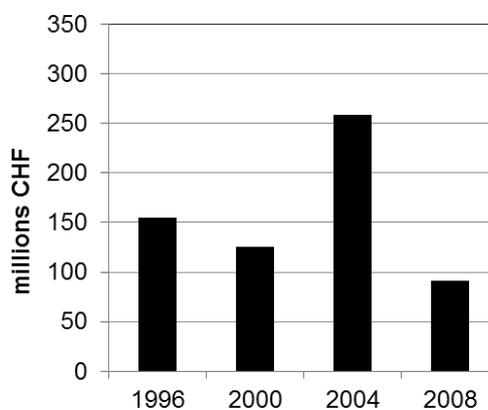
As depicted on figure 6, Switzerland has been a leader in regards to public-private co-publications metric for several years. No increase in terms of comparative performance with other EU countries is found (EU mean value remains at 18% of the Swiss mark throughout the years). For this reason this metric cannot explain the progression observed on figure 3 where Switzerland improves its rank compared to other innovative countries.

Another metric related to intensity of research partnering is provided by the number of funding requests for matching funds scheme of the Swiss government through its Commission for Technology and Innovation. This widespread tool aims at incentivize firms (in particular SMEs) to engage with PROs and consists in providing matching funds to the firm's own R&D investment in a Research Partnership project with a PRO. The PRO contribution to the project (usually close to 50%) is funded by the government. Figure 7 lists the number of such matching project requests of Swiss firms engaging with Swiss PROs. Except for an increase in 2009 due to the introduction of more flexible funding criteria, the amount of project funding requests remain stable.



Source: Commission for Technology & Innovation

**Figure 7** Number of funding requests for Swiss firms-PROs projects to CTI.



Source: Swiss Federal Statistical Office

**Figure 8** Amount spent by Swiss firms on R&D projects with Swiss PROs.

The same is true for yet another research partnering metric, namely the amount spent by Swiss firms on “extra-muros” R&D mandates to Swiss PROs (figure 8). This metric is collected every fourth year by the Federal Statistical Office, together with *economiesuisse*, an association of Swiss firms. Here again no increasing trend in the last 10 years has been reported.

In summary, intensity of research partnering metrics do not provide an explanation for the rise in ranking in research partnering depicted in figure 3. Private-public co-publication intensity, matching fund requests for University – firms collaborative projects or the amount spent by firms on R&D collaborative projects with Universities remain stable during the period at hand.

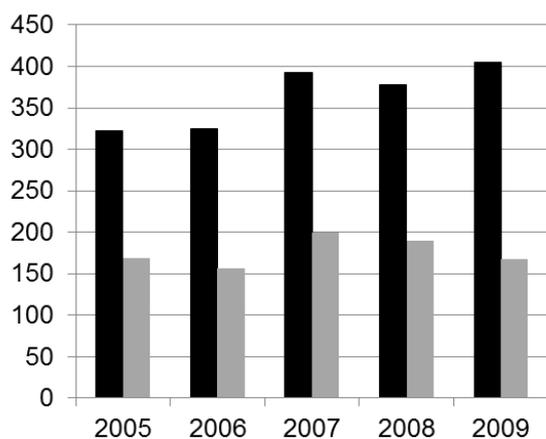
If not the intensity, it is the quality (eg the transaction costs of research partnering, framework conditions) of the relationship that has improved. This observation is in line with the figure 4 and the establishment of dedicated teams of technology transfer professionals active in formalizing research partnering activities. Alliance managers from firms are able to engage with a growing number of professional knowledge and technology transfer agents from the Universities.

### 3.2 Technology licensing metrics

On the side of technology licensing channel, the Swiss technology transfer association (swiTT) provide since 2005 an annual survey comprising several metrics. Due to a variable participation of certain institutions from year to year, we focus the analysis on the data provided by Swiss Universities in these surveys.

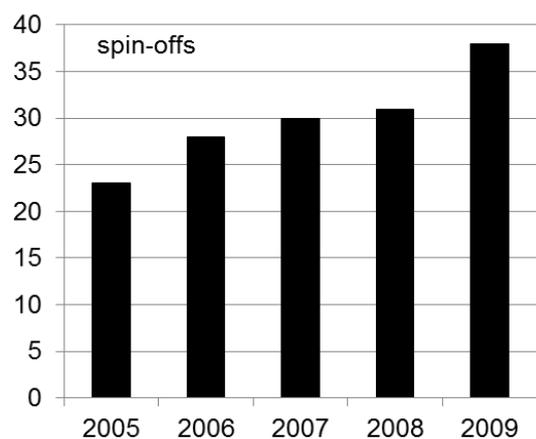
Figure 9 depicts the evolution of invention disclosures (black) made by the researches to their institution. This number increases about 30% during the four years span at hand.

Despite the fact that the amount of executed licenses remains stable (figure 9 gray) a rather strong increase in spin-offs creation (60%) is observed during the same period (figure 10).



Source: Swiss Technology Transfer Association

**Figure 9** Number of inventions disclosures received (black) and licenses executed by Swiss Universities (gray) in function of time.



Source: Swiss Technology Transfer Association

**Figure 10** Number of spin-offs (license based) from Swiss Universities as a function of time.

Overall we observe a growing trend of the technology licensing metrics which could, at least partly, explain the increase in the rankings enjoyed by Switzerland.

Another element which concurs with such positive results is the fact that knowledge and technology transfer offices are more efficient in converting inventions disclosures into licenses than other European countries as shown on figure 11.

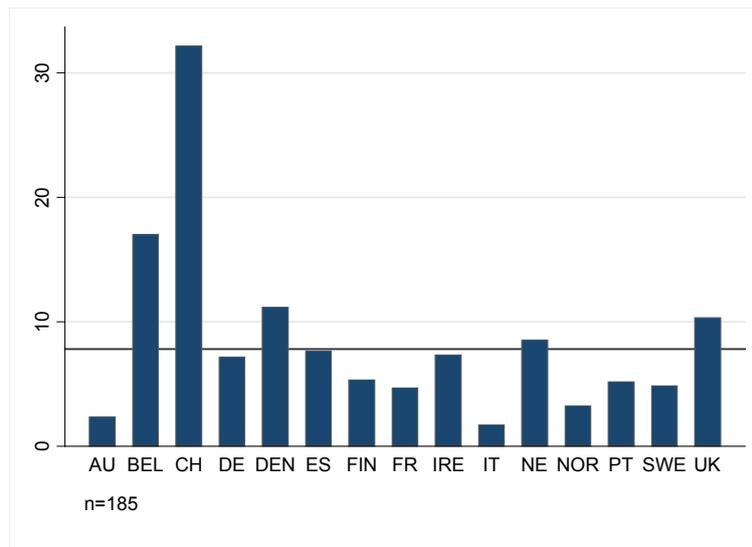


Figure 11 Average number of licenses per country for Europe [2]

## 4. Conclusion

We have examined in this study a broad range of metrics pertaining to research partnering and technology licensing activities in Switzerland. These metrics focus on the intensity rather than the income generated from these activities. It is important to note that more important than generating income, technology transfer aims at maximizing the speed and the likelihood to obtain innovations on the market.

Metrics aimed at measuring the intensity of research partnering remains stable as a function of time for the period considered. As a consequence, the progression observed in innovation related metrics covering University – Industry collaboration could be explained by a more qualitative (rather than quantitative) improvement. This result is in line with the progression of professional dedicated staff active in technology transfer offices and the associated reduction of transaction costs as well as a clearer framework in which these relationships take place.

In terms of technology licensing, we observe an increase of intensity combined with a high level of efficiency, which is in line with the related progression observed in innovation related metrics.

Based on these findings, policies focusing on increasing the intensity of research partnering and further developing technology licensing should contribute to maintain Switzerland in a leading position.

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# Insurance Companies as one of the Drivers of Entrepreneurship in Developing Countries

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**Although insurance companies are mainly associated with the development of financial markets, they also represent important factors in the development of entrepreneurship. Namely, the development of small and medium-size enterprises is widely threatened in developing countries primarily due to the impact of competition of multinational companies. And, on the other hand, one of the important influential factors on their course of business is a high level of economic and political risk that is and will be present for some time in developing countries. In order to increase their competitiveness, SMEs decide to credit insurance with insurance companies, thus reducing the credit risk and also the cost of credit (interest rates). Therefore, these companies can gain in competitiveness in comparison to large enterprises, multinational companies. The insurance companies are thus becoming the key factor in the process of financing by providing security in a volatile business environment and contributing to the competitive advantage of SMEs in transition countries.**

## Keywords

Entrepreneurship Credits, Entrepreneurship Development, Insurance Companies.

## 1. The importance of SME and entrepreneurship

The developing countries, which released themselves from the shackles of socialism rather late, should encourage the development of small and medium enterprises as a *conditio sine qua non* for the development of their economies. Namely, after the abolition of socialism, in developing countries, there was an influx of foreign capital due to privatization of state enterprises. In those situations, economies in transition countries can easily come to a position to depend on big multinational companies, which, driven by supranational motives, often use vague legislation of transition countries to make as much profit as possible. So, it is in the national interest of all developing countries, to achieve economic growth and development on the grounds of domestic production incentives and, primarily, the creation of the independent economy. The best way of accomplishing such objective is to invest in the development and strengthening of small enterprises, and particularly in the medium ones.

The main problem of small and medium enterprises are the undefined legislation, complicated administration, inadequate management, lack of information, and the last but not the least, insufficient financial resources. On top of these problems is the unfavorable business climate in developing countries which have, for quite some time, favored the public sector and large economic systems that have entirely different business strategy that the one used by small and medium enterprises. But despite these difficulties, the advantage of developing countries is that they could learn from the developed countries that the main and key factor of economic development is the creation of competitive and export oriented SME sector. An interesting fact is that currently there are about 20 million SMEs in the European Union, in fact they make up about 99% of companies in the European Union and contribute to the creation of more than half of the extra value in the European Union.[7]

Although the development of SMEs in the European Union is at high level, a lot of effort is put into the improvement of this sector, and the new trends that have occurred concerning the issue are oriented towards standardization in this area.[5] The SMEE sector in Serbia has more than 300,000 companies and shops, and makes up 66% of employment, 55% of GDP and 40% of export in Serbia.[8] From today's perspective, a lot of effort has been made to encourage development and strengthening of the sector of small and medium-sized enterprises in Serbia, but there are still some crucial problems, which do not subside, but under the auspices of the global economic crisis they only deepen.

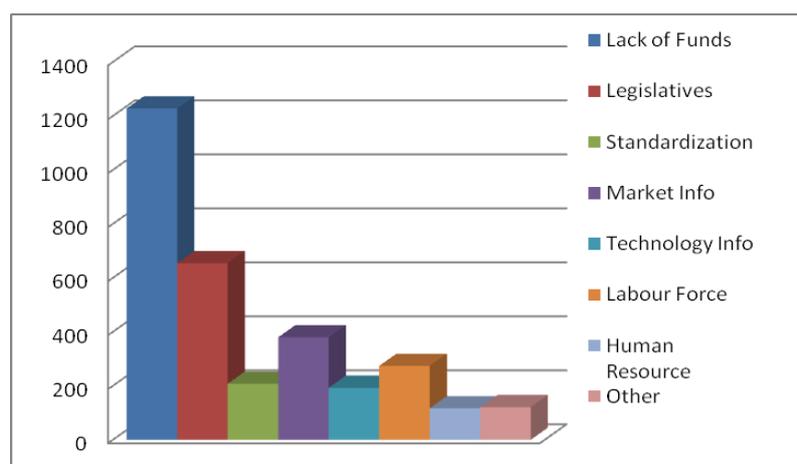
## 2. Analysis of the situation of SMEs and entrepreneurship in Vojvodina

To fully understand the problem that SMEs have, it is necessary to analyze their current situation. The data obtained from the analysis conducted in Vojvodina over the period from 2008-2010 [1] indicate that, despite the numerous results achieved by various measures in this sector, there are still some difficulties that are more or less manifested in their business and, in times of crisis, can ultimately lead to their disappearance.

The analysis conducted in 2370 companies in Vojvodina provided interesting data about the SMEE sector, but for the purpose of our analysis we will present only the relevant data.

As for the market and competitive business in SMEs, they are mostly active in the domestic market, while the share of their business activities in foreign markets is minimal. As for the issue, certain measures should be taken to increase export activity of these enterprises. In addition, the fact obtained from a questionnaire where the respondents confirmed that 26% of the market is unstable and 40% is subject to seasonal changes [1,14]. Bearing this in mind, there are certain measures that need to be taken to increase share in the foreign market by means of export credits. As one of the limiting factors is the cost of financing, insurance companies could be the solution to the problem since they could provide credit insurance.

Among the problems SMEE face in their business, the leading problem is lack of funds which should be recoverable through state aid since financial institutions' credits for small and medium-sized enterprises and entrepreneurs are too expensive. Following lack of financial resources, is another big problem, those are still unregulated regulations or legislation in the field of SMEE business. Strengthening the private sector and creating more favorable conditions for in the form of legislative and institutional framework is crucial for the development of SMEE sector, in that way conditions are created for the sector to get new employees and thus reduce the unemployment rate, which is the most important problem in the country. Overview of the critical areas of SMEE sector is given in the following figure:



**Figure 1** Overview of the critical areas of SMEE sector in Vojvodina [1,26]

As you can see from the above, lack of funds is undoubtedly in the first place. In recent years SMEE sector in Serbia has received support from many financial institutions that encourage development, it should be pointed out that the funds have been distributed steadily across regions. Some of the recent development programs that have supported the development of SMEE are: [10] the BAS program of

EBRD which has supported 214 SMEEs so far, and the project is going to run until November 2011; the funds were approved by the International Investment Bank EIB and in 2010 they amounted to 60 million euro's; then 56.3 million dollars from the Revolving Fund of the European Agency for Reconstruction; and many other projects.

The problem with these support programs is that in most cases there is no feedback on whether the funds were specifically spent, then SMEEs are not informed about the possibilities of obtaining funds on favorable conditions and hence, in most cases, they use their own capital as the main source of financing. For these reasons, supporting the companies through credit insurance would be an adequate means of incentives. For the credit funds to be spent specifically insurance should be narrowed down to the export credit insurance, in that way, by increasing exports, apart from stimulating the development of SMEE, external balance deficit could be decreased, i.e. the balance of payments would be improved. They would increase their awareness if they merged in clusters, through which SMEs and entrepreneurs would be informed and get policies easier.

### **3. Insurance companies as an incentive factor for SMEEs**

Starting from the facts that the lack of financial resources hampers development of SMEEs, and that most SMEEs is financed from its own sources, that they do not meet requirements for obtaining credit and operate in volatile markets, there is an obvious need for government intervention in this area. The state and international institutions can grant a credit at more favorable terms in order to help those enterprises, but a more efficient means of support is insurance of the previously mentioned export credits.

In addition to economic risks affecting SMEEs there is a political factor that is present in the countries in transition in Southeast Europe and makes it harder for enterprises to enter foreign markets because it increases business risk, it is linked to higher costs, especially financing, and hence the enterprise loses the competitiveness. This issue of economic and political risk, primarily creates problem of financing SMEEs, therefore the government needs to find a way to assure conditions for enterprise products to be competitive in foreign markets. Insurance company, being the representative of the State, should solve this problem.

In most cases, no private insurance company would agree to take export credit insurance due to the high level of economic and especially political risks. Therefore, by hiring insurance companies as a representative the State needs to insure export credits. In that way two problems could be solved, on one hand, the problem of external trade deficit, and on the other, the problem of obtaining financial resources for SMEEs, which indirectly contributes to the development of financial markets by strengthening the insurance sector and increasing activities of the bank sector. This proves that involvement of insurance companies as State representative has multiplied effect on the development of the country.

The system of export credit insurance has proved to be successful in many developed countries where private and public insurance companies cover the risk for exporters. When it comes to small and medium-sized enterprises, due to the lack of development and willingness of insurance companies to insure the credit, the government should be the one to take the initiative. The risk for small and medium-sized enterprises is higher because the total assets of these companies are smaller, so when borrowing they usually don't have their assets which would be used as collateral or mortgage, and it hampers obtaining credits for the purpose of starting manufacture. For all the above reasons, insurance would considerably reduce the cost of financing these companies.

In developed countries this system works for years and has proved to be a successful means of increasing export activities of SMEEs. The crucial thing is that insurance premium is relatively low, compared to the high cost of financing. Taking the advantage of insurance, there would be a possibility for insuring a financial credit, or insuring export business, depending on the requirements of a company.

An important emphasis of the Federal Government's work should be to promote the interests of small business. This is also true of the export insurance scheme. The advisory and information services would be particularly tailored to the needs of small and medium-sized enterprises and to issues of relevance for them. Small and medium-sized exporters, in particular, are only able to fulfill orders from high-risk countries in many cases with the help of insurance. They are much less able to absorb possible bad debt losses than larger companies. Three out of four applications for cover in developed countries come from the small business sector. In many cases these are for small transactions on short credit terms. But small firms are regularly involved as subcontractors in large-scale projects as well.

Only transactions which are eligible for cover and in which the risk is justifiable can be covered. Most export business in Serbia would be eligible for cover. The criteria should be, for example, whether the export transaction safeguards or creates jobs whether it maintains presence in markets, as well as its relevance for overall foreign, developmental or structural policy.

A guarantee can only be granted, however, if the risk is justifiable. The Government Committee should stipulate the requirements for cover for each country. These take into account the financial strength and economic policies of the country concerned, as well as macroeconomic and political factors. In addition to this, the foreign buyer's creditworthiness and his payment record are scrutinized. Even if a buyer is insufficiently creditworthy, it may be possible to cover the transaction if a state or bank guarantee is forthcoming. No cover can be given, however, in cases where there is a high probability of loss.

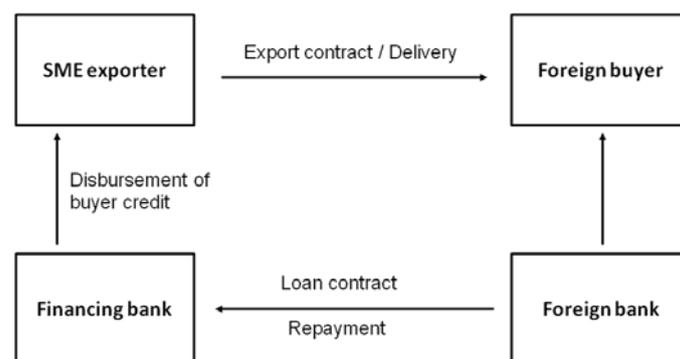
Benefits obtained by the use of insurance are to make it possible to open up difficult markets, protection from non-payment, make export financing easier, create a level playing field in international competition etc.

Types of insurance that would be of interest for SMEs in transition countries, which have proven successful in the EU would be medium and long credit term supplier credit cover as well as buyer credit cover for the financing of export deals with tied buyer credits. These types of cover would be suitable mostly for individual export transactions. Also there is a wide range of cover options available for export transactions on short credit terms (payment periods of up to two years): wholeturnover policies and wholeturnover policies light insure exports on short credit terms of an exporter who supplies several buyers in different countries. Revolving supplier credit guarantees and revolving buyer credit guarantees provide protection against bad debt losses in cases of repeated deliveries to one buyer. One-off transactions can also be covered with an export credit guarantee on short credit terms. [6]

When raw materials, semi-finished goods, components, consumer goods and spare parts are supplied, the accepted credit period should be normally only up to a six months maximum. For high-value components and consumer durables the acceptable credit period should be 12 months. In these cases of short credit periods the cross-border supplies would be covered under short-term supplier credit guarantees.

The cover would be taken effect with the shipment of the goods and/or the commencement of service, and would be ended with full payment of the covered amount owing to the SME. For the provision of cover the insurance company would charge the SME an administrative fee and a premium, the amounts of which depend on the order value. The premium level would depend on the foreign buyer's credit rating, the general country risk and length of the credit period.

Take a form of credit insurance and its benefits for SMEs. Suppose that the credit relationship and export business was carried to a credit scheme given in Figure No. 2



**Figure 2** Business processes

On the basis of the scheme one can see that the entrepreneur applying for export credit insurance can insure a credit line or they can insure export business. Some major enterprises have the possibility of insuring manufacture costs so that the enterprise could enter the secure export business and establish credit relations. Insurance as such, on one hand, encourages SMEs to start transactions with a foreign partner, and on the other, it facilitates the funding process. By insuring credits or export business, SMEs obtain credit (funds) more easily since the bank, owning the policy, is willing to grant a credit without any further collateral by means of personal and real property. When it comes to credit costs, they are reduced, since they are the reflection of bank loan risk. Hence it is better for SMEs to pay the

insurance premium and reduce the cost of financing through insurance, bearing in mind benefits and advantages of the insurance policy. The insurance premium is variable, depending on the experience with the guarantee applicant, the risk and size of export business and the risks of the country they export to.

As already mentioned the basic types of insurance which have shown to be useful to encourage SMEs in developed countries, which could be applicable in countries in transition are wholeturnover policies and wholeturnover policies light insure exports on short credit terms of an exporter who supplies several buyers in different countries and revolving supplier credit guarantees and revolving buyer credit guarantees which provide protection against bad debt losses in cases of repeated deliveries to one buyer. For supplier credit guarantees and revolving supplier credit guarantees SMEs pay administrative fees and premium for cover. The administrative fee depends primarily on the order value. The premium rate is also determined by the country risk category into which the country of the buyer falls. Besides, the premium rate is influenced by other parameters such as the term of the contract, status of the buyer (public or private) and, where applicable, the percentage of cover.

The premium for wholeturnover policies and wholeturnover policies light is calculated on the basis of monthly declared turnover. For wholeturnover policies the premium is fixed on the basis of the risks covered in each individual policy, while fixed premium rates apply to wholeturnover policies light. For both types of policies the premium rates will be adjusted in accordance with the claims experience under a system of no-claims bonuses/risk surcharges, which results in premium reductions or increases in subsequent years. However, both types of cover are normally cheaper than an individual supplier credit guarantee.

### **3.1 Fundamentals of wholeturnover policies**

In the developed countries the wholeturnover policies is often used by SMEs. In particular semi-finished goods, consumer goods, raw materials and agricultural produce are usually traded on short credit terms. For all companies with a turnover that qualifies for cover amounting to at least EUR 500,000 and a number of foreign buyers in several countries the obvious choice would be a wholeturnover policy as comprehensive cover. It protects SMEs from bad debt losses due to foreign buyer insolvency, non-payment of receivables within six months following due date as well as due to political risks, especially lack of hard currencies or restrictions on the international payments system.

In most cases wholeturnover cover can be provided at a much more favorable price than supplier credit guarantees for individual transactions. Besides, there are no individual applications or handling fees. The premium amount is determined mostly by the country risk and the terms of payment that the SME agreed with the buyers. The higher the risk attached to countries and buyers included in wholeturnover policy, the higher the premium rate will be. On the other hand, the premium will be the more favorable, the better the risks are balanced. The flexibility of wholeturnover cover is proven by a great variety of options for inclusion. The SME can have receivables from business with all private customers in all other countries included in wholeturnover cover. They can choose freely which countries they want to include in the cover. They can apply for limits (maximum amounts) for commercial and political risks respectively for each buyer, which will be fixed without any extra costs. Hence they can always know which of their customers are included in the cover and with what amounts [6].

In addition, they can optionally include certain types of receivables for the entire policy period and exercise these options on a country-by-country basis. Receivables due to foreign subsidiaries from foreign customers can be included in the wholeturnover policy irrespective of whether the goods are delivered by subsidiary to a third country or an end buyer within the country it is domiciled in.

### **3.2 Fundamentals of wholeturnover policies light**

Wholeturnover policies light are ideal for exporters whose annual turnover in export business is less than one million Euros and who normally agree short credit terms of up to four months. Hence they are aimed at small and medium-sized companies whose turnover from export business is not yet big enough to qualify for normal wholeturnover cover. A wholeturnover policy light is even easier to handle than a standard wholeturnover policy but does not offer the same comprehensive options for inclusions. The wholeturnover policy light also runs for one year, however, all insurable business has to be included in the policy. When cover commences, the premium rate will be fixed for two years,

afterwards the premium may be reduced due to a system of no-claims bonuses/risk surcharges depending on the loss experience [6].

In particular customized goods should be insured because it may be almost impossible to sell them to another buyer if they cannot be delivered. Manufacturing risk cover includes the actual prime costs incurred. These are estimated in advance by SMEs and form the basis for the maximum cover amount given. If an insured event occurs, the actual amount of the loss is ascertained by a specially prepared expertise. The guarantee covers all political and commercial circumstances in the buyer country which prevent the completion or the dispatch of the goods. The risk of an embargo being imposed is also covered.

### 3.3 Fundamentals of revolving supplier credit cover

Revolving supplier credit guarantees cover repeated deliveries of goods and the provision of services to one foreign buyer on short credit terms of up to 24 months. Their scope of cover and the premium rate are the same as for short-term supplier credit cover, however, it is much easier for SME to handle. If a positive decision is taken on the application for a revolving supplier credit guarantee, SMEs receive a policy in which the maximum liability accepted ("maximum amount" or "limit"), the permissible payment terms and other general conditions are specified. Because of this limit, which is fixed at the outset, the amount freed can be used up once the covered shipment has been paid for further supplies – the policy "revolves". There is no need to file separate applications for supplier credit cover for each order and that helps SMEs to react much more flexible to market trends. The Government continues to be liable for these covered trade receivables even if the revolving supplier credit guarantee is not renewed upon the expiry of the policy year [6].

### 3.4 The real state of credit insurance in Serbia

The current issue of SME's credit insurance, in turbulent business conditions and trends caused by global economic crisis, is becoming more and more important. On 30<sup>th</sup> September 2010. insurance companies balance 117.4 billion dinars, which, compared to the third trimester 2009, presents the 19.1% increase [9]. If one observed premium structures of the insurance companies sector in the third trimester 2010, they would see that the premium share coming from credit insurance accounted for 0.08% of the total sum, which indicates that the awareness of credit insurance and its positive effects on the development of enterprises in Serbia needs to be raised.

A step forward to raising awareness of the benefits of insurance is the establishment of guarantee fund which is a nonprofit organization. The Fund provides bank credit lines by reaching an agreement on business cooperation with banks that are willing to support program activities of the Fund and to adapt credit conditions (interest rate, term and of repayment) to the conditions defined in the Fund program and the tenders that the Fund holds; the tenders for granting guarantees for the purpose of granting credits intended for financing certain economic activities [4].

The guarantee fund was established in Vojvodina as well. Its main goal is to help SME business in Vojvodina. Fund activities in 2009 were as follows:

Activity	Guaranteed amount employed (RSD)	EUR=95.89 RSD	Number of guarantees	Effect of the activity
Agricultural machinery	192.688.797,70	2.009.502,65	54	56 units of agricultural machinery
Women entrepreneurship –start up	6.822.736,11	71.152,58	6	16 new jobs
Women entrepreneurship – women who perform activities for less than 3 years	47.661.528,04	497.050,00	24	101 new jobs
Total	247.173.061,85	2.577.705,23	86	

Table 1 Guaranteed amount employed by allocation in 2009 [2]

As one can see from the table, during 2009 the Fund issued only 86 guarantees, while in the same year in Vojvodina there were 23,066 active companies out of which 22,933 are categorized as SMEs [3]. To assume that in 2009 the 86 guarantees were given to various companies would be rather bold, but it would mean 0.37% of SMEs took the advantages that the guarantee fund gave.

#### 4. Concluding remarks

Given the above, the situation in the credit insurance area in Serbia is at an early stage. Although there is a possibility of insuring credits for SMEs, there are many difficulties due to the entrepreneurs' lack of knowledge about procedures for obtaining an insurance policy and the like.

A possible solution to this problem might be SMEs association in clusters which would enable them get the information and obtain insurance policies easier. Associating in clusters or associations, they would cooperate with insurance companies which, being the government representative, would insure export credits. Hence, by means of clusters, they would obtain information and secure placement of funds, since the State, over continuous cooperation among clusters, would enhance the security in terms of credit solvency of enterprises they grant funds to. However, joining a cluster or an association, shouldn't be a precondition for obtaining a policy, but its purpose would be the reduction of bureaucracy i.e. procedures and the increased knowledge i.e. the awareness of the need for credit insurance especially in the case of export business.

Countries in transition have the possibility to apply the model that the developed countries have used for a longer period of time, which proved to be a good instrument of facilitating the business for SMEs, and an incentive for their export activities. By insuring credits or business of SMEs, funds are directed towards achievement of macroeconomic goals of the state that ultimately help the global economic situation in the country to improve. If there is an insurance company is state representative, it would encourage development of SMEs, increase exports, achieve higher employment rate, on the other hand it would influence the financial sector development since the banks would grant credits to entrepreneurs with greater security and, hence, increase their business volume.

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# Methodology for analyses and selection of Best Practices in the area of embedded systems and industrial informatics

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The paper describes a methodology for elaboration, selection and analyses of the Best Practices (BPs) from the numerous gathered good practices (GPs) related to the transformation of research into innovation. The methodology has been developed by Foundation for New Bulgarian University as part of an I3E funded project. The project goal is identification of numerous good practices in the area of Embedded Systems and Industrial informatics from the region of South Eastern Europe (SEE). The methodology is part of Work Package 4, activity number 4.2. Within this activity, it has been necessary to identify a short list of the 30 BPs from the 120 GPs gathered within activity 4.1.

The proposed methodology contains guidelines and criteria related to the thematic area of GPs, description forms of research achievements, technological innovations and applied financial mechanisms. It could be used as a template with very few adaptations for BP selection from many GP in other European Union funded projects. The selection of the 30 Best Practices is particularly important for the next project phase 4.3. This activity has to elaborate how the research results of the 30 BPs to be transformed to innovation and to describe the process in a document called Methodology Guideline for Innovation.

## Keywords

Methodology for analyses and selection of Best Practices from many Good Practices, Embedded Systems, Industrial Informatics, I3E

## 1. Introduction

One of the project objectives, within the WP4, is the development of methodology guidelines for elaboration, selection and analysis of a set of Best Practices. This Methodology describes how the analysis and selection of GPs will be carried out and provides guidelines for the project partners to analyse the gathered GPs following a defined set of criteria and on bases of a comprehensive analysis to select a number of GPs which are related to the transformation of research into innovation on the areas of Industrial Informatics and Embedded Systems.

The I3E project envisages collecting at least 100 GPs within the activity 4.1, which has to be finished until June 2010. At the teleconference held on August 31st, 2009, when WP4 was kicked off, it was agreed that each project partner should collect at least 10 GPs in accordance with the given recommendations and presentation templates. Each of the GP examples should clearly present the applied financial mechanism that enabled the transformation of research into innovation.

Based on that, in activity 4.2 a subset of a minimum 30 BPs from the gathered 100 GPs will be selected. This document will define a methodology and the criteria to be used in the assessment

process. After that each of the BPs will be further analyzed through a detailed SWOT analysis. Finally the results will be used in the next 4.3 activity of the project for the preparation of one of the major project deliverables the - Methodology Guideline for Innovation. In this document based on the outputs from 4.2 a methodology guideline is developed describing how research results may be transformed into innovation and which financial tools make it feasible.

## **2. Methodology description**

### **2.1 Overview**

The objective of Activity 4.2 is to assess and select a subset of a minimum of 30 BPs from the gathered 120 GPs. The document defines a methodology and the criteria used in the elaboration process. Then each of the BPs will be further analyzed through a detailed SWOT analysis. At the end the results will be used in the next activity of the project 4.3 in which a Methodology Guideline for Innovation will be prepared. In this document based on the outputs from 4.2 a methodology guideline will be developed describing how research results may be transformed to innovation and which financial tools that make this feasible.

The methodology is based on several criteria – financial, impact, realisation, innovation, social, etc. Each one will bring a certain number of points to each GP. It is possible that some criteria apply to specific GPs, and other does not. In order to have a clear and meaningful elaboration process it is important for each GP to provide as detailed information as possible. The inputs that are needed for the elaboration process are described below.

Each GP will be assessed by 3 project partners. Two of the partners shall be organizations different from the one that has submitted the GPs and the third partner will be the leading project partner and organizer.

### **2.2. Needed Inputs**

In order to elaborate and analyse the gathered GPs they shall contain two major groups of input information. The first group is more important for the assessment process.

- Group 1
  - GP description
  - Description of the R&D team
  - Description of the financial mechanism that was used during the transformation of research into innovation
  - Accomplished benefits for R&D team, institution, SME
  - Sustainability after the financial aid
  - GP evaluation
- Group 2
  - GP theme and objectives
  - Location: country, region, place, institution
  - Evaluation of GP in terms of additional explanation of the reason why the proposed GP is considered an example of GP
  - Contacts for R&D team. Optionally contacts for the financial facilitator if he is different.

### **2.3 Complementary Information and Non-applicable Criteria**

If necessary the reviewer will have two options for specific manoeuvres. Both of them must be used in limited cases after careful appreciation.

During the evaluation of GPs the reviewer can decide that some complementary information will facilitates the fair and detailed evaluation of the GP. In this case the reviewer might request the additional information from the responsible partner. If the answer is received in a reasonable time the complementary information might be used for the final evaluation.

In some specific cases the reviewer might decide that some criteria are non-applicable to the certain GP. In this case the reviewer has the possibility to extract this criterion without a decreasing of the final evaluation. Details will be given below.

### **3. Grading System**

Based on the cases of the criteria below, a system of grading will be applied. Each GP will be evaluated against several criteria. Each criterion is subdivided into several sub criteria. Each sub criteria brings a certain number of points between 0 and the maximum for the particular criteria described in paragraph 4. The evaluator shall fill the scores in the table in Annex A. The final score is calculated as a percentage determined from the GP points score (from all the applicable for the particular GP criteria) divided by the possible maximum score. Some criteria / sub criteria might not be relevant to certain GP. In this case, described in paragraph 2.3, the evaluator shall extract the maximum scores for these criteria from the total maximum score but not less than 85 points. The most difficult task for the evaluator is to decide which criteria are non-applicable for the particular GP.

### **4. BP selection criteria**

#### **4.1 Financial criteria:**

15 points max

- Attractiveness for investors: expected benefits (influence over the market, long term profit, short term profit, taxes decrease and value for money). If certain GP has:

6 points max

- Influence over the market - 2 points;

Long term profit - 1 point;

Short term profit - 1 point;

Value for money - 1 point;

Taxes decrease - 1 point.

- Financial diversification: all types of financing (corporate, seed, government and private funds, personal) must be present; combinations of two or more types of financing are preferable.

4 points max

- GPs that provide attractive financing mechanisms that support the other market players in the field of embedded systems and Industrial informatics. For example a bank or a fund offering a scheme for financing research and development of the SMEs part of the sector in SEE.

5 points max

#### **4.2 Applicability/Impact criteria**

15 points max

- International validity: application in the country of origin, distribution among all SEE countries, distribution in EU, distribution over the world.

6 points max

- Wide range of participants: GP's which are good for SME's, large industrial companies, universities, small research groups, individuals.

4 points max

- International synergy of intellectual resource: which are the possibilities for cooperation between participants (private and state companies, universities, retailers and wholesalers).

5 points max

### **4.3 Realisation**

15 points max

- New idea realisation: time span, approximate cost, team (approximate number of staff members – belonging to one company or university, belonging to different companies / universities). If a company or organization complies with those criteria the innovation and commercialisation of that idea should be recent.  
7 points max
- New technological realisation through a novel means of existing idea: results (better parameters / characteristics / efficiency, lower cost / size / weight, more functional use)  
5 points max
- Improvement/novelty introduction to well-known technology: same as 3.2.  
3 points max

### **4.4 Innovation**

15 points max

- Innovation shall be recent (preferably from the last 1 or 2 years). It might be a product, process, service or even a financial mechanism. Note that a new version or repackaging of an already well-accepted technological solution does not qualify as an innovation.
- Recent GPs that have achieved something beyond the current state of the art in the area of embedded systems and Industrial informatics.  
5 points max
- Novel ideas that have achieved a real innovation in its market niche despite the relatively low R&D effort/cost behind them.  
4 points max
- Innovative prototypes ready to enter the market.  
6 points max

### **4.5 Time & life criteria**

12 points max

- Expected use of GP: less than 3 years (1 point max), 3 - 5 years (2 points max), and more than 5 years (2 points max).  
4 points max
- GP sustainability and potential for growth.  
2 points max
- Energy saving GP with classical energy sources.  
2 points max
- Environment friendly GP  
2 points max
- Use of new energy sources (wind, solar energy, bio energy, thermal energy)  
2 points max

### **4.6 Social criteria**

10 points max

- Creating new work places.  
4 points max
- Oriented to handicapped people.  
2 points max
- Enhancing of personal qualification.

- 2 points max
- Number of trained staff in areas related to embedded systems and industrial informatics.  
2 points max

#### 4.7 Transferability

10 points max. Transferability criteria elaborate GP that has achieved results that might be easily transferred to other players from the SEE region. That criterion is particularly important for the project since one of the project goals is to build a network and to transfer knowledge between the different GPs. Thus practices, by which the results were transferred to more than two places, shall score 10, to two places - 7, and to one - 5. The possibility for transfer has to be scored with 2 and by its lack - 0 points.

#### 4.8 Overall reviewer impression

8 points max. Since it is quite difficult to make fair criteria for assessment of so many different good practices an additional criterion will be added. It gives opportunity to the reviewer to provide its overall impression from the Good Practice. This criterion gives a maximum of 8 points. Since this criteria is quite subjective the reviewer shall specify in the notes section of Annex A why points as per this criteria are/ or are not given.

### 5. Results

As a final result 30 BP were selected among the initial 120 GPs. The country representation is shown on Table 1 and on Table 2 is presented the representation as per Industrial areas.

**Table 1** BP country representation

Country	GP 120		Original Data	
Greece	21	17.50%	9	30.00%
Austria	23	19.17%	6	20.00%
Italia	11	9.17%	5	16.67%
Bulgaria	20	16.67%	4	13.33%
Slovenia	14	11.67%	2	6.67%
Serbia	11	9.17%	2	6.67%
Ukraine	10	8.33%	2	6.67%
Romania	10	8.33%	0	0.00%
	120	100.00%	30	100.00%

**Table 2** BP country representation

Industrial Area	Original Data	
Industrial informatics	13	43.33%
Nomadic environments	4	13.33%
Private spaces	4	13.33%
Public infrastructures	9	30.00%
	30	100.00%

## 6. Conclusion

The proposed methodology for elaboration and selection of Best Practices among many Good Practice examples was successfully implemented into this I3E funded project. Due to its close following and execution from all the partners were selected 30 BPs among 120 GPs. The methodology had its pros and cons. The pros were that it has selected BP from almost every country and those BPs were from all the Industrial domains of Embedded systems and Industrial Informatics. The cons was that it was relatively difficult for the evaluators to determine are some of the criteria applicable to certain Good practice. The final results were accepted by all partners and the project continued in its next phase. In this one the partners has to further elaborate the chosen BP and to perform a SWOT analyses of the BP's.

# Audit of the Information Systems (IS) as a tool for continuous improvement of the performance of an organization

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Today information systems and information technology (IS and IT) are essential components for the operation of any organization. Their importance in providing support to business and operational processes, as well as management activities for tactical and strategic operations, has dramatically increased over the last 15 years. As IT has become an essential component of any business, it is not just an additional expense for the organization, but also a means for generating additional income and achieving business goals.

With its widespread use, possible misuse of information becomes a major concern. Data security and integrity are of primary importance for any organization. Information management involves identifying what information should be kept, how and where it should be stored, and who should have access. The quality of this process affects the quality of the information submitted to management, which directly affects its decisions, which in turn are essential for the survival of the organization in the global market. Additionally, some further topics are enhancing the complexity to the topic. One such example is alignment of IT with business, known as 'IT strategic alignment', which is becoming one of the major challenges of managing IT and business in general in the last period. From here stems the importance of checks and audits of information technology as a key mechanism for ensuring the integrity of information, with a view to the continuous improvement of the organization [2].

In this paper the example of IT audit in certain organization is given. COBIT is used as a basic audit methodology. The main goal of the paper is to show that the IT audit should be viewed as a tool for fostering the continuous improvement and IT strategic alignment.

## Keywords

Audit, Information Systems, COBIT, Continuous Improvement of Business Process, IT Strategic alignment

## 1. Introduction

Today successful organizations such as Google, Apple, T-Mobile, etc., are doing more than simply collecting and storing large amounts of data and information. By managing this information, they develop competitive strategies. Professor Thomas Davenport explained that such organizations are analytics competitors or competitors with the analysis [3]. It is clear that the IS and IT are facing new challenges that are making them more and more complex and difficult to manage. Besides the generic demands to obtain the right information to a right place in a right time in right format (in order to obtain management by facts), globalization and rapid development of the technology brought up additional questions/demands concerning the IS and IT, like security, strategic alignment of IT, etc.

Although the idea of management by facts is seemingly a simple process, in its application most organizations face three problems [3]:

1. Collecting relevant and reliable information,
2. Finding relevant information in vast amounts of available data, and
3. Transforming the data into information and knowledge.

Alignment is the correct positioning of components in an organization and their continuous adjustment to achieve the defined objectives. IT Governance is achieved by [4]:

- Strategic alignment of IT with business,
- Implementation of IT systems in business,
- Risk management of IT systems,
- Management of IT resources, and
- Measurement of the performance of IT systems

Since the IT and IS audit is one of the tools to evaluate the condition of the IS and IT, it is obvious that they have to cope with all this issues. For example, although SAIT should be among the primary objectives of IT audits, today audits are focused more on the technical part and less on the substantive one, the reason being that they are executed by IT experts who are not very familiar with MIS (Management Information Systems). The goal of this paper is to show the benefits that can be gained when audits also check whether systems are aligned with both the organizational needs and the business goals of the organization. This should improve the potentials of the IT audit in direction of the continuous improvement of the organization as a whole.

## 2. Audit Methodologies

IT audit is an objective process of collecting data for evaluation of information systems, operations and their functions. The evaluation of the collected information indicates whether the information systems store data securely, maintain the accuracy of the information and work effectively to achieve the goals of the organization. IT audits must answer the following general questions [5]:

- Do the computer systems work at all times when needed? (Availability)
- Are the data systems available only to authorized personnel? (Confidentiality)
- Is the data in the systems always timely, reliable and accurate? (Integrity)
- Are the operations of the systems effective? (Operations)
- Do the systems work in accordance with the user requirements, organizational policies and procedures and applicable laws and regulations? (Compliance)

Audits are carried out in phases / stages. According to [6], phases for running audits can be divided as follows:

1. Planning
2. Field work (executing)
3. Reporting

### 2.1 Planning

When planning an IT audit, the IT systems to be taken into consideration have to be associated with the organizational strategy. As things stand now, the methodologies for IT auditing that are mostly implemented in praxis are not suggesting analysis of the strategic documents, like strategy and strategic goals of the organization, IT strategy and its goals, etc. So, in the real life the consultation of those strategic documents in this important phase of the audit is left on the knowledge and experience of the auditors themselves. Auditors can choose the systems based on observations and on analysis of the risks. If the auditor (or the whole team) has no information on the strategic needs and goals of the company, the results of the audit will be inadequate. By using this approach, mathematically speaking it is possible to find the "local maximum of the function" without getting a synergistic effect on the results obtained. This important connection should yield an optimal solution which would lead to the realization of strategic goals of the organization. Therefore, the company's strategy and goals must be among the major inputs in the planning of IS audits.

## 2.2 Field work (executing)

The field work phase involves the execution of the audit. An important aspect of the audit, which should be determined before the field work begins, is to define the assessment of the level of fulfilment / compliance with the standards. This is a process in which the data processes or products are compared with certain defined criteria and evaluated to determine the extent to which they met the relevant criteria and whether corrective action is needed. Table 1 ([7]), gives one possible way of to carry out such an assessment; it is used in the case study.

Table 1 Compliance assessment

Supported by documentation	Conducted in practice	Degree of implementation
Yes	Yes	Fulfilled
Yes	Partly	Partially fulfilled
Partly	Yes	Partially fulfilled
Partly	Partly	Partially fulfilled
No	Yes	Partially fulfilled
Yes	No	Unfulfilled
Partly	No	Unfulfilled
No	Partly	Unfulfilled
no	No	Unfulfilled

## 2.3 Reporting

After completion of the audit, the auditor must report the findings to the clients. The audit report is a very important document which should be skilfully written so as to be understandable to all levels of management and staff.

## 3. Case Study of Implemented Audit Methodology

We will present the practical implementation of an audit of the functions of an IS in a global nonprofit organization. More precisely, the audit was carried out in the department which deals with the execution and follow up of different projects of the organization (in the following text the department is addressed as organization). The audit was done in accordance with COBIT, ISACA and IIA standards and methodologies; more specifically, we used ISACA methodology for planning, COBIT methodology for conducting the audit and IIA standards for reporting.

The first step was planning the audits of the organization's information systems.

For the audit we needed an auditor with knowledge of IT and SDLC (Systems Development Life Cycle) methodology. The duration of audit activities for carrying out the planned tasks was three weeks plus one additional week for writing and communicating the audit report.

Besides the ordinary documents that has to be analyzed in this planning phase, like IT plan, IT inventory, etc. [9], in order to exploit the SAIT we intended to consulte the mission, vision, general strategy and the IT strategy of the organization. Surprisingly the department had mission, vision and IT strategy (probably due to the fact that most of the documents are in electronic format), but had no written general strategy at the moment of auditing (this is one of the serious remarks noted in the final report). We therefore analyzed the mission, vision and the IT strategy of the organization. The mission of the organization is to expand its capacity and the capacity of its partners for the timely implementation of projects (cases) and activities. Working in some of the harshest environments and conditions in the world, the vision of the organization is to always provide its clients with services and results that meet the highest standards of quality, speed and efficiency.

From this we conclude that for the organization to achieve its mission and vision it requires a stable IT capacity that will enable efficient use of resources and will give accurate results. The key words from the mission and vision are expand, quality, speed and efficiency. In other words, the audit, concerning the SAIT had to answer the question(s), like "Are the information systems capable to "follow" the growth of the activities (in terms of new locations and new projects), obtaining good quality of data, in a short period of time and with acceptable costs?"

According to the size and importance of the systems, the audit objectives are defined as follows:

Primary objectives:

1. Is there a system for management of ICT resources?
2. Are there appropriate policies and procedures for strategic planning and management?
3. Are the roles and responsibilities clearly defined for effective and secure execution of ICT operations?

Secondary objectives

1. Is access to critical data and programs is secure and solely available to authorized people?
2. Is the network physically and logically secure?
3. Are there change management controls in place?
4. Are there implemented procedures for correct, complete and timely processing of data?

Considering the inventory / list of all automated applications, the organization uses the following information systems:

- An application for correspondence (CorLog) - where all the organization's internal and external communication is logged
- A time monitoring system – monitoring the amount of time employees spend per project
- A case management system – monitoring all the organization's on-going projects/ cases
- A database for issuing and monitoring recommendations (RecTrack) – such recommendations are issued as a result of completed projects/ cases
- An electronic telephone directory (Tel.directory) – a database of all employees

Analysis of identified IS risks used a method based on a scale of 100 points, as shown in Table 2 [8], where extra criterion (SUIT) was added in correspondence with previous discussions.

**Table 2** Risk Assessment of the applications in the organization using the model of 100 points

Category	Description	Max.	Tel. directory	Time Monitoring	Case Management	CorLog	RecTrack
A	Criticality	20	5	20	20	15	15
B	Complexity	20	5	20	20	10	5
C	Technology	10	5	10	5	5	10
D	Control environment	15	10	10	15	5	5
E	Integration	15	10	5	10	15	20
F	SAIT	20	5	20	20	10	10
Total		100	40	85	90	60	65

From the risk assessment table we see that the systems for case management and time-monitoring are the most critical applications in the organization, because they maintain all the important information on the projects. Hence, the risks associated with using these systems are the greatest.

Both information systems are accessed locally (there are local servers) in Locations 1, 2 and as well as some other locations (7 and 8), while other locations have access via Citrix, as shown in Figure 1.

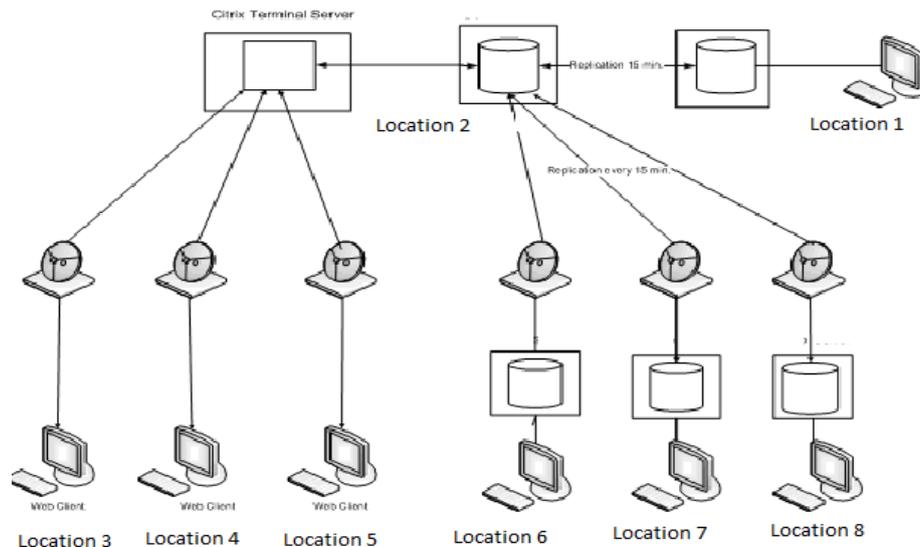
Audit of all technical elements of the systems was done by assessing the degree of fulfillment: evaluating responsiveness to the requirements of the standard to determine to what extent they meet the relevant criteria and whether corrective action is required.

Secondary objectives of the audits were pursued with respect to the following elements; the results are summarized in Table 3.

Due to the limited space in the paper we will only list the summarized findings for the COBIT elements while we will provide a detailed review for the third COBIT element.

Element 1: Installation and configuration of the Application System and the general ICT environment

Audit results: Technical aspects of the application system have been properly configured and implemented however the application performance is very slow in some locations.



**Figure 1** Architecture of the system for projects

#### Element 2: Processing

Audit results: The system is following the organizational workflow however there are no effective automated controls to ensure authorized, accurate and complete transactions from input to processing modules to the output of information.

#### Element 3: Data ownership

Objective of this element: To determine whether data owners have a clear understanding of their roles and responsibilities in ensuring the quality of data and the effectiveness of the application system.

We have expanded the audit with an analysis of the strategic alignment of IT. The new role of IT audits should be to reveal whether the IT and IS provide information that corresponds to the strategy. Currently, the organization has an IT strategy that has been developed taking into account various parameters including but not limited to the operational requirements of users, feedback received from users and potential areas for IT development. However, the following is not covered in this document:

- Definition of the IT services requested / required from service providers (SLA - service level agreement)
- Legal risks and requirements
- Best practices
- System for monitoring the reliability of data
- Electronic data protection and
- Policies for password creation

It is important to emphasize that there are no internal documents signed with providers that define the contracts for IT services and IT policies (SLA) given that the information system currently being used by the organization is maintained by the IT department in location 2.

From the analysis of the IT strategy, we can see that the organization has internal mechanisms for coordination of IT initiatives but no effective mechanism for supervision and coordination of IT programming and administrative activities, and therefore no proper forum for:

1. Establishing and ensuring that effective and efficient use of IT investments has been achieved;
2. Holding discussions to determine what resources are needed for IT support of IT activities and explaining the requirements for additional IT resources;
3. Recommending appropriate IT policies and procedures for business continuity plans for critical systems, security and replacement of systems or development of new systems that comply with standards;
4. Overseeing and coordinating the development of new IT systems;
5. Acting as an IT coordinator for the organization to ensure that all relevant directives are distributed to employees;
6. Ensuring that the IT needs of individual departments are met.

Long-term and short-term IT plans establish IT tasks necessary to fulfil the strategy and meet the needs of the organization. Such plans are important because they provide the basis for allocating and

monitoring the use of resources, information to interested parties about how the IT strategy will be delivered and a demonstration of how to prioritize IT activities to meet the needs of the organization. These plans should be used for calculation and analysis of investments in information technology. Audits found that, in the absence of such plans and a list of initiatives to support the process of project management, the organization cannot clearly show how IT resources are effectively used.

As a consequence:

1. Alignment of IT activities that include the terms and details of staff responsible for performing IT tasks is not visible within the organization;
2. Decisions on IT services are not planned but are determined according to current needs (on an ad-hoc basis). It is obvious that there are financial constraints in the organization, but this also means that the organization does not get a full picture of whether IT meets its business needs;
3. There are no controls to ensure that IT goals and short- and long-term plans are meeting organizational goals and plans;
4. There is no formal mechanism to assess whether and to what extent existing information systems meet the requirements for the automation of business processes, functionality, stability, complexity, costs and benefits.

According to the organizational structure, the IT unit is in the administrative department. The audit has no evidence to determine that this structure is based on sufficient analysis of the nature of the necessary IT services and the staffing and financial resources required for effective performance of functions. The audit proposes the establishment of an IT unit; for its efficient performance it is necessary to first define:

1. Description of the structure, functions and duties of all staff working in the IT unit;
2. Description of reporting lines, roles and responsibilities of staff in the IT unit.

The audit found that the organization has dedicated staff to provide software services, including troubleshooting and installing hardware and software. While some support requests are received by e-mail, the organization does not have mechanisms to store and analyze requests, including phone calls, or to analyze the nature of the requests. Because of this, the organization cannot develop a comprehensive list of equipment and systems problems and is not able to generate a list of frequently asked questions to establish the training needs of staff, which could strengthen the IT skills of employees in general.

The organization informed the audit that there is lack of funding for IT activities, which restricts the upgrade of IT equipment and technology. However, accurate information about how much is spent on IT is not available because the organization has no policies and procedures to ensure that IT costs are reflected in the budget in a consistent manner. The audit is of the opinion that this information is essential to allow the organization to explain and justify the need for IT investments necessary to support the organizational mandate. It is necessary to establish an IT fund, preferably within the administrative budget, which will help in collecting and reporting on IT costs and will facilitate analysis of investment in the use of IT applications and support for additional funding.

Element 4: Change management

Audit results: New releases and upgrades have been properly reviewed and staff has received adequate training.

Element 5: Logical access control

Audit results: The application system does not maintain appropriate confidentiality and integrity of data. There are no logical access controls and procedures to protect the system and information from accidental or intentional misuse.

Element 6: Data retention/backup/recovery

Audit results: There are effective controls for backup and recovery of data during the process of data storage and retrieval however the system does not have detailed audit trail.

**Table 3** Evaluation of the elements of the system

Elements of the system to check	Level of fulfillment			Remarks and suggestions for improvement
	Fulfilled	Partially fulfilled	Unfulfilled	
1. Installation and configuration of the Application System and the general ICT environment		X		Installing Domino servers in each location that will replicate the main Server in Location 2
2. Processing			X	New integrated system, it is not productive to improve (change) the old
3. Data ownership			X	To establish an IT department that will be composed of about three people and be responsible for IT support
4. Change management	X			Fulfilled
5. Logical access control			X	New system
6. Data retention/backup/recovery		X		The system is missing a detailed audit trail

The audit found that existing systems do not meet the needs of the organization and that there is a requirement for a new integrated system for tracking cases, timing and issuing recommendations. The systems showed significant pitfalls concerning the processing and logical access control and certain pitfalls concerning data ownership and data retention/backup/recovery. This kind of shortcomings can significantly affect the fulfillment of the mission and vision of the organization – expansion of the missions, timely carrying out and monitoring of the cases (projects), etc.

Using the gap analysis the audit defined a detailed list of specifications that the new improved system has to have in order to meet the aforementioned requirements. Due to the space limitation, here we will pinpoint just few of them only to have the picture of the level of details, Table 4.

**Table 4** Functionality of the document management

Feature Group	Requirement id	Requirement description	Current	Future
<b>Collaborative Editing</b>	FN_CM_001	1. Some of the document types are multi-part documents, where each section of the document may be authored / edited / reviewed / approved by a different set of people. Therefore, the following use-case scenario describes the necessary functionalities:	NO	YES
		1.1 It should be possible for the users to check-in / check-out individual sections of a multi-part document separately. This will ensure that multiple users can work on different sections of the same document in parallel.	NO	YES
		2.1 It should be possible for the document owner to define access rights (read, write etc.) and metadata elements for each section of a multi-part document. This will ensure that the users have the appropriate level of access based on their task assignment.	NO	YES
		3.1 ...	...	...

The development and implementation of the system should follow established organizational standards and procedures. Two basic options are available to replace existing systems (the decision on this issue is beyond the frame of the audit):

- Buying a commercial system (off-the-shelf) based on a relational databases, or
- Developing a new system within the organization with existing staff or by hiring consultants.

## 4. Conclusions

Audits of IS systems are of great importance and benefit in ensuring the quality of economic activities and business processes within organizations. Through the audit process it is possible to check the quality of data and information, the way data is obtained from the systems, how to use the data and whether the data contributes to the improvement of the organization's decision-making process. This paper confirms the theories about the importance of information and IS and demonstrates how their accuracy and timeliness is essential for the organization. It also shows the importance of SAIT and its verification.

Globalization, technology and diverse organizational structures have made business very complex. Audits should help the organization gain competitive advantage in the market. Properly planned and implemented, the recommendations of the audits can have far-reaching consequences and benefits for the organization and can provide meaningful results that are visible at every level in an organization.

Audits, no matter how well conducted, may miss their aim and issue invalid recommendations if they do not take into account the organizational strategy. Audits should give guidance for improving the performance of organizations, making better products, gaining higher profits and better return on investment and obtaining a competitive advantage. Audits of IT and business processes can be seen as a way to improve performance of the organization, which will result in competitive advantage.

In this paper we have shown how significant and far-reaching conclusions can be derived from the IT audit. Detected significant deficiencies in existing information systems can have serious implications for the (none) implementation of the strategic goals of the organization. From this we can conclude that it is necessary to (1) clearly define the organizational goals, (2) connect them with (translate them into) IT objectives, (3) continuously compare the performance of existing business processes and IT (where audit is one of the basic tools) to determine directions for future improvement in the organization. Moreover, it is irrelevant whether it is for profit or non-profit, product or service, small or large organization - the process is the same, it only vary in its complexity.

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# Entrepreneurial intentions within business and non-business studies

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**Along with the changing nature of work and the prevailing global value being placed on entrepreneurship, the development of an 'enterprise culture' has become a primary objective for many countries. It has been argued that an enterprise culture depends upon a population of individuals who are 'enterprising', and who have the ability to take action, (as employees or employers), using creative and innovative approaches. Enterprise education operates on the premise that individuals can be taught to be more enterprising, and aims to develop in young individuals a set of skills that will allow them to be both job creators and job seekers – and so contribute to the enterprise culture.**

**Although extensive research evidence has been available on different scopes of entrepreneurship in Macedonia, not much has been revealed about the entrepreneurial intentions of the senior students within business and non-business studies and their interest in the field of entrepreneurship as a possible future career. Furthermore, some anecdotic evidence would propose, that there would be more ambitions for traditional jobs in larger industries and public sector rather than pursuing entrepreneurial career.**

**Preliminary results show that the economic and business students are more likely to start their own company and have more knowledge for starting a new business rather than the students from technical faculties which is due the fact that students from the economic faculties usually attend more economic courses during their studies. It is very likely to be confirmed that the student entrepreneurial intentions are less the case of their personal characteristics but they lay in their knowledge and abilities acquired through their education and also working experience. Thus, higher interest for entrepreneurship career is more likely to be associated with higher level of knowledge on how to run a business rather than level of innovativeness and other entrepreneurial prerequisites.**

## **Keywords**

Entrepreneurship, entrepreneurial intentions, entrepreneurship education, business studies, non-business studies

## **1. Introduction**

Although extensive research evidence has been available on different scopes of entrepreneurship in Macedonia, not much has been revealed about the entrepreneurial intentions of the senior students and their interest and ambitions in the field of entrepreneurship as a possible future career.

Furthermore, some anecdotic evidence would propose, that there would be more ambitions for traditional jobs in larger industries and public sector rather than pursuing entrepreneurial career. More specific emphasis will be given to the entrepreneurial intentions of the students from the technical colleges apart from the students of economics and business colleges.

Thus the essential part of the research is focused on the student's entrepreneurial intentions towards establishing new companies and the assessment of the quality of educational system and entrepreneurship teaching programs towards supporting entrepreneurial culture among the student population. Research was performed through a survey carried out among the students Republic of Macedonia from both technical and economic colleges in which students will be asked whether they will establish their own company after graduation. More than 600 students participated in the research.

## 2. Literature and hypothesis

### 2.1 Literature

The fundamental reasons why students give a lot of importance to education (Pais, 2001), researchers point out, come from their beliefs of open possibilities of transition from one social class into another – therefore, the educated youth have great expectations in a parallel line with their level of education [1]. When young people are in a deciding position on their future career, in most cases, they have a poor image about what that sort of a vocation offers them and what are the consequences from that decision. For instance, students who enrol a faculty of pedagogy they decide to become pedagogues/teachers, most commonly based upon their own observations, their own thoughts and their already formed model of a teacher. This type of a teacher is usually based on the blurred memories from the kindergarten teachers of their past while attending it, which sadly, is a very narrow-minded thinking when it comes to making a decision like this [2].

Life, family and working experience affect our behaviour and intentions to a large extent, even though they are dependant on how we respond, i.e. our own reaction to those experiences. Similarly, in the entrepreneurship, experiences affect to a large extent on entrepreneurial behaviour and intentions. Education also affects entrepreneurial behaviour to a great extent [3].

Potential entrepreneurs are most often frightened or marvelled by entrepreneurship, depending on the prototype of the entrepreneur they represent. If individuals learn about entrepreneurship, their behaviour and intentions considerably change. Via entrepreneurial education, they have an opportunity to shape themselves as a broader and a richer model of an entrepreneur, as well as to present themselves more optimistically as entrepreneurs. Generally, individuals form different models of entrepreneurs. Thus, past entrepreneurial experiences are related to more realistic views about them as entrepreneurs [2].

Numerous researches conveyed in developing countries, especially the countries which in the process of transition into free enterprise economy gave high priority to the development of entrepreneurship and to the small and medium businesses, show great disproportions in the motivation and ambitions among the students of technology and social sciences. Namely, students from the faculties of economics display great motivation for power compared to their colleagues from the faculties of technology, while the ambitions of the students of technology are much greater from the ones the students of economics have [4].

These pieces of research show connection and similarities between the results from the research from both groups of students, and the reason is due to the assumption that those students when in secondary school, right before the choice to continue their education, whether to study economics or social sciences, they do not receive sufficient information that would help bringing the right decision and initiating their brilliant future and career.

On the other hand, the imperfection of the labour market expressed by the unsynchronized educational programs with the staff unrelated to their appropriate vocations and professions, as well as the claims and the needs of the realistic business sector for specific new professions and staff with a deficient character, imposes the need for active policy on planing human resources according to the labor market needs, implementing and promoting new educational programs, as well as implementing entrepreneurial education and development of entrepreneurship in all levels of formal education as a mean for stimulating self-employment and filling the gap between the supply and the demand for the labour market.

## **2.2 Hypothesis**

H1: Students of economics are more likely to start their own company than the students from technical faculties.

Most researchers [5], [6], [7] point out that greater the number entrepreneurial subjects included in the syllabuses of faculties, affects on the greater number of founded companies. Hence, the students from the economic faculties usually attend economic and business classes for four years while in some certain departments entrepreneurship is taught as a mandatory course. Despite the mandatory course of entrepreneurship, some departments in the faculties of economics also include entrepreneurship as a facultative course in their syllabuses. On the other hand, at the technical faculties students usually attend technical courses only, mainly because of the unavailability of economic or business related courses in their studying programs.

H2: Students of economics have more foreknowledge for starting a new business than the technical faculties' students.

I assume that the students of economics upon attending classes on economics are more confident in their knowledge and skills acquired in the field of entrepreneurship rather than the technical students who on the other hand didn't have an opportunity to take any classes in business or economics. Namely, the previously conveyed researches indicate that people who have and are confident in their knowledge, skills and abilities are eight times more likely to become entrepreneurs than the people who don't [8].

H5: Students who during their studies have acquired some practice or worked for a private company are more inclined to set up a company.

Many students from the Western European countries during the studies have the opportunity to take practice in the private enterprises and as well to work in real work environment with regular job responsibilities and duties. These practices offer the opportunity to acquire additional skills and capabilities and as well invaluable working experience which in major extent will bring them more benefit later on in the regular employment. Listen

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Thus, some of the latest researches show that the safest way for integration with the labour market is the so-called "dual system" where education takes place simultaneously with the practice because it allows the students to become insiders in the market while they are studying [9]. In Germany, Denmark and Switzerland this system is compiled and implemented by cooperation of the companies and the appropriate faculties. It is considered that it is beneficial for all the three parties: the students increase their employment options, the educational institutions widen their program range, the companies maintain contact with the potential young employees who might be employed in the future. As a result, around 82% of the graduates in Germany land their first jobs within the first 6 months after graduation [10].

## **3. Methodology and sampling**

### **3.1 Methodology of research**

#### **3.1.1 Data source**

The major data source is the questionnaire on students' entrepreneurial intentions, taken as an example from the previous preformed research in Slovenia aimed to evaluate the entrepreneurial profile of Slovenian people [11]. The questionnaire was compiled of 5 sections – the first section deals with the questions on the students' entrepreneurial intentions while the second states the reasons for starting a business answered only by students who intend to start a company. The third section of the questionnaire defines the reasons for not starting a company, answered only by students who do not intend or do not know whether in the future will start a company. The fourth section generally deals with the values, interests and standings while the fifth deals with the demographical characteristics. As from the first question in the first section students immediately specify whether they intend to start a company or not, while the questions in the other sections ascertain the intentions, motives, behavior, values, interests and standings of the youth.

### 3.1.2 The objective of the research

The objective of the research is to study the enterprising of the youth from the aspect of whether young people consider an entrepreneurial career as a possible future employment occupation. As research sample for our research we have included senior students enrolled in the final academic years, having in mind that they are one step away to finishing their studies and assuming that their thoughts are directed towards a future career and occupation decision making. Additionally to our general research we have also included research sample of two groups of students, one from the faculties of technology and the technical faculties and one from the faculties of economics and the business faculties, using them to make comparisons in terms of their entrepreneurial intentions.

### 3.1.3 Data processing

The data collected from the questionnaire is being processed and analyzed by the SPSS 15.0 software program for Windows and Microsoft Excel 2007 program. The procedure of processing analysis contains the following phases: (1) Targeting and classification of the population; (2) Design of both on-field an on-line versions of the questionnaire; (3) Carrying out the poll process within the two types of faculties; (4) Processing with the SPSS statistics program; (5) Analyzing of the final results.

In order to check the hypothesis I have been using the CHI-square test with values in the interval of  $[0, x_{2max}]$  as well as the Cramer's coefficient defined in the interval of  $[0,1]$  in order to show how strong is the connection between the nominal variables. For confirmation or rejection of the hypothesis I have also used the CROSSTABS subprogram as a part of the SPSS software program.

## 4. Results

### 4.1 Entrepreneurial intention among students

Research results show that the interests among students for founding a company is huge, however it is only stimulated by the future wish for setting up a company and not the real possibility and the current situation to which students are faced with at the moment of their decision. Hence, most of the students choose to set up a company in their later lives and solely after five years of graduation, which is due to the logical decision to either continue their education and temporary escape or postpone the decision about their future career choice or either to choose to be employed in private or public sector, and thus avoid the unemployment and leave the idea for founding a company still opened couple of years after the first employment. Accordingly, the number of students who wish to form their own companies after the first 12 months of graduation is close to 4 % which shows poor students' readiness to put their acquired skills and knowledge into practice by forming their own companies and thus capitalizing their intellectual effort at the same time. Main reasons that contribute to the results mentioned above are: the lack of knowledge, lack of experience, no encouragement and support from the stakeholders of the entrepreneurial environment (their professors, parents, relatives, media) and mostly lack of financial resources. Thus the fact that only 2.6 % of the students have their own company only additionally emphasis the strong influence of the reasons mentioned above.

Table 1 Entrepreneurial intentions among students.

Type of faculty	Already have own company	Intention to establish company next 12 months	Intention to establish company 1-5 years	Intention to establish company 5-10 years	Intention to establish company after 10 and more years	No intention to establish a company
Business faculty	0.6%	1,6%	22.2%	13.8%	5.5%	6.3%
Technical faculty	1.9%	2.1%	15.0%	14.4%	3.4%	13.1%
Total	2.6%	3.7%	37.2%	28.2%	8.9%	19.4%

If we compare the same parameters between the business faculties and the faculties of economics against the faculties of technology and technical faculties we can reach the following conclusions:

Only 6.3% of the students of the business faculties and the faculties of economics do not intent to set up their own company, while twice as many (near 13%) of the students of the faculties of technology and technical faculties have chosen not to set up their own business.

There is a more serious intention in founding a company at the students of business faculties and the faculties of economics with the quarter (22.2%) of them who are planning to set up a company in period of 1-5 years; 13.8% that are planning to form a company in period of 5-10 years; 5.5 % that are planning to set up a company in period of 10 and more year, 1.6% that are planning to set up a company in period of 12 months, while only 0.6 own their company.

Opposite to the results at the students studying at the business faculties and the faculties of economics, 15% of the students studying at the faculties of technology are planning to set up a company in period of 1-5 years; 14.4% are planning to form a company in period of 5-10 years; 3.4% are planning to set up a company in period of 10 and more years, 2.1% are planning to set up a company in period of 12 months, while only 3.4% own their company.

In terms at situation, the results are surprisingly interesting. As we were pretty much convinced into defining the basic hypothesis that in the fact that the students of the business faculties and the faculties of economics are more focused toward forming a company than the students studying at the faculties of technology and technical faculties, it turns out that such an argument is in accordance with the received results. Namely 93.1% of the students of the business faculties and the faculties of economics have intentions to establish company in future, while 85 % their counterparts from the faculties of technology and technical faculties have such intentions.

On other hand regarding the results about the state of the already established start-up companies, the students of the faculties of technology and technical faculties are showing much sustainable successful entrepreneurial stories than their counterparts from the business faculties and the faculties of economics. This is mainly due to the fact that most of the students of the faculties of technology have more innovative and technologically based ideas that affect to better sustainability of their business model which is more or less dependable upon the upstream development trend of the information and communication technologies (ICT) industry and the growing market of ICT services.

But, as we have already said in the theoretic part of the research, these results picture the following statements:

- Students of the business faculties and the faculties of economics study more economic subjects
- Students of the business faculties and the faculties of economics have more prerequisites and are more talented for founding a company but they don't have authentic entrepreneurial ideas.
- Students of the faculties of technology and technical faculties are very good technically, and frequently have very strong product ideas. However, they are weak in the area of commercialization and marketing.

## 4.2 Entrepreneurial experience among students

One of the most important factors which affect the students' entrepreneurial profiling, apart from being a member in student organizations, parents' support, the professors (the quality of the educational system) and the state support is of course the possibility to work and have a practice in a company during the course of their studies.

**Table 2** Internship (part time job) during studies

Type of Faculty	Yes, by personal engagement in seeking of open internship or vacancy	Yes, by intermediation of the temporary employment agency	Yes, by intermediation of the student organisation	No
Business faculty	23.5%	0,5%	2.6%	23.5%
Technical faculty	24.3%	2.1%	4.4%	19.3%
Total	47.7%	2.6%	7.0%	42.7%

The previous results show that many of the students (58 %) had the opportunity to do a practice or to work for a company, against those with the percent of 42 who didn't have the opportunity to do that, because of the hardness of the study courses. Though the previous numbers look impressive, it is still surprising a fact that more than 83 % of those who said that they did some kind of practice during the course of their studies, applied that they did that on their own initiative.

In the questionnaire, I also inserted the question about the necessary knowledge, skills and experience needed for a student to establish a company. If he wants to set up a company, the entrepreneur must be familiar with the all main functions of the company and the way it operates. They especially need knowledge about sales, economics of enterprise (finance), organization of enterprises, human resource management, principles of law and so on.

**Table 3** Entrepreneurial knowledge to establish a company.

Type of faculty	Yes, enough	No	No, but trying to educate themselves on their own initiative (seminars, workshops etc.)	Not sure
Business faculty	4.5%	4,5%	32.8%	8.1%
Technical faculty	9.7%	10.0%	19.3%	11.0%
Total	14.2%	14.6%	52.1%	19.1%

As it can be seen more than 66% from the interviewees said that they didn't possess the necessary knowledge and did not have an experience, 19 % said that they were not confident enough in their knowledge and experience, while 14 % said that they had enough knowledge, skills and experience to set up and manage their own company. Regardless of the large number of 66% of inexperienced entrepreneurs (without the necessary knowledge, skills and experience) it is still favourable a fact that 78% of the inexperienced students are willing to become educated on entrepreneurship their own initiative (reading literature in the field of entrepreneurship, attending seminars, workshops and so on). If we compare the results on different levels of students (the students of the faculties of economics and the business faculties versus the faculties of technology and technical faculties) the situation will be as it follows:

1. More than 74% from the interviewed students of the faculties of economics and business faculties answered that they didn't possess such an experience and knowledge, 16% were not sure in their own skills and experience, while 9% said that they did possess the knowledge, skills and experience needed to establish their own company.
2. More than 58% from the interviewed students of the faculties of technology and technical faculties answered that they did not possess such an experience and knowledge, 22% were not sure in their own skills and experience, while 19% said that they did have the knowledge, skills and experience to form their own company.

It can be concluded that the students studying at the faculties of technology and technical faculties stressed they think they have better knowledge, skills and the necessary experience to form their own company, while most of the students studying at the faculties of economics and business faculties stressed that they are more self-educated in the field of entrepreneurship rather than their counterparts from the faculties of technology and technical faculties.

This is a reflection of the fact that students of the faculties of technology and technical faculties frequently have very strong product ideas and technical expertise which arise from their profound theoretical knowledge of computer programming, mechanics, machining, 3D modeling and designing etc. which makes them more confident in their acquired knowledge which can be more market payable and market materialized on labour market as well. But this doesn't make them more entrepreneurial friendly than their counterparts from the faculties of economics and business faculties since the students of the faculties of technology and technical faculties usually lack of knowledge in the area of commercialization and marketing which are of major essence for the entrepreneurial success.

### 4.3 Entrepreneurial education among students

Support for starting a business can be given by teachers as well, which to a large extent influence the individuals who think about entrepreneurship as a possible career. Schools that include entrepreneurship and innovation programs in their curriculum are the ones that create entrepreneurs and are one of the creators of entrepreneurial environment. For example, the bigger number of entrepreneurial subjects in school, the bigger possibility those students to start their own business in the future [7].

According to previously quoted I've decided to evaluate the educational system regarding the level of involvement of entrepreneurship as a subject in the overall academic curricula. For that reason I've asked interviewees to give their more general mark about the degree to which Macedonian formal educational system encourages the entrepreneurship through a fivefold Likert scale. Additionally, the interviewees were given a chance to give reasons for their answers through a further use of conditional questions.

**Table 4** Level of which formal educational system encourages entrepreneurship

Type of faculty	Not enough	Little	Moderate	Much	Enough
Business faculty	5.2%	8,9%	20.7%	3.6%	11.7%
Technical faculty	12.1%	11.7%	16.0%	2.6%	7.6%
Total	17.3%	20.6%	36.7%	6.1%	19.3%

Hence, the results are as they follow:

1. Near 75 % of the interviewees gave insubstantial, low and moderate mark about the degree of implementing the entrepreneurial skills in our formal educational system. Or more precisely 37 % of them gave a moderate mark, 20 % a low mark and 17 % insubstantial mark in their evaluation. If we neglect the statistically neutral moderate mark for which usually the interviewees go for, it can be concluded that the formal educational system received mostly insubstantial to low grade (38%) in implementing the entrepreneurial skills in the formal education.
2. 25 % of those, whose mark was very good to excellent, based their grades on the following criteria: having a good educational program (subjects) which encourages the entrepreneurship, encouragement by the professors, the existence of extracurricular activities and lectures by proven entrepreneurs.
3. 75 % of those whose mark was insubstantial to good, based their grades on the following criteria: lack of practice, extracurricular activities, lectures by proven entrepreneurs, and appropriate subjects which encourage the entrepreneurship.

## 5. Conclusions and implications

### 5.1 Conclusions

The results from the contingency table for H1 showed that the percentages of students from faculties of economics and business faculties who intend to establish a company is 54.3%, while that percentage of students from faculties of technology and technical faculties is 45.7%. Accordingly, we can confirm H1, i.e. students of faculties of economics and business faculties are more inclined to establish an enterprise than the students of faculties of technology and technical faculties. This is mainly a result from the theoretically proved statements:

- Students of the business faculties and the faculties of economics study more economic subjects
- Students of the business faculties and the faculties of economics have more prerequisites and are more talented for founding a company but they don't have authentic entrepreneurial ideas.
- Students of the faculties of technology and technical faculties are very good technically, and frequently have very strong product ideas. However, they are weak in the area of commercialization and marketing.

The results from the contingency table for H2 showed that different faculties provide students with different level of foreknowledge of the business area. From the results can be concluded that the students studying at the faculties of technology and technical faculties stressed they thought they have better knowledge, skills and the necessary experience to form their own company, while most of the students studying at the faculties of economics and business faculties stressed that they are more self-educated in the field of entrepreneurship rather than their counterparts from the faculties of technology and technical faculties.

This is a reflection of the fact that students of the faculties of technology and technical faculties frequently have very strong product ideas and technical expertise which arise from their profound theoretical knowledge of computer programming, mechanics, machining, 3D modeling and designing etc. which makes them more confident in their acquired knowledge which can be more market payable and market materialized on labour market as well. However, this doesn't make them more entrepreneurial friendly than their counterparts from the faculties of economics and business faculties since the students of the faculties of technology and technical faculties often lack of knowledge in the area of commercialization and marketing which are of major essence for the entrepreneurial success. In terms of the training (working) students are differently inclined towards setting up a company, i.e. we can accept the conclusion that students who worked in a private company or acquired some practice during their studies have a greater inclination to founding a company. The previous results show that many of the students (58 %) had the opportunity to do a practice or to work for a company, against those with the percent of 42 who didn't have the opportunity to do that, because of the hardness of the study courses. Though the previous numbers look impressive, it is still surprising a fact that more than 83 % of those who said that they did some kind of practice during the course of their studies, applied that they did that on their own initiative. This situation in one hand shows quite high degree of students' self initiative as one of the major factors and stimulus for establishing a company, but at the same time also shows not enough efficiency in the work of the student organizations and does not justifies the purpose and the aim of their existence at the same time.

## **5.2 Implications**

Even though students' general interest for founding an enterprise is great (nearly 3/4 from the polled students) it is stimulated only by the desire to establish a company, but not as well by the realistic opportunities and the current situations which students face at the moment of decision making. Namely, apart from the high personal motivation and desire to set up a business, the lack of required knowledge, lack of experience, lack of support and stimulation by the rest of the stakeholders of the entrepreneurial environment (teachers, parents, relatives, media etc) and the lack of financial funds additionally postpones students' decision of setting up a business immediately upon graduation, i.e. in the following 12 months. Instead of that, students choose to start a company in some later point of their lives, in a period of 5-10 years after their graduation which reasonably is a result of the students decision whether they want to continue their education by enrolling postgraduate studies or to become employed in the public or private sector where they can be acquired with the needed working experience so that again, when they would be 27-32 years old they would try to reconsider the possibility of founding a company.

The previous findings only confirm the general image of the quality of the educational system in Republic of Macedonia and the measures taken in entrepreneurial education. That is to say, the non-decisiveness of starting a company immediately upon graduation, i.e. in the following 12 months is a direct reflection of the inadequately passed and acquired knowledge and skills in the educational process and the insufficient experience of their practical application in the real life.

Correspondingly to this situation students choose the path that leads to the temporary or long-term unemployment (those who try to find a job but unfortunately fail), to the temporary or long-term employment (those who have found a job and used the possibility to acquire training and practical knowledge on the working place) and the path to continue their studies (those who temporarily postponed the choice of becoming unemployed or employed).

On other hand regarding the evaluation of the educational system in Macedonia and the level of involvement of entrepreneurship as a subject in the overall academic curricula it can be stressed that it will be a real challenge to build inter-disciplinary approaches, making entrepreneurship education accessible to all students, and where appropriate creating teams for the development and exploitation of business ideas, mixing students from economic and business studies with students from other faculties and with different backgrounds.

Although courses and activities on/about entrepreneurship for all categories of students, in any field of study, provide basic business skills and raise awareness of entrepreneurship as a potential career

option, the teaching process needs to be additionally tailored to the specific needs of different categories of studies where more emphasis will be placed on one aspect or another, for instance:

- Entrepreneurship within business schools and economics studies should be more focused on business start-up and new venture creation, and on the management and growth of SMEs. Students of economics should learn to work with students from different fields (engineering, scientific studies, etc).
- Entrepreneurship within science and technology studies on other hand should be especially concerned with the exploiting intellectual property, creating spin-off companies and venturing, and as well to offer courses on issues such as:
  - management techniques;
  - marketing, commercializing and selling of technology based ideas;
  - patenting and protecting technology based ideas;
  - financing and internationalizing high-tech ventures.

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# Capital Budgeting – A Tool for Improvement of Operations of Small and Medium Enterprises

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**Capital budgeting is a planning process that determines whether a company should pursue a specific long term investment into new equipment, plant, product or improvement of existing ones. The movement to new products, services, or markets must be preceded by capital expenditures and capital budgeting decisions which define company's strategic direction and therefore are very important for survival and success of the company.**

**The allocation of capital in small and medium enterprises is often more important than in large companies due to the fact that funds necessary to finance projects may be difficult to obtain. Also, small and medium enterprises may not have luxury to correct a mistake. Yet small and medium companies make less extensive use of capital budgeting techniques than the large ones. If a small business fails to use capital budget methods because its managers are not well trained or informed, it may be putting itself at a serious competitive disadvantage. Therefore, in order to compete effectively with big companies, small and medium enterprises must attain knowledge in capital budgeting methods.**

**This paper will explain and demonstrate capital budgeting methods in order to help entrepreneurs to make prudent decisions about what, where, and how much money to allocate to new facilities or improve existing ones in order to ensure long-term success.**

## **Keywords**

Capital budgeting, Capital budgeting methods, Cash flow, Discount rate.

## **1. Introduction**

When a company makes a capital investment, it outlays cash in the expectation of long term future benefits. Examples of such capital investments include the purchase of new or replacement of existing manufacturing equipment, plants, products and so on.

An investment proposal should be evaluated in terms of whether or not it provides a return equal to, or greater than, that requested by investors. Capital budgeting methods that are the most commonly used for such evaluation are payback method, net present value, internal rate of return and profitability index. In practice, often a combination of these methods is used.

## **2. Capital budgeting methods**

One of the basic methods for evaluating investment project is payback period, which is the period needed for the return of initial project investment by cash flows. [2] According to this method, the projects that return their investment earlier are considered more attractive, and all realized cash flows after the return of initial investment may be regarded as the profit realized on the basis of this project. Likewise, the project that returns the invested money in a short period of time is less risky because a

significant risk component is the probability of enterprise to lose certain or total amount of money invested in the project.

Actual payback period =  $I - CF_1 - CF_2 - \dots - CF_t$  [3]

I – capital investment in a project,

CF1, CF2...CFt – annual cash flows from the project.

When the enterprise uses payback period as the criterion for accepting or rejecting the project, it determines the maximum payback period and accepts the projects covering the investment before the agreed deadline.

The enterprise do not normally use payback period as the primary criterion for the selection of projects but this method has a secondary additional rule for decision-making. Thus, the enterprise may set out a rule stipulating that every project having return on capital of at least 20 percent and payback period shorter than ten years will be accepted. If the investor must select one of the projects with the same return on capital, they will opt for the one with a shorter payback period.

The pitfalls of this method are the fact that time dimension of money (i.e. this method uses nominal cash flows) is not taken into consideration and that cash flows are ignored completely after the initial investment is returned. Besides, this method cannot be used if the investment is distributed in several periods of time or when there is no initial investment at all.

*The net present value* (NPV) method calculates the expected monetary gain or loss from a project by discounting all expected future cash inflows and outflows to the present point in time, using the required rate of return. [4]

$$NPV = \sum_{t=0}^n \frac{CF_t}{(1+r)^t} \quad [5]$$

CFt – the cash flow in the period t,

r – the discount rate,

n – project time period.

This method is the difference between the initial capital investment and the present value of all future cash flows generated due to the project exploitation by discounting the cost of the project capital. The minimum condition that the project must meet in order to be approved is to have the NPV greater or equal to zero. If this condition is not met, the project should be rejected. If the NPV is equal to zero, the cash flows of the project are sufficient for paying off the invested capital and providing the required rate of return on capital.

The limits of the NPV method refers primarily to the need for long-term and precise projection of the net cash flow and salvage value (See 2.1 The projection of the cash flow from the investment project.) of the project, not only regarding the amount but also time distribution of the cash flows. Potential inaccuracies may lead the investor to wrong conclusions.

*Internal rate of return* (IRR) method is a method of ranking investment proposals using the rate of return on an investment, calculated by finding the discount rate that equals the present value of future cash inflows to the project's cost. [6] That means that IRR is the discount rate which forces the present value of project's inflows to equal the present value of its costs.

$$NPV = \sum_{t=0}^n \frac{CF_t}{(1+IRR)^t} = 0 \quad [7]$$

The minimum condition that the project must meet in order to be approved is to have the IRR greater or equal to the cost of the project capital. Conversely, the project is rejected if the IRR is lower than the cost of the project capital. If the investors take two projects into consideration, whereby the IRR is greater than the cost of the capital in both projects, they will choose the one with a greater value of the IRR provided that the projects are mutually exclusive, or both of them will be approved in the case of independent projects.

When the investor considers independent projects, the NPV and IRR lead to the same decision about the acceptance or rejection of the project. When the investor, however, considers mutually exclusive projects, the NPV and IRR may lead to different decisions in the case of a considerable difference in the size of the project and/or timing differences between cash flows of the project. When evaluating mutually exclusive projects, especially those that differ in scale and/or timing, the NPV method should be used. [8]

*Profitability index* is the ration between the sum of present values of all future cash flows in the expected period of project exploitation and the amount of initial investment. [9]

$$PI = \frac{\sum_{i=1}^n \frac{CF_t}{(1+r)^t}}{I} \quad [10]$$

This method transforms the absolute sum of the profitability obtained by the NPV into the index and enables the assessment of the relative profitability of the project. The minimum condition for the acceptance of the project requires the profitability index equals 1.0 or better in the case of independent projects, whereas the project with the greatest profitability index is accepted in the case of mutually exclusive projects.

## 2.1 Projection of cash flows from the investment project

Incremental cash flows, or the additional operating cash flow generated when the enterprise decides to invest in the certain project, are used for the purpose of the assessment of the project by discounting. The projection of the cash flow of the certain investment project must be based on the forecast of the three key elements: [11]

- Net capital investment,
- Net residual cash inflow and
- Net cash flow from investing activities.

Net capital investment includes the outflow needed to make the investment ready for operation and generating the expected profit. These expenditures include the fixed assets increased by all dependent costs, installation costs and the costs relating to the rise in the necessary operating costs, such as cash, receivables and stock.

Net residual cash inflow is the expected cash inflow that the investor will receive after the end of the project time period from the sale of fixed and working capital used during the operation of the project.

The projection of net cash flow from investing activities is complex and implemented in three steps:

- Projection of income and cost for every year of the project time period,
- Determination of accounting earnings based on the projected income and cost and
- Transformation of accounting earnings into net cash flows for every year of the project time period.

It is impossible to forecast income and cost of the certain period with one hundred percent certainty due to various factors, such as: forecast mistakes, technological advancement, reaction of competitors, interest rate changes, etc. There are three ways for income and cost forecast of the certain project: [12]

- Forecast based on experience,
- Market testing in order to assess potential demand and income,
- Use of the method of economic scenario analysis.

The enterprise that constantly commences the same type of the project may forecast the income or cost of the project on the basis of experience or historical data.

If the enterprise forecasts the income and cost of the project referring to new products, services or market, it is necessary to carry out the market research or testing in order to forecast the interest for the purchase of that product or service.

When the enterprise is exposed to uncertainty owing to external factors that cannot be controlled despite the good knowledge about the market, it may consider different scenarios with their certainty, income and cost.

In order to reach accounting earning from forecast, it is necessary to classify the planned cost into operational and capital (Operational cost is the expenditure relating to generating the income in the current period of time, whereas capital cost has effects during a longer period of time. Operational cost are deducted from the income of current period, and capital cost is amortized or depreciated during a longer period of time.). Then, it is needed to depreciate or amortize capital expenditures over time and allocate fixed expenses of the company that cannot be traced to a specific project, such as general sales and administrative expenses (GS&A), that can be allocated to a project based on the measure such as project's revenues.

$EBIT = \text{income} - COGS - GS\&A - \text{depreciation and amortization}$  [according to 13]

EBIT – earnings before interest and taxes,

COGS – cost of goods sold.

Also, the investor has to consider the tax effect that is tax liability created by the operating income projected. Therefore, EBIT must be adjusted for the tax influence multiplying by the factor (1-t), where t is the interest rate applied on net income.

In order to get from accounting earnings to cash flows, the investor has to add back non-cash expenses like depreciation and amortization, subtract cash outflows which are not expensed (capital expenditures) and transform accrual revenues and expenses into cash revenues and expenses by considering changes in working capital.

Non-cash expenses reduce accounting earnings, but not cash flows so it is necessary to add them to the net income when calculating the cash flows. However, some non-cash expenses, such as amortization and depreciation, reduce tax liabilities of the enterprise and result in tax benefit (tax benefit=depreciation \* tax rate).

Conversely, there are non-cash expenses that are not tax deductible, as with ration of goodwill. Such non-cash expenses do not enable tax reduction and do not have the influence on the cash flow.

Investments in working capital are cash outflows since money invested in inventory or accounts receivable cannot be used elsewhere and therefore, it represents a drain on cash flows. It has to be recognised that cash flow drain is reduced to the extent to which some of these investments can be financed using supplier's credit, or account receivables. Also, any decrease in working capital increases cash flow in that year. It is important to have in mind that at the end of the project life working capital investments need to be salvaged.

Within investment analysis it is important to observe incremental cash flows, or cash flows that the project achieves for the enterprise it takes. Namely, some cash flows for investing activities are incurred and it is not important for them if the project will be undertaken or not. Those cash flows are called sunk costs and they are excluded from the acceptance analysis for an investment project. A typical example for sunk costs is research and development expenditures for considering a project.

## 2.2 Discount rate

The discount rate of the project is one of the basic inputs for the dynamic methods of capital budgeting. The discount rate must reflect the level of project risk so it is important to investigate whether the project risk differs from the enterprise risk when determining it.

If all the projects of the enterprise have a similar exposure to risk and belong to the same field of activities, the cost of equity (The cost of equity is the rate of return required by the owners of ordinary shares so they will have an interest to purchase and keep the shares of the enterprise. It must be pointed out that the free cash flow to the equity is the cash flow discounted by the cost of equity while using the dynamic methods of capital budgeting, and it represents a cash flow available to the owners of ordinary shares obtained on the basis of the project, which ceases when all business expenditures are incurred, all necessary investments into working and fixed assets are made, the interest rate is paid and the payment of the principal of the debt is completed.), i.e. the cost of the total capital (The cost of the total capital takes into consideration all the sources of the capital and is obtained as the weighted average cost of all sources of the capital of the enterprise. Free cash flow to the firm is a cash flow before incurring the debt and after taxation, which measures the funds made on the basis of the project for all creditors, after all re-investing actions to the enterprise are incurred. Free cash flow is discounted by the cost of the total capital of the enterprise by using dynamic methods of capital budgeting) is used as the discount rate of the enterprise and beta of the enterprise may be used as a beta of the certain project. This approach may be used for the enterprises involved in one activity and implementing homogeneous projects.

When the enterprise is involved in different activities, and the projects within each activity have a similar level of risk, it is possible to calculate the cost of equity or the cost of total capital of each activity and use it as the discount rate of the project. It is clear that riskier activities have a higher cost of equity than less risky activities do. If the weighted average cost of capital is used for all projects, notwithstanding what field of activities they belong to, there will be gradual excessive investment into riskier activities and the rise in the total risk of enterprise operations.

When calculating the beta of each project, or each activity of the enterprise, it is possible, in addition to the historical market beta (Historical market beta is calculated on the basis of the

formula  $\beta = \frac{COV(R_A, R_M)}{\sigma_{R_M}^2}$  . [13]), to use pure play method and accounting beta method. In the pure

play method, the company tries to find several single-product companies in the same line of business as the project being evaluated, and it then average companies' betas to determine the cost of the

capital for its own project. [14] This method can only be used for major assets such as whole divisions. An additional problem with this method is the difficulty to find pure play proxy firm.

Accounting beta method is a method of estimating a project's beta by running a regression of the company's accounting return on assets against the average return on assets for a large sample of firms, such as those included in the S&P 400. [15] In practice, accounting betas are calculated for divisions or the large units, not for single assets, and divisional betas are then used for the division's project.

Likewise, the project of the enterprise may have different exposure to risk regarding both the common projects of the enterprise and the field of activities it belongs to. Therefore, if the project is large, the price of own funds or total capital necessary for running the project is separately assessed. The assessment of the cost of equity or cost of total capital can be done by the use of a beta enterprise that implements different projects or by the use of inter-sector regression of beta on fundamental variables. [16]

### 3. Conclusion

The investment of scarce capital is connected with uncertainty and risk. The bigger amount of such long term capital investment, which will be in accordance with strategic orientation of the company, will bring the greatest benefit to the company.

All companies should use capital budgeting methods since capital investment requires huge amount of financial resources and therefore has a long term economic consequences. This is especially true for small and medium enterprises because a wrong capital investment decision often leads to their bankruptcy. In order to compete effectively with big companies, it is crucial for small and medium enterprises to attain knowledge in capital budgeting methods.

### 4. Example

Company XYZ is developing new type of extruder and it already spent 3 million EUR in research and development. These expenses have been capitalized. Company decides to proceed with commercial introduction of the product and the company will have to spend an additional 5 mil. EUR for a new plant and production equipment. Salvage value of new plant and production equipment at the end of the life of the project is projected to be 700.000 EUR.

Capital maintenance expenditures are required in the amount of 30.000 EUR in year 1. After that, it is projected that capital expenditures will grow at the same rate as inflation (which is assumed to be 3% per year) until the end of the life of the project.

The sale of the product is expected to begin in the first year. Also, it is expected that company will sell 25 machines each year until the end of the project's life. The machines will be priced 200.000 EUR each. The price is expected to grow at the same rate as inflation.

Based upon past experience, company anticipates that variable expenses will be 72% of the revenue each year.

Initial investment in working capital is projected at 300.000 EUR. Salvageable fraction of working capital at the end of the project life is 100%.

The discount rate for the project is projected at 11,54% (beta of the project is 0,9, riskless rate 4,2%, market premium 8,5% and debt ratio 30%).

The project is expected to have a useful life of 10 years. The corporate tax rate is 10%. Company uses straight line depreciation to estimate depreciation each year.

Should the company undertake a project?

*Answer:* It can be seen from Table 1 that all major capital budgeting indicators favour the undertaking of the project. According to a payback period the investor will need 4.02 years for an investment's revenues to cover its costs.

Net present value is 3.213.188,11 EUR and since it is positive investor should undertake the project according the NPV rule.

According to the minimal requirement of internal rate of return, IRR should be higher than the cost of capital of the project in order to accept the project. In this case the IRR=22,90% and cost of the capital is 11,54%, which means that investor should undertake the project.

Profitability index is 4,97 and it is higher than 1, which is minimal requirement according to the profitability index rule.

**Table 1** Capital budgeting indicators

<b>YEARS</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>INITIAL INVESTMENT</b>											
Investment	5,000,000.00										
- Tax Credit	0.00										
Net Investment	5,000,000.00										
+ Working Cap	300,000.00										
+ Opp. Cost	0.00										
+ Other invest.	0.00										
Initial Investment	5,300,000.00										
<b>OPERATING CASHFLOWS</b>											
Revenues		5,000,000.00	5,150,000.00	5,304,500.00	5,463,635.00	5,627,544.05	5,796,370.37	5,970,261.48	6,149,369.33	6,333,850.41	6,523,865.92
-Var. Expenses		3,600,000.00	3,708,000.00	3,819,240.00	3,933,817.20	4,051,831.72	4,173,386.67	4,298,588.27	4,427,545.92	4,560,372.29	4,697,183.46
- Fixed Expenses		30,000.00	30,900.00	31,827.00	32,781.81	33,765.26	34,778.22	35,821.57	36,896.22	38,003.10	39,143.20
EBITDA		1,370,000.00	1,411,100.00	1,453,433.00	1,497,035.99	1,541,947.07	1,588,205.48	1,635,851.65	1,684,927.20	1,735,475.01	1,787,539.26
- Depreciation		430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00
EBIT		940,000.00	981,100.00	1,023,433.00	1,067,035.99	1,111,947.07	1,158,205.48	1,205,851.65	1,254,927.20	1,305,475.01	1,357,539.26
-Tax		94,000.00	98,110.00	102,343.30	106,703.60	111,194.71	115,820.55	120,585.16	125,492.72	130,547.50	135,753.93
EBIT(1-t)		846,000.00	882,990.00	921,089.70	960,332.39	1,000,752.36	1,042,384.93	1,085,266.48	1,129,434.48	1,174,927.51	1,221,785.34
+ Depreciation		430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00
- ∂ Work. Cap			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>SALVAGE VALUE</b>											
Equipment		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	700,000.00
Working Capital		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	300,000.00
<b>NATCF</b>	<b>5,300,000.00</b>	<b>1,276,000.00</b>	<b>1,312,990.00</b>	<b>1,351,089.70</b>	<b>1,390,332.39</b>	<b>1,430,752.36</b>	<b>1,472,384.93</b>	<b>1,515,266.48</b>	<b>1,559,434.48</b>	<b>1,604,927.51</b>	<b>1,651,785.34</b>
<b>Discounted CF</b>	<b>5,300,000.00</b>	<b>1,144,035.50</b>	<b>1,055,453.43</b>	<b>973,757.17</b>	<b>898,408.71</b>	<b>828,912.36</b>	<b>764,811.37</b>	<b>705,684.88</b>	<b>651,145.07</b>	<b>600,834.52</b>	<b>890,075.09</b>
<b>BOOK VALUE &amp; DEPRECIATION</b>											
Book Value (beginning)		5,000,000.00	4,570,000.00	4,140,000.00	3,710,000.00	3,280,000.00	2,850,000.00	2,420,000.00	1,990,000.00	1,560,000.00	1,130,000.00
Depreciation		430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00	430,000.00
BV(ending)		5,000,000.00	4,570,000.00	4,140,000.00	3,710,000.00	3,280,000.00	2,850,000.00	2,420,000.00	1,990,000.00	1,560,000.00	700,000.00
<b>INVESTMENT INDICATORS</b>											
Payback period		4.02	years								
NPV =		3,213,118.11									
IRR =		22.90%									
PI =		4.97									

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# Development of PIFC in Albania - a step on the road to European Integration

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The concept of Public Internal Financial Control (PIFC) has been developed by the European Commission in order to provide a structured and operational model to assist national governments in re-engineering their internal control environment and in particular to upgrade their public sector control systems in line with international standards and EU best practice.

The democratic changes affecting all areas of life in the last years, have led to reforms in the management of public finances of the public sector in the Republic of Albania.

On the road to our accession to the European Union we are in the process of important conceptual, legislative and structural reform of the Public Internal Financial Control framework with the aim of strengthening the managerial accountability of the managers of public sector organizations and further develop independent internal audit.

Actually the Ministry of Finance is completing the legal framework for FMC and IA in compliance with the EU requirements. Now, we have prepared and approved "The Law on Financial Management and Control", Law "On Public Financial Inspection" and amendments in the existing Law "On Internal Audit in Public Sector". Such laws and other by laws, professional guidance and regulations create the legal frame where PIFC System is based for implementation.

In order to ensure the transparency of public resources' management and spending, the legislator has introduced the requirement to the Council of Ministers (through the Minister of Finance) to report on an annual basis on the status of internal control in the Republic of Albania to the National Assembly.

This paper includes findings from the annual reports on the status of financial management and control (FMC) and internal audit throughout public sector in Albania. The paper summarizes the self-assessment made by the managers of public sector organizations and the internal auditors regarding the state of FMC and internal audit. It also includes information about the activity of the Central Harmonization Units (CHUs) and respectively, for financial management and control and for internal audit at the Ministry of Finance, which are directly engaged in the harmonization of the internal control in the public sector of Albania. The paper aims to give some key issues regarding PIFC development in Albania such as: the level of transparency regarding the status of the financial management and control and internal audit in the public sector; the awareness of the Heads of public organizations about the importance of sound financial management and control and to enhance their managerial accountability; information about the self assessment of the heads of public sector organizations on the adequacy and the effectiveness of internal control and about the progress made. It also outlines the weaknesses, solutions and development opportunities based on the assessment of the status of the financial management and control systems as well as of the internal audit. Through conclusions it summarizes the main directions in which the Albanian institutions must be focused in the future for further development and improvement of management of public resources. The development of the new model of public internal financial control in Albania demands

from all the participants in the process, leading to effective action in accordance with their roles and responsibilities. Only proper implementation of new legislation and efforts by all stakeholders can lead to achieving the goal - to create a modern system, reliable and functioning of public internal financial control. In this regard the CHU/FMC will outline specific measures related to strengthening managerial accountability and updating of legislation and methodology in the field of internal control in accordance with EU legislation and best practices. As one of the "three pillars" of the of Public Internal Financial Control System, Internal Audit has developed and continuously improved in order to take its modern role as advisor for the assessment and systems and contributing to the achievement of strategic and operational objectives of the organization, always in accordance with international standards and best practices. In this context, CHU/IA, CHU/FMC and the Minister of Finance are responsible to develop and implement all measures necessary for the successful implementation of the PIFC model and achievement of high professional standards in the field of internal auditing in the public sector.

## Keywords

Public Internal Financial Control, (PIFC), Internal Audit, Financial Management and Control, Internal Audit Units and Public Entities, Risk Management.

## 1. Introduction

### 1.1. PIFC system in Albania

PIFC (Public Internal Financial Control) System contains a comprehensive and consolidated control system, including the structure, method, administrative procedures and internal audit which is set to achieve management objectives based on principles of transparency, legality, efficiency and effectiveness. PIFC system focuses on three main pillars:

- Sound financial management and control systems (FMC) as a primary responsibility of managers in each unit of public expenditure.
- Independent and objective function of Internal Audit (IA), to support management and to provide reasonable assurance that control systems are established in accordance with rules and standards, according to the principles of a sound financial management.
- Central Harmonization Units (CHU) in the Ministry of Finance (MoF) - to design and implement a methodology, to harmonize and standardize the quality system for FMC and Internal Audit.

The main actors of the current PIFC system in Albania are: the Minister of Finance, CHU/FMC (Central Harmonization Unit for Financial Management and Control) and CHU/IA (Central Harmonization Unit for Internal Audit). The Minister of Finance is responsible for establishing internal control systems to all public general government entities and fulfilling his duties in the field of FMC supported by the CHU. The CHU/FMC is responsible for the implementation of public internal audit as the basis for monitoring and control of public finances. CHU/IA initiates and supports the process of creating a functionally independent internal audit service, in the ministries and at different levels of local government.

## 2. Financial Management and Control

### 2.1. Concept of Financial Management and Control

Financial Management and Control is a system of policies, procedures, activities and controls, which are established, maintained and regularly updated by the head of public unit and are put into practice by all the personnel aiming to address risks and to provide sufficient assurance that the objectives of the public unit are achieved through:

- efficient, effective and economic activities

- compliance with the existing legislation and internal regulations and contracts;
- reliable and complete operational financial information;
- Safeguarding of information and assets.

Financial Management and Control in the public sector is achieved through: (i) creating an efficient and effective control environment, (ii) effective risk management, (iii) proper implementation of control activities, (iv) information and communication; (v) monitoring of the control activities of the public sector entities.

## **2.2. Assessment of FMC components in the Albanian public sector**

- The self assessment questionnaire on FMC components

In order to collect information about the FMC status in the public sector, a self assessment questionnaire on FMC components for all public organizations – central and local government units was prepared and delivered.

The scope of the questionnaire was to address the level of fulfilment of the main requirements of internal control framework related to the five components of FMC – control environment, risk management, control activities, information and communication and monitoring. The self assessment control tool is intended to be used as well by the public sector entities in order to help them to identify the aspects of internal control in the respective organization where additional awareness and training needs to be targeted. The total number of the public sector organizations to which the self assessment questionnaire has been sent for reply is 434 and precisely 305 communes, 67 Municipalities, 12 Regional Councils, 50 Central Government units including line Ministries. Only 135 completed questionnaires have been received, which represents 31% of the whole organizations. However, most of central government units and big municipalities have replied. Most of local government units are represented by very small communes. Out of the Central government organizations completed questionnaires have been submitted by 12 ministries, 24 agencies and other relevant structures. Out of the local government organizations – municipalities, communes and regional councils - completed questionnaires have been submitted by 39 Municipalities, 12 Regional Councils and 48 communes.

- Analysis of FMC self-assessment questionnaires

### **2.2.1 Control Environment**

The first group of components of internal control describes the basic conditions, completion of which is important for creating an appropriate control environment in a particular institution. The control environment provides our organization, by influencing the control consciousness of its people. It is up to the foundation where all other components of internal control structure as it raises and decides discipline. The control environment is the key to good management of public funds and other elements of financial management and control. The section of control environment in self-evaluation questionnaire contains 31 questions, divided in five subsections, and respectively: setting goals, personal and professional ethics, and the management style of work, organizational structure, human resources policies and procedures.

- **Objectives Setting**

General estimates indicate that most public institutions have designed the mission, and strategies that have been distributed to all staff or at least to the management level of the unit. More detailed results shows that there are about 36% of institutions that do not have the mission statement or the strategy for determining the priorities of the institution. This phenomenon is verified in the local government units, especially in small communes. Central institutions and a large part of the municipalities, which cover about 51% of institutions, have responded to the mission statement, have adopted strategies and action plan for achievement of their goals in accordance with the requirements of Law no.9936, "On management of budgetary system in the Republic of Albania ". The following chart reflects some statistics about mission design, strategy, action plan in public institutions and distribution of them to all employees.

*Conclusions and recommendations:* Considering that for this component have a number of institutions which have a negative response, the primary objective remains that the requirements of the 9936 Law "On budget management system in the Republic of Albania" to be applied in all local government units. All local government units must have their parts of the program budget medium-term budget in

accordance with procedures approved by the Minister of Finance as well as ongoing monitoring of their implementation.

- **Personal and Professional Ethics**

With regard to personal and professional ethics, the managers have stated positive results in implementing the existing legal framework with regard to ethics. During the analysis of responses to questionnaires, we may conclude that the legal framework in force is known and applied from most of public entities. The legal framework is represented by the: Law no.8549, date 11.11.1999 "On the Status of civil servants" and Law no. 9131, dated 09.08.2003 "On the Rules of Ethics in Public Administration. A part of the institutions, mainly the central ones, have made progress by drafting their own code of ethics, or include ethics elements in their internal regulation document. Despite the large number of institutions that claim they apply the Code of Ethics, or special rules of ethics included in their institutional regulations, in 58% of institutions there is no promotion procedures and updating knowledge of staff with these rules. It also displayed a pronounced weakness in terms of reporting violations. It is responsibility of managers of institutions to determine the development and implementation of procedures for reporting violations of ethics rules. Regarding the existence of procedures for reporting errors, fraud and irregularities - 53% of institutions state that currently do not have such existing procedures, but planning their presentation;

- **Managerial style of work**

With regard to management style of work, there is a positive element of best practice, the held of regular management level meetings to discuss about main issues of the organization. In some institutions, the frequency and manner of organization of the meetings are described in internal regulations of the institutions. One of the elements essential components of managerial style is the delegation of tasks. Currently noted shortcomings in this regard, especially in nonexistence of written procedures for delegation of duties and description of the way the powers could be delegated. Institutions declare that the delegation of duties is realized in practice, but this element is not reflected in job descriptions.

- **Organizational Structure**

With regard to the organizational structure, managers consider that in their organizations there is good organizational structure, and there are job description for employees approved and updated on regularly annual basis. Requirements of Law no.9936, "On management of budgetary system in the Republic of Albania", regarding the appointment of Authorizing and Executing officers result as fulfilled by the majority of authorities (90%). However, we noted that in practice this functions are not always covered by the high level managers and their direct subordinates. Leadership interaction between institutions and internal audit results effective. Only 5% of institutions have provided negative response in these indicators and this percentage is represented mainly by communes.

- **Human resources management policies and procedures**

There are good results in terms of existence of job description and review of the same in central government and large municipalities. Regarding local government, and specifically in the communes, most of them replied that there does not exist job description in written form. Despite legal framework requirements for preparation of job description for each position, still these requirements are not applied. The results show that in terms of the control environment, managers are confident they have created good conditions for the basic functioning of the institutions they manage.

*Conclusions and recommendations*

The focus for increasing the effectiveness should be in determining the mission, strategy and objectives, and in designing specific action plans which should include deadlines and responsible persons for their implementation. Must be reviewed the assignment of the positions of executing officers. With the new draft financial management and control law, it is intended to clarify the roles and responsibilities of the key actors of the system.

## **2.2.2 Risk Management**

Risk management is the process of identifying, evaluating and monitoring the risks facing the organization in achieving its objectives and performance of controls necessary to keep exposure to risk at a level acceptable to the institution. This section of the self-evaluation questionnaire contains a few questions (four in total) since it is considered that risk management is a new concept for our public

administration. In this context, more than 50% of institutions state that they do not possess any procedure regarding identification, analysis and control of risks that impede the achievement of the goals of the institution, specifically during mid-term budget planning. But while there is no written procedures for identifying risks, they are subject to continuous discussion and evaluation between the stakeholders and employees in order to minimize risks and make possible the achievement of the objectives. The results shows that 67% have responded very good, 24% good, and only 9% replied that do not assess risk or take measures for its mitigation.

*Conclusions and recommendations:* Some positive side in this regard, as the existence of a good practical discussion on the possible risks during the process of setting objectives are noted. However, based on comments received from institutions, conclude that even in cases where there are risk management procedures, they focus more on financial risks and not in all kinds of risks that could prejudice the achievement of goals.

### **2.2.3 Control Activities**

Control activities are the rules, procedures and actions aimed at reducing the risks with a view to achieve the objectives of the organization and promote the implementation of decisions of the head of the entity. The results of the self assessment questionnaires replies, define this element of financial management and control rated as very good in many institutions, central and local ones. The heads of state institutions that have met the minimum legal requirements and have put in place appropriate controls in the following areas: the existence of rules/guidelines for the description of internal key operational and financial processes, including documents and information flow, decision-making, setting the activities of internal controls, the double signature system, safeguarding assets and segregation of duties, documentation of all operations, activities and financial transactions. As highlighted weaknesses of the system, results in the lack of support of information systems technology and above all in the local government units. With regard to training needs, over 87% of institutions have expressed their need for training for managers and specialists, in the field of financial management and control. It is the responsibility of CHU/FMC to identify needs and develop an appropriate training strategy for public sector employees.

*Conclusions and recommendations:* The emphasis and focus in the future should be the development of IT systems to improve control activities. Also, each unit must have internal regulations which should summarize the description of all procedures for the activities conducted, provide access to information and assets from the right people, developing IT systems to support control activities.

### **2.2.4 Information and Communication**

The fourth group of components of internal control issues related to information and communication. Information is the basis of communication required for effective performance of assigned duties. Information and communication system must provide identification, collection and distribution of the information in the appropriate form and terms in order to allow the performing of duties. From the graphical presentation of answers to questions in this component of FMC, is found that over 28% of institutions have no written guidelines regarding the mode of communication within the institution, 18% of these institutions have a good level and 54% of institutions have internal regulations including communication rules (this mainly in the central institutions, regional councils and large municipalities). More than 48% of institutions declare that their IT system is not developed in those levels to support the monitoring of targets. The central institutions and precisely 43% of them, have answered "very good", 27% good and 29% poor. Feels towards the establishment of procedures necessary to provide real information, for appropriate, timely implementation of some activities within the institution. This need is evidenced in more than 75% of responses to questionnaires.

*Conclusions and recommendations:* The responses show that, public sector instintities has not yet a adequate system of communication and information. This prevents the daily work of staff and managerial decision making. It also creates complications in the achievement of the objectives of institutions (known as the weakness in the "control environment"). In this regard is noted that in some central institutions, especially those created recently, they created several electronic databases and some others are in process, in order to provide better information.

## 2.2.5 Monitoring

Monitoring is the process of reviewing the entire activity of the organization, which aims to provide reasonable assurance that control activities operate according to the purpose for which they were created and remain efficient with the passage of time. As a strong point of this component results the line of reporting; its regularity is a good practice. About 88% of managers consider that the progress towards achieving goals is regularly monitored and the reasons that may impede their fulfilment are analyzed. Following the line of interaction with auditors, there is a high percentage of institutions (70%), which states that they respond appropriately to internal audit recommendations.

*Conclusions and recommendations:* A good part of the management state that they review financial management and control not only on an annual basis. Some of them are involved in the regulation of their internal performance indicators, monitoring tools and regularity in reporting. However, establishing a new legal framework for FMC, will create strong basis for improvement of this component.

## 2.3. Findings

### Positive Aspects

- The existence of a sound control environment in a good part of its components elements.
- The requirements of Law no.9936 "On management of budgetary system in the Republic of Albania" are met, especially regarding the drafting of mission, strategies and objectives. Generally in all public organizations results that, structures are suitable for the dimensions and character of the organization activity.
- The existence of job description and review, mainly for managerial positions in all central and local government institutions.
- Has been appointed in almost all public entities the Authorizing officers and executing officers in accordance to the requirements of Budget law.
- Dominant part of heads of public entities testify the proper functioning of lines of reporting; regular management-level meetings to discuss crucial issues for organization management.

### Identified gaps

- Lack of analysis, documentation and management of risks that impede the achievement of the objectives in public organizations.
- Lack of awareness at the right level of managers and staff to the concepts of financial management and control.
- Lack of codes / rules of ethics for every organization.
- Lack of practices and written rules for signaling irregularities.
- Delegation of duties turns out to be good practice but not regulated by normative acts, or included in job descriptions.
- Managerial supervision focuses mainly on financial aspects than on monitoring objectives or efficiency.
- It is required to intensify training for heads of entities in order to improve the use information.
- Communication within the unit is not uniform, and the staff is not always aware of the product/ outcome of the processes in which they contribute.

## 2.4 Objectives for the future

The following directions need to be addressed in the future:

- Strengthening managerial accountability and changing the mentality of the managers responsibility to see top-down, by consolidating the legal basis and awareness seminars.
- Improve and increase the financial management methodology and control, including development of: Guidelines for the development of risk management, asset management, guidelines for the preparation of a statement of quality and report son FMC existing system,
- Identify the needs for training and support to training institutions and professional conduct in the field of financial management and control of senior officials and managers of public sector institutions;
- Strengthening the capacity of CHU/FMC staff through training and on-job training,
- Increase awareness regarding new FMC concepts in central and local administration.

## 3. Internal Audit

### 3.1. Sources of information on IA activities in the public sector

Information about the internal audit activity in the public sector is collected on the basis of audit reports and annual audit reports for 2009, 2010 received from IA units. This information has been received from 13 central institutions, five subordinate institutions, four Independent Institutions and part of the audit of Local Government structures. Likewise, a supplementary form titled "Questionnaire for annual tests" was delivered to IA representatives of IA structures in the public sector, and the 40 replies received served as source of information for this paper.

### 3.2. Establishment of IA functions in the public sector

- **Establishment of new IA Units**

Internal audit function should be implemented by all public sector institutions as requirement of Article 2 of Law no.9720 "On Internal Audit in Public Sector (including all central and local government institutions, other institutions, central and local which provide public services and, independent institutions). Audit Procedures Manual further defines the criteria for job creation and operation of the internal audit structures and it highlights the fundamental principles on which this activity is exercised. Implementing the above framework, by the end of 2009, 119 units were created (internal audit structures), which exert their function at the level of central government (in all line ministries except the Ministry of Integration), subordinate institutions, local levels (municipalities and communes), and independent institutions. In 2009 the number of structures of central government audit units was 69, compared with 52 existing in 2008; this represents an increase of 32%. In the case of local government, the increase was of 28%. This rising trend is a positive indicator for the development of auditing systems, which show a greater expansion of practical implementation of the Law on Internal Audit. Despite improvements made in this direction, there are still issues that have a significant impact on creation and implementation of institutional capacity of internal audit. The CHU/IA in his role as leader and coordinator of all activities of the internal audit system, determines that these issues continue to be vulnerable. The most important issue is related to the fact that high level management in public entities did not understand properly the role of internal audit and its mission. Thus in many subjects has not yet established the internal audit unit. Also, some entities do not respect the criteria of establishing audit structures. Within the IA units established the principle of independent function, but there are frequent occasions when these units are required to act as control structures, thus exercising the function of financial inspection. Currently there is no clear division between the role of functionally independent internal audit and financial inspection, as one of the basic requirements of European standards in the field of auditing. With regard to the respect of deadlines for the establishment of internal audit units, the most significant weaknesses are in the area of local government units.

- **Administrative capacity of IA units.**

Another important element in the progress of audit activity, in addition to creating the structures, is meeting the needs of human resources with integrity and professional competence. Because of the very delicate nature of the internal audit profession, which includes not only evaluation of control systems (financial or other), but also provides recommendations, the auditors should possess and demonstrate in the context of their activities, appropriate professional knowledge and integrity to ensure proper presentation of the effectiveness of the audit tasks. By analyzing the completeness and composition of the audit structure, we note that by the end of 2010, from 416 positions for internal auditors (based on organizational schemes adopted), has been hired 406 auditors, of whom 277 certified auditors, 58 in the process certification and 71 still not certified. In 2009, among 119 Audit structures, 106 of them are completed of staff. According to the data, progress is made in recruiting internal auditors in the past two years. In 2009 the number of employees rose by 34.4% against 2008. In addition during 2010 the number of IA Units was increased with 11% achieving 132 IAU in total. General Directorate of Audit continues to implement the training program "Certification of Internal Auditors in Public Sector" to four relevant curricula and modules: Audit, Governance and Control, Accounting and Legislation. Organization, management and development of training for certification "Internal Audit in Public Sector" are a direct product of collaboration between GAD and Training Commission, as the bodies responsible for this process.

### **3.3. Evaluation of performance and reporting of internal audit units**

The Audit Units mainly consider the following as areas with the greatest risk:

- Financial management systems,
- Dependent entities which have responsibility for significant amounts of public funds coming from several financial sources,
- Strategic Investment projects working
- Subjects or areas that have significant weaknesses in internal control systems,
- Human Resource Management,
- Units and areas with low levels of knowledge and use of information technology systems.

Based on the assessment of areas with higher risk mentioned above, audit units have set their priorities. The main sources are committed to audit units or high-risk areas, with allocation of sufficient time and technical expertise and other resources to the needs identified. However, it was conducted additional missions at the request of management audit, as a result of updating the risk assessment during the year and in cases where the management sees fit such a mission. When assessing the risk level was high, was appointed and length suitable for tracking recommendations. In this way, internal audit is not only intended to find the conditions, consequences and responsibilities, but above all, improvements and prevent repetition of such phenomena in the future. Generally, the total number of audits planned and implemented also has increased year by year, and this indicator can be seen that if combined with other factors (cost / benefit), shows a process for improving increase the effectiveness of audit work. However, given the observed deviations in fact opposed the plan, as well as trends over the years concludes that they are almost the same factors influence that consists of:

- Changing the priorities in the activities of the entities audited,
- IA missions overlap with audits conducted by other audit institutions, especially the SAI;
- Interference management in implementing audit plans seeking audits,
- Lack of capacity to audit and frequent change of audit staff and sometimes the heads of IAU;
- Performance of the auditor's disappointing, especially the staff employed recently.

Specifically for internal audit structures in prefectures, it is considered as fundamental problem the collisions between the specific functions provided in the law "On the Institution of the Prefect" regarding financial control and, internal audit functions according to the IA Law. One of the most important issues relates to typology of audit engagements. Currently, the Internal Audit Law in force, does not have a clear distinction between audit and consulting services and insurance, respectively, providing the kinds of commitments are not listed.

### **3.4. Audit findings and recommendations**

The overall assessment for internal audit activities is positive, as significant improvements in the country, but at the same time, some important factors have a negative impact on achieving the objectives of the audit and should be handled properly so to improve future results. In general, the same gaps are found in almost all supervised entities to which summarize as follows:

- The quality of preparation of materials is estimated to be at the level required by standards. Reports are incomplete and rarely heard work of the unit itself.
- There is sufficient knowledge for the presentation and setting up controls as part of the activities of the organization. Thus, auditors have difficulty in evaluating internal control. When evaluation of control provided, it is usually theoretical, without any of the concrete process of auditing and assessment of inherent meaning and control risks.
- Lack of clarity on these facts limit the role of the auditor; he/she acts just like the facts and the register fails to provide useful recommendations to improve systems in terms of preventing adverse events, and in enhancing the effectiveness, efficiency and economics of the process that is audited.
- Frequent deviations from plans, audits required by management to increase the risk of impact functional independence of the auditor, expressed exactly the independent planning, execution as well as impartial, objective assessment of audit evidence and provide an independent opinion.
- Besides the unsatisfactory level of preparation of reports, there are many gaps in the procedure for communicating the audit results with management.

- The status of some structures remains unresolved audit. There are still facilities that operate within the internal audit, but they are called, respectively, control units and perform the duties of inspection.
- Low levels of knowledge of the management of new and modern role of internal audit within the PIFC system recently has been an obstacle to the proper functioning of the Internal Audit in the public sector.

### **3.5. Further developments regarding IA in the future relate to:**

- Improving the awareness of managers regarding PIFC, FMC and IA.
- The low level of awareness is the issue of non-compliance of the basic principle of functional and organizational independence of internal audit
- Specific activities should be undertaken in order to create an environment full legal and procedural training to conduct the internal audit function.
- Building administrative capacity of the units that IA and quality of internal audit remains to be done in terms of professional training and capacity of auditors.
- Guarantee stability of the professional staff is an issue that is often found in structures, especially the audit of public entities or other levels of local government. Changes unfounded trained staff brings not only loss of the acquired professional experience, but they also have an impact on the quality of audits.
- Create and implement a specialized program for the purchase of practical skills will contribute to increase the quality of internal audit structures

## **4. Overall conclusions**

The development of the new model of public internal financial control in Albania demands from all the participants in the process, leading to effective action in accordance with their roles and responsibilities. Only proper implementation of new legislation and efforts by all stakeholders can lead to achieving the goal - to create a modern system, reliable and functioning of public internal financial control. Specific measures related to strengthening managerial accountability and updating of legislation and methodology in the field of internal control in accordance with EU legislation and best practices should be outlined. As one of the "three pillars" of the of Public Internal Financial Control System, Internal Audit has developed and continuously improved in order to win its modern role as advisor for the assessment and systems and contributing to the achievement of strategic and operational objectives of the organization, always in accordance with international standards and best practices. In this context, responsibility to develop and implement all measures necessary for the successful implementation of the PIFC model and achievement of high professional standards in the field of internal auditing in the public sector remains the most important issue to be addressed during the future developments in Albania.

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# 2 Goals with one shot: Promoting entrepreneurship among students in secondary school can beat academic failure and increase future employment chances

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## 1. Introduction

During the past decade many countries have been faced with several problems such as population growth, lack of improvement in economy, difficulties of the labor market to absorb the new graduates and government policies to downsize its structure. These problems have forced those countries to find a solution for the unemployment problem of graduates, alternative preparation for the labor market and providing further opportunities for learning.

Through appropriate training methods, societies can create entrepreneurs who will develop new business and maximize the economic potential of an area. At this point, schools, colleges and universities can function as a catalyst. The United States has the longest tradition of fostering entrepreneurship at universities and schools, comparatively to any other country. Unfortunately, in Europe, the development of entrepreneurship education has been much slower. Regarding Europe's welfare system, people are less willing to take risks.

All these problems and crisis have caused us to pay more attention to entrepreneurship as a fundamental issue and have brought about an increasing demand in entrepreneurship education. Thus entrepreneurship must be regarded as one of the necessities in development of countries. In this regard, a number of initiatives for promoting entrepreneurship at school by means of mentoring students to create their own micro-companies have been promoted by European Union and individual governments.

Spain, and the Autonomous Region of Catalonia, face some of the fundamental problem's of today's development in the European Mediterranean area: an uncontrolled unemployment rate of 20% (and growing), and an amazing 30% of kids not finishing secondary school. (1) Specially, the rate of youth unemployment in Spain, which has been in the OECD's fastest growing percentage since the beginning of the crisis, is forecasted to remain above 40% for at least 2011, according to projections. (2) On the other hand, Catalonia has been described as one of the most active regions in the world by number of entrepreneurship projects by population: according to the Global Entrepreneurship Monitor 2010, 6,38% of the adult population was involved in 2009 in early-stage entrepreneurial activity(3). Historical economic and social reasons and the situation of Catalonia and especially of its capital city, Barcelona, have helped to promote and maintain this high rate of entrepreneurship spirit.

**Table 1** Statistical Study in Europe

	<b>Europe-25</b>	<b>Spain</b>	<b>Catalonia</b>
<b>Population</b>	501 millions	48,3 millions	7,3 millions
<b>GDP per Capita (in Euros)</b>	24,700	23,500	27,500
<b>Total rate of unemployment</b>	9.6%	20%	17. 3%
<b>Unemployment rate amongst young people</b>	12.6%	40%	40%
<b>% Students not finishing secondary school</b>	22%	38.9%	31.5%
<b>Entrepreneurial rate according to GEM</b>	8,6	5,2	6,8

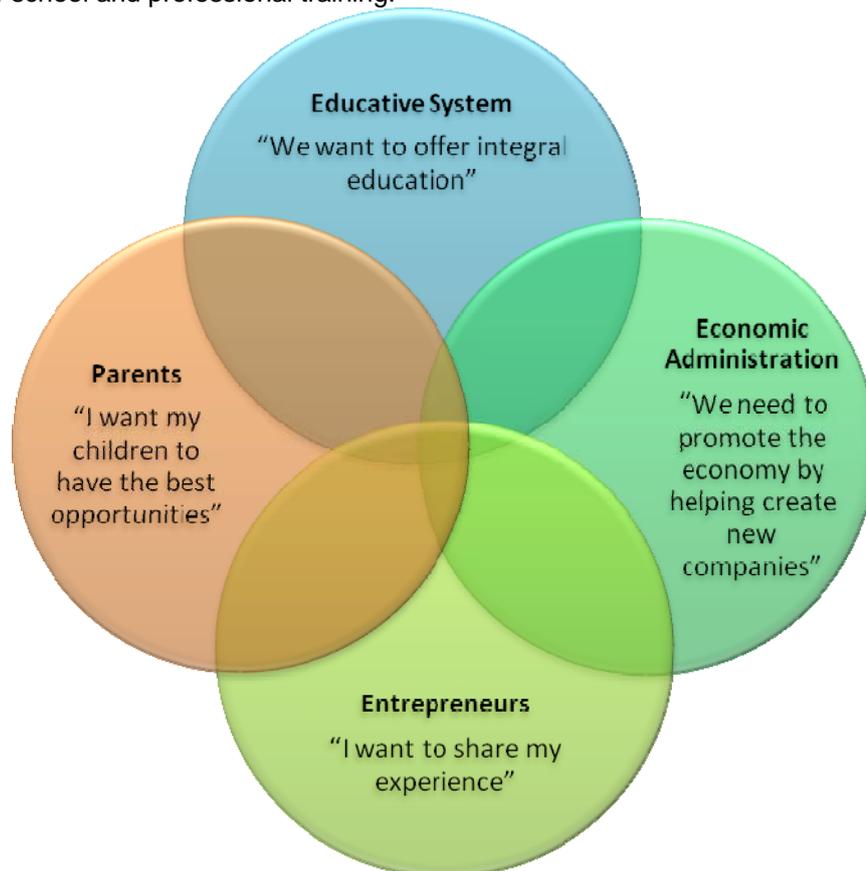
With this grim scenario in sight, the clear need exists to further promote entrepreneurship in Spain, and especially in our region, Catalonia, where the potential irradiation of wealth to the community can be maximized. For this reason, we have decided to focus on the role of entrepreneurship and on its development as an academic discipline with a strong emphasis on programs that encourage independence and self-development for young students in secondary school.

## 2. Convergence of Stakeholders in one common goal

The Foundation Escola Emprenedors is a non-profit entity founded in 2008. The Foundation's purpose is to promote the entrepreneurship and innovative spirit among young students (14 to 20 years old) in Catalonia, Spain. It has been created and managed by seasoned entrepreneurs, and involves the participation of key stakeholders in the community.

The Foundation collaborates with outstanding university partners in order to develop programs that seek to build a sustained capacity in entrepreneurship. The Foundation Escola Emprenedors has established a partnership involving some of the best business schools in the world, as IESE or ESADE, and works thanks to the enthusiasm and altruistic collaboration of entrepreneurs of our country who want to share their time and experience with the youngster in the education process. We believe that it is the best way of transmitting the values of excellence, innovation and responsibility to build up a more fair and wealthy world.

As a result of the economic and social situation described above, the Autonomous Government of Catalonia has decided to improve the level of entrepreneurship education of students in secondary school, high-school and professional training.



**Figure 1:** Stakeholder involvement and interests in promoting Entrepreneurship in our country

### 2.1 The "Be an Entrepreneur" program

The Foundation Escola Emprenedors, in collaboration with the Department of Education of the Autonomous Government of Catalonia, has created the "Be an Entrepreneur" program, as a means to

systematically promote entrepreneurial spirit among students in secondary schools. The program has the following characteristics:

- It is oriented to groups of 20-30 students, typically the average size of a class group in Catalan schools in secondary education.
- The program is delivered in 12 sessions of 1 hour each, during a full Quarter
- Classes are mandatory for students, and are held during normal school time.
- Besides secondary school (14 to 16 years old), the program can be applied to College Students (16-18 years old), Professional and Technical Education (16 to 20 years old), and first University courses
- Sessions are conducted in English
- Teachers are external to the School, and are paid and trained by the Foundation Escola Emprenedors
- In the first session, the students are divided freely in groups of 4-5 persons. Each group will develop its own project.
- The 12 sessions' program includes conceiving, designing and fully developing a Project Plan, whether by creating a new company, a new product or a social entrepreneurship project.
- Team learning is encouraged
- Communication skills (powerpoint, public-speaking, presentation skills) are strongly trained and encouraged
- Community Entrepreneurs are encouraged to participate as guests speakers in some of the sessions. For example parents of students are invited to present their Entrepreneur project to the class.
- Normal teachers of the School are intimately involved in the project by assisting to the classes, coordinating the teamwork, and providing support to the Foundation teachers.
- Students have to work regularly at home between the sessions, in teams, for preparing materials and ideas.
- Sessions are 20% Theory, and 80% Learning-by-Doing activities.
- The students have to finalize the program by creating a 5-10 minutes public presentation with Powerpoint and a presentation Video. All students present a part of the developed project.
- Project Plans developed by the students are presented in formal public sessions in presence of the rest of the class and the teachers. When possible, parents, guests and external entrepreneurs are invited.
- The Projects do not end in a Contest, and prizes are not awarded. Being able to present the project in public is the final goal and achievement.

When designing and developing the Be an Entrepreneur program, our goals have been to focus on the acquirement of personal competences and entrepreneurial skills:

Personal attributes and skills	Business Skills
<ul style="list-style-type: none"> <li>• Creativity</li> <li>• Team working</li> <li>• Problem-solving skills</li> <li>• Taking calculated risks, and confronting risk</li> <li>• Communication skills</li> <li>• Assertiveness</li> <li>• Leadership</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding how a business works, and how wealth is created</li> <li>• Entrepreneurial thinking and generation of business ideas</li> <li>• Basic economics</li> <li>• Experience of key business functions</li> <li>• Developing market research</li> <li>• Developing a business plan</li> </ul>

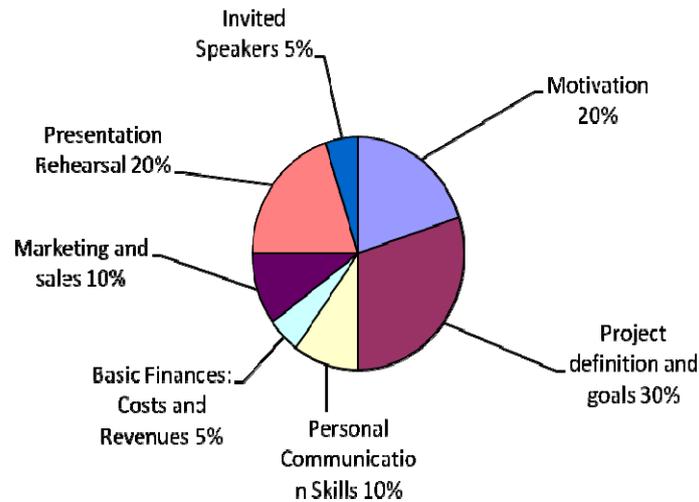
<ul style="list-style-type: none"> <li>• Critical thinking</li> <li>• Self-confidence</li> <li>• Taking initiative</li> <li>• Assuming responsibilities</li> <li>• Autonomy</li> <li>• Taking individual and group decisions</li> <li>• Time management, and keeping deadlines</li> <li>• Setting goals;</li> <li>• Negotiating skills;</li> <li>• Project management;</li> <li>• Use of Information and Communication Technologies (ICTs);</li> <li>• Public speaking and presentation skills</li> <li>• Analyzing and planning own activities;</li> <li>• Improving own learning and performance.</li> </ul>	<ul style="list-style-type: none"> <li>• Human resources management</li> <li>• Financial literacy</li> <li>• Budgeting and allocating resources</li> <li>• Raising finance through shares, sponsors, loans</li> <li>• Calculating product cost and profit</li> <li>• Accounting</li> <li>• Marketing</li> <li>• Entrepreneurial thinking and generation of business ideas</li> <li>• Advertising a product/service</li> <li>• Putting on an exhibition, and taking part in a trade fair</li> <li>• Sales and purchasing techniques</li> <li>• Developing and managing business contacts, interacting with the local community</li> </ul>
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The Entrepreneurs Program is unique in the use of innovative methodologies for training. The Program, in its very ideology, offers for the first time student's protagonism with the possibility of an education to learn to be entrepreneurs, an offer which is neither elitist nor boring. Actually, the main axis of the activity program is the participation, but with an intention that goes beyond the exclusive playful character. When facing individual challenges when the pupils do exhibitions, the objective is to reinforce the teamwork while they decide aspects of the project

The steps through which the program runs and students are guided include:

1. Describe the main idea of the product, service or company
2. Identify the people's need the project will serve
3. How the product will be produced? This is a very light approach, as we accept inventions not necessarily doable, like for example a chewing gum that substitutes all main meals providing same nutrients
4. Identifying the basic finances, just by listing the costs and the possible future income
5. Identifying the basic "departments" of any organization, and making the kids identify with one of the roles (Director, Marketing and Sales, Production, Finances, Research, Logistics, etc)
6. Marketing and planning a product launch, striking good if possible, with commercials (TV and press) to do.

All of the above will depend on whether the business consists of setting up a video games company, a hotel, a community service or, why not, a high-tech company.



**Table 2:** Content Distribution during the Program

Week by week, each group has to share with the other groups how their company is evolving, by short presentations in English to the rest of the groups, as one of our goals is to get students used to speaking business English in public. If the boys put a shirt and a tie on and girls wear business suits, the credibility is increased and surely the entertainment value is as well.

Ideally, the Program tries to warn about the loss of values such as the effort and the sacrifice between the new generations, where young people are at a critical step and in front of a society that does not promote entrepreneurship because it gives everything chewed up to the youth. Our Program offers a solution. It seeks to prepare youth to be responsible, enterprising individuals who become entrepreneurs or entrepreneurial thinkers. With the help of an entrepreneurship spirited educator and the educational institution, the responsibility for learning transfers to the students and activity will take a more important role instead of passive receiving. The aim of entrepreneurship education is to teach the students the attitude, skills and information that are needed later on in working life regardless of whether one works for someone else or as an independent entrepreneur. It's a way to immerse them in real life learning experiences where they can take risks, manage the results and learn from the outcomes.

Regarding teacher training, the emphasis of the teachers' role is in achieving the entrepreneurship education targets. It's important that the teacher's attitude and perception of life are entrepreneurial.

Finally, the "Be an Entrepreneur" program is based in the "Learning-by-doing" methodologies. It's not sufficient simply to have an experience in order to learn. Without reflecting upon this experience it may quickly be forgotten or its learning potential lost. It is from the feelings and thoughts emerging from this reflection that generalizations or concepts can be generated. And it is generalizations which enable new situations to be tackled effectively. Similarly, if it is intended that behaviour should be changed by learning, it is not sufficient simply to learn new concepts and develop new generalizations. This learning must be tested out in new situations. The learner must make the link between theory and action by planning for that action, carrying it out, and then reflecting upon it, relating what happens back to the theory.

## 2.2 Results

The Foundation Escola Emprenedors has implemented the "Be an Entrepreneur Program" in 34 schools between 2008 and 2011 in the Autonomous Region of Catalonia, i.e., for three complete academic years (2008-2009, 2009-2010, 2010-2011). A total of 56 programs have been implemented (average of 1.6 programs per school), as there is a variation between the number of individual groups (classes) in each school, i.e., some schools have only 1 group of students of 4th of Secondary School, while others have 4. All schools were Public schools.

The total number of students has been of 2570.

<b>Number of Participating Schools</b>	50
<b>Average number of groups (classes or lines) in each school</b>	2
<b>Average number of students per Group</b>	30
<b>Total number of students</b>	3000
<b>Average course where the program was implemented</b>	4th year of Secondary School
<b>Average age of students (min, màx)</b>	15 (13-19)
<b>Mean number of sessions per program</b>	12-15
<b>Average duration of the program</b>	4 months
<b>Average % students of immigrant origin</b>	20%
<b>Number of schools in low-income areas</b>	12
<b>Number of schools in medium-income areas</b>	36
<b>Number of schools in high-income areas</b>	2

**Table 2:** Reality of the “Be an Entrepreneur” program in Catalonia, in 2008-2011

The type of Project presented by the students could be defined in the following way: leisure and entertainment (30%), social (20%), tourism (20%), Internet, programming and technology (10%), Educative (10%), and Services (10%).

### **2.3 Opinions of teachers and alumni**

When measuring the results it should be remembered that some of them are visible in the short-term and some in the long-term. The evaluation study of the Be Entrepreneur’s Program was carried out in the following way: a questionnaire was used in evaluating the programs conducted in 2010.

Although no systematic evaluation of the results was conducted in terms of improvement of academic failure of the alumni, due to lack of data and resources, surveys were conducted to alumni and teachers, with the following global qualitative results:

- A total of 250 questionnaires were sent to students.
- 85% of the respondents fully or somewhat agreed that they have learned new issues on entrepreneurship. Moreover, for them, the perception of entrepreneurship changed to being more positive as a result of the training.
- Alumni were happy to have the opportunity to make their projects real, with the help of the trained teachers, in the framework of the “Be an Entrepreneur” program
- Alumni valued the team-building spirit, and the chance to be able to present their business cases in front of a real audience
- Teachers valued the good team spirit, and the innovative climate that was created. They also evaluated the normal use of English.

All the 30 schools expressed their wish to repeat the program in the following years.

## **4. Conclusion**

We think that implementing the Be an Entrepreneur program in Secondary School in Catalonia has been a success. Students learned the basics of creating projects of their own, increased their self-esteem, learned communication skills while improving their English level, in a dynamic and constructive environment. All the students participated in the activity, thus demonstrating its widespread application. Teachers showed a high degree of satisfaction with the activity. Plans are in progress to extend this program to more schools in Catalonia, and authors are open to help expand the experience to other countries.

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# Diffusion of Innovation by Rate of Usage of Internet

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The paper examines correlation of Innovation in the firms in Macedonia and Internet. Today, Internet is recognized as one of the most important economic indicators. This indicator creates structural position for innovative potential. It is noticeable that countries that have highest penetration of broadband Internet in the same time have highest indexes for innovation, competitiveness and technological development. Through survey of representative sample of Macedonian companies, after validation 1.979 forms were taken into consideration. The survey followed general OECD guidelines set out in publication known as the Oslo-Manual. For the purposes of field research two stratification criteria have been adopted: economic size (in terms of employed workforce), and business sector.

The survey collected information about product/service innovation, as well as processes, logistics and marketing innovation, and other key variables, during the three-year period from 2006 to 2008. By performing statistical analysis comes out that there is implication on usage of Internet on innovation in the firms. It has been found that there is moderate positive correlation between innovative activities in the firms and usage of Internet or innovation is more rapid in firms that use Internet than the firms that not use Internet. Also, as a summary output of regression statistics could be found that 14,5% of variation in the number of innovative activities is explained, by the variation in the number of access of employees to the Internet and 27,5% by variation in the number of average usage of Internet in the company. Thus, second conclusion has been drawn that there is positive correlation between implemented innovations in firms in Macedonia and employees access to the Internet and frequency of usage of Internet of those employees.

## Keywords

Innovation, Diffusion, Broadband Internet, Correlation

## 1. Introduction

Globalization represents trend which irresistibly destroys local and national borders, thus causing sharp competition on the world markets. Only those who have access to the key information and could follow on timely manner world-wide trends and exchange information could be in struggle with fierce competition in the world.

In order to realize full potential of the country it is required to exploit all possible resources and in the same time to create possibility for new growth of economy. Taking into consideration that development of electronic communications networks and especially fast Internet (broadband Internet) are basis for technological platform for introducing information society, from which clearly emerge critical role that

this technology has. Internet connects consumers, businesses, governments and speed up social interactions. It is more than obvious that policy for broadband Internet access represents vital instrument for providing competitiveness of the countries. According to Statistical Indicators Benchmarking the Information Society (SIBIS) research from November 2003, "Broadband Internet is probably the single most important enabling technological development on the present time and it is, therefore, imperative to measure who has access to it, and what it is being used for." p. 23. [1] Services on this platform like E-Commerce, E-Health, E-government, E- Education, create added value, new ideas and they are key source for new jobs. ICT not only provides products which are innovative by themselves, but they are main promoters of changes in modern economy, economy based on knowledge.

As much as households and businesses have access to the Internet, that much they are increasing capabilities for access to the worldwide information and possibility for business. Recognizing connection between Internet and business, in 2000 European Commission (EC) recommended to all member countries to provide accessibility to broadband Internet with low price, interconnected networks and development of advance information technologies. Furthermore, in 2003 EC recommend development of national strategies for access to the broadband Internet, thus to significantly increase number of such connections with ultimate aim to stimulate innovation in member countries, and finally with Europe 2020 strategy aiming "broadband access to all by 2013". [2]

Today, Internet penetration is count as one of the most important economic indicators. This indicator creates structural position for innovative potential. According to the Organisation for Economic Co-operation and Development (OECD) 2007 statistics for penetration of broadband Internet in enterprises as well as comparison with European Innovation Scoreboard (EIS) 2007 and World Economic Forum (WEF) indexes, global index for competitiveness from Xavier Sala Martin, and Business Index for competitiveness of Michael Porter [3-7] it is noticeable that countries that have highest penetration of broadband Internet in the same time have highest indexes for innovation, competitiveness and technological development

## 2. Framework and Hypotheses

"Innovation could be defined as a process which lead towards adoption and spreading of new technologies, with ultimate aim to create new processes, products and services. While term adoption represent final phase of innovation, spreading is related on offering new services and commodities." EIS 2005, page 7. [8] According to Freeman and Engel, Innovations refer to process which starts with new idea, and ending with introduction to the market. [9] Pioneer in innovation Van De Ven (1986) suggests simple definition for innovation "Innovation is development and implementation" [10]. This definition allows for any kind of change in the organization to assign innovation, if change is manageable. Concept of innovation has many characteristics. It could be classified as radical or incremental. The last one includes step by step improvement in the current technologies, while radical innovation is related to introducing of new technologies and discontinuity from previous one.

According to Berkhout and others [11], in order field of innovation to be successful several aspects must be included, as it is: science, product development and entrepreneurship which play the key role. There is no innovation without entrepreneurship. Aralica and others [12], while discuss experience of Croatian companies stated that measurements and analysis of innovative activities as well as influence on micro and macro level is very difficult, burden with conceptual and applicative difficulties, especially in the countries in Central and Eastern Europe. Competitiveness of countries is now more and more technologically oriented. That is one of the reasons that current statistics for measurements of Innovations activities in the era of globalization is inappropriate stated Collecchia [13]. A lot of international organizations initiate new indicators which realistically will show the level of Science Technology and Innovation (STI) in the countries thus helping in bringing new national policy for development and growth. Porter and Stern [14] proved that R&D variables are important determinant for innovation and growth of productivity. Countries in EU through continuation of Lisbon Strategy for growth and new jobs, with Europe 2020 Strategy [2] established advance politics and reforms, specially designed in order European regulation and economic frames to be as much as friendly towards smart growth, fostering knowledge, innovation, education and digital society. One of the key goals which have been established was the level of 3% from GDP in each EU member states to be dedicated for research and development. EU Members States have introduced system for monitoring of progress in innovation as a significant indicator for country performance. In that national framework for innovation "Trend Chart on Innovation" [15-17] they consider strong and weak side of each

member states under different indicators for innovations. Taking into consideration importance of innovations, EU dedicated significant time and resources in order to define global politics towards innovations, to identify main reasons why total potential is not used and how could be achieved advance innovative economy in EU 27 Member States. In Aho report [18] as a main remark has been directed that EU countries must develop much more friendly business environment for innovation.

Strategy for development of innovation includes all stakeholders: business community, public sector, and of course, consumers. This is obvious because process of innovations includes not only business sector, but also public administration on national, regional and municipality level, public sector and consumers. Innovation strongly depends from consumers and citizens and their needs for innovative products and services. That is the reason why besides creation of optimal frames and capabilities for innovation, it must be created friendly market for innovation and needs for such products and services. Innovation comes in different forms, besides technological innovation, in this category belongs organizational innovations, process innovation, innovations in services and marketing innovations.

Republic of Macedonia must take serious steps with the aim to improve innovation in public and private sector. In order to follow, analyze and improve politics related to competitiveness of national economy it must be established national system for innovation and indicators which will reflect the real situation of innovation in the country. Polenakovic and Pinto in their paper clearly stated that "Republic of Macedonia missing well defined National system for Innovation with clear and well defined connections between science, technology and innovation and their connections with economic development." [19]

Besides well-defined system for innovation must be examine relations between several input and output factors of this system. In other words it must have better efficiency in exploitation of resources for science, technologies and innovations.

Advance usage of IT tools led towards a wide range of technological innovation for firms. ICT also have major impact on sales channels, marketing approaches, as well as creating new potential for logistics and communication and finally organization.

Very little academic research has been focused upon the relationship between ICT implementation in the small and medium enterprises and innovation in any form. Specifically, focusing of usage of broadband Internet and relationship with innovation could results in specific recommendation which could help in growth of SME. Diffusion of Innovation in Oslo Manual [20] is defined as "the way, in which innovations spread, through market or non-market cannels, from their very first implementation to different consumers, countries, regions, sectors, markets and firms."

*Hypothesis 1:* It is proposed that innovation is more rapid in firms that use Internet than the firms that not use Internet

*Hypothesis 2:* It is proposed that innovation is more rapid in firms that usage of broadband Internet is spread through all employees, rather to those that only need to perform work and the usage is more frequent.

### 3. Methodology and Operationalizations

The data was collected as part of wider survey "European Innovation Scoreboard 2010 for Republic of Macedonia" Polenakovic, Nestorovski et al [21]. The survey was administrated during May 2010 – September 2010. The objective of the survey was to generate statistical data necessary to carry out the analysis of Innovation and Entrepreneurship drivers in Macedonia.

In order to consider an appropriate sample design, it was first useful to look at the total population of companies:

**Table 1** Total number of registered companies at the end of year

Year	No. of companies
2006	91.104
2007	94.112
2008	98.270
2009	101.323

Taking into consideration number of active companies in the country it has been agreed to limit the research to 3.000 invited firms as a representative Macedonian sample. After the validation of returned surveys, 1.979 forms were taken into consideration which means in total 1.979 firms provided usable responses and this represents a 66% response rate. The high response rate was explained by

the fact that the process of interviewing of companies was initiated by official e-mail invitation and the Questionnaire. Companies were given the opportunity to choose the mode of interview:

- filling the questionnaire in person with interviewers or
- filling the questionnaire electronically and sending it back to designated e-mail address

The companies that did not answer the first e-mail were contacted by telephone and were given extensive information about the survey and the reasons for their participation. Finally, letter from the Minister of Economy has been sent to all participants in order to given higher importance of the survey and to achieve higher response rate.

Data were collected in accordance with Macedonian laws and the survey was carried out under the agreed set of international rules as laid out from the OECD, Community Innovation Survey (CIS) 2008 including new 2008-1010 methodology [22], and Eurostat recommendations. The survey followed general guidelines set out in publication known as the Oslo-Manual. [20] This document offered suggestions for realisation of innovation surveys, including statistical procedures and a review of the range of concepts that fall together under the umbrella term innovation. The CIS deals with the innovation activities of enterprises within EU Member States. The business classification used for the survey is based on the Statistical Classification of Economic Activities in the European Community (NACE Rev. 2) excluding sectors L and Q.

The random stratified sample was taken from the Central Registry of Republic of Macedonia. For the purposes of field research two stratification criteria have been adopted: economic size (in terms of employed workforce), and business sector. The total population consists of all active companies registered in the Central Registry of Macedonia (to have done business in 2006 or 2007 or 2008) and to have existed for at least three years. The database was divided in 8 groups according to Macedonian statistical regions: Skopje, Pelagonia, Polog, Eastern, South-Eastern, North-Eastern, South-Western, and Vardar. The coverage is therefore organized in a two-dimensional matrix of cells defined by one of the possible intersections Number of Workers \* Sector. The sample of companies is then selected by the individual cells, thus ensuring adequate representation of heterogeneity in the field of observation.

The survey collected information about product and service innovation, as well as other type of innovations and other key variables, during the three-year period from 2006 to 2008. Most questions cover new or significantly improved goods/services or the implementation of new or significantly improved processes, logistics or distribution methods and marketing innovations.

Other information gathered mainly concerns:

- the kind of technological innovation introduced;
- the influence of government policies in enhancing the innovation climate;
- expenditures on innovative activities carried out by the company;
- the share of turnover generated by new products;
- the impact of enterprises' innovation activities

The survey takes into account other aspects of the innovation process such as: the factors that restrict or prevent enterprises from developing innovation activity, the public support of innovation, cooperation agreements, sources of information on innovation, and the propensity to use patents or other forms of intellectual property protection. There was set of questions in order to determine each category of innovation.

New products have been counted if any significantly improved or new product development has been performed, regardless of being new only for the market of the company or only new to the firm. The same applies to the service innovation. Process innovation describes new methods relating to the firm business practices either internally or in external, including new relation. The following aspects have been taken into consideration:

- to reduce time to respond to customer or supplier needs
- improve ability to develop new products or processes
- improve quality of goods or services
- reduce costs per unit output
- Improve communication or information sharing within your enterprise or with other enterprises or institutions

Organizational innovation is described as:

- New methods of organizing work responsibilities and decision making
- New business practices for organizing procedures
- New methods of organizing external relations with other firms or public institutions

Innovation in Logistics is described as new or significantly improved logistic, distribution or distribution method for the input materials, products or services, while marketing innovations have been represented through implementation of a new marketing concept or strategy that differs significantly from the enterprise's existing marketing methods and which has not been used before. This kind of innovation implies significant changes in product design or packaging, product placement, product promotion or pricing. Seasonal, regular and other routine changes in marketing methods are excluded from the concept of marketing innovation.

## 4. Results

The enterprise system in Macedonia is characterized by small-sized firms in terms of both turnover and employees. These are companies with low turnover and limited staff. Due to the difficulty in sizing the sample, from the economic point of view, it could be useful to use, by analogy, as sizing depends on the number of employees declared and their variation from 2007 to 2009. In 2007, the percentage of enterprises with 0-5 employees was equal to 51.8% (down to 49.6% in 2009). In general, the majority of companies are set in a size range below 50 employees (with 77.7% of companies in 2007 and 78.70% in 2009). By analyzing the information from geographical point of view, the smallest enterprises (0 to 5 employees) are located in the northeast regions (68% in 2007 and 62% in 2009) and in the southeast (64.8% in 2007 and 62.8% in 2009). Larger companies (over 51 employees) are mainly located in the eastern region. Besides these problems, enterprises are highly isolated in terms of relationships with other companies and towards target markets.

### 4.1 Diffusion of Innovation in Firms by Internet Usage (Internet Access)

Out of 1.979 respondent, 1.596 firms use any kind of Internet, which represent 80,6% from total population count. From the other side Innovation in the companies has been defined as an innovation in products, services, method of production, logistics, organizational innovation and marketing innovation. Total number of enterprises that have any kind of innovation is 1.520 or 76.5% from total population.

Diffusion of Innovative activities significantly differs from region to region, showing that Skopje and Southeast region has been more innovative than other regions. The same fact applies for the usage of Internet. Dominant technology for using broadband Internet is ADSL and it is count for 58,5% from total population or more than 72,6% from those that use Internet.

Concerning importance of Internet in the growth and productivity, *correlation analysis* has been performed in order to estimate relation between independent variable "usages of Internet in the firms" with dependent variable "innovation in the firm". By performing such statistical analysis coming out that *there is implication on usage of Internet on innovation in the firms*. A computed value of coefficient of correlation is 0.525, showing *moderate positive correlation*. By computing coefficient of determination has been explained proportion of the total variation in the "innovative activities in the firms" by the variation in the independent variable "usages of Internet in the firms". Coefficient of determination is 0.275 or 27,5 % of the variation in the number of innovative activities is explained, or accounted for, by the variation in the number of firms which uses Internet. Table 2 summarizes innovation activities by firms in Macedonia.

**Table 2** Innovation in small and medium companies

New or significantly improved products	24,9 %
New or significantly improved services	23,1 %
New or significantly improved method of production of goods or services	22,5 %
New or significantly improved logistics	22,8 %
New or significantly improved supporting activities for organisational processes	22,7 %
New or significantly improved marketing methods	34,6%
Total of any kind of innovation	76,5 %

Innovation activity is count either that activity is new to the market of the firm, or only new to the firm. By this hypothesis is confirmed that *Innovation is more rapid in firms that use Internet than in those that does not use Internet, or the rate of diffusion of Innovation is increasing for firms that use Internet compared to firms that not use Internet.*

#### 4.2 Diffusion of Innovation by Rate of Usage, Access and Purpose of Usage of Internet

Based on collected data investigation of relation between innovation and usage, access and purpose of usage of Internet has been performed.

In the last three years, in average of 34% of companies have increased internet access speed, with the maximum number being in Skopje (54,5%) and in the south-western region (44,6%). Increasing access speed is connected with increased Internet activities. *More than 96% of companies that increase access speed have implemented some innovation in the last three years.*

Out of 1.596 firms that use Internet, 81,1% use Internet every day (Table 3); while in 30% in the companies that use Internet all employees have access to the Internet (Table 4).

**Table 3** How often internet is used in the enterprises

		Everyday	A Few days in week	Rare	I don't know	No answer	Total
<b>Total</b>	a.v.	1.294	178	67	10	47	1.596
	%	81,1%	11%	4,2%	0,6%	3,0%	100,0%

a.v. – absolute value

**Table 4** How many employees have access to the Internet

		Only management	All employees	Most of the employees	Only part of employees for which Internet is necessary in their work	No answer	Total
<b>Total</b>	a.v.	591	480	227	269	29	1.596
	%	37,1%	30,0%	14,2%	16,8%	1,8%	100,0%

By performing linear regression analysis using the "least squares" method at 95% confidence interval has been analyzed single dependent variable "any kind of innovations". Values of dependent value is checked whether is affected by the values of one or more independent variables, "average usage of Internet in the company" and "how many employees have access to Internet". As a summary output of regression statistics could be found that 14,5% of variation in the number of innovative activities is explained, by the variation in the number of access of employees to the Internet and 27,5% by variation in the number of average usage of Internet in the company. Those figures *show moderate correlation* between analyzed variables. E-mail correspondences are most widely use activity in the companies that used Internet. More that 85% used this tool, while 66% of the companies seeking new business opportunities through Internet. Only 14,8% of all companies that use Internet have used this application for selling and buying products and services. This could be explained due to very low penetration of credit cards with possibility for Internet trading, Internet security and low training and education for such business model. (Table 5)

**Table 5** Purposes the companies do you most often use Internet

	Yes		No		Total	
	a.v.	%	a.v.	%	a.v.	%
For e-mail	1.368	85,7%	228	14,3%	1.596	100,0%
For seeking new business opportunities	1.053	66,0%	543	34,0%	1.596	100,0%
For performing working tasks	1.053	66,0%	543	34,0%	1.596	100,0%
For professional education	551	34,5%	1.045	65,5%	1.596	100,0%
For buying or selling products or services	237	14,8%	1.359	85,2%	1.596	100,0%
For data transfer including video, pictures	426	26,7%	1.170	73,3%	1.596	100,0%

	Yes		No		Total	
	a.v.	%	a.v.	%	a.v.	%
and music						
For other Internet applications	347	21,7%	1.249	78,3%	1.596	100,0%
For software downloads	240	15,0%	1.356	85,0%	1.596	100,0%
For news and information related to yours business	487	30,5%	1.109	69,5%	1.596	100,0%

Regarding the possession and use of web sites, 60,4 % of enterprises do not have a website and only 10% use the company's web site to support their business operations. (Table 6)

**Table 6** For which purposes are internet web sites used

Answers	Yes		No		Total	
	a.v.	%	a.v.	%	a.v.	%
Our company have no own web site	963	60,4%	633	39,6%	1596	100,0%
For advertising and information of our company	396	24,8%	1200	75,2%	1596	100,0%
For direct sale of products and services	88	5,5%	1508	94,5%	1596	100,0%
Education and training	29	1,8%	1567	98,2%	1596	100,0%
Support of business	160	10,0%	1436	90,0%	1596	100,0%
I don't know	24	1,5%	1572	98,5%	1596	100,0%

*There is positive correlation between implemented innovation in firms in Macedonia and employees access to the Internet and frequency of usage of Internet of those employees. Diffusion of Innovation is higher in firms that usage of broadband Internet is spread through larger number of employees and the companies use Internet more frequently.*

## 5. Conclusions

The survey results show that the diffusion and adoption of Innovation varies with geographical region, Internet access, rate of usage, as well as who is using the Internet.

Hypothesis 1 is supported by findings that *diffusion of innovation is greater in firms that have Internet access*, illustrating that the diffusion of innovation occurs in those firms that have access to more information. The survey clearly shows that companies beside e-mail which is by far most usable application 85,7%, use Internet for seeking new business opportunities 66%, performing daily work 66%, but also to find news and information regarding their business 30,5%. All these companies have access to more information and obviously use them to implement some type of innovation in their daily business. Continuous increase of adoption of Internet suggests that companies appreciate the power of ICT and are able to find resources to adopt it.

More in line with expectations is the fact that the firms in which Internet is spread wider through employees and rate of usage is more frequent, is likely to have more innovative activities in the firms, thereby supporting Hypothesis 2.

The current level of Internet Access is high, but still there is room for further expansion, especially considering Europe 2020 goal of broadband to all by 2013. Future expansion decisions are likely to concern upgrading of existing Internet Access, governmental intervention in rural areas, and further growth of penetration into the firms due to some legal requirements.

To conclude, data analyzed in this paper has been drawn from national survey of Macedonia. It is already proven that innovations increase competitiveness of the firms. In order to increase competitiveness of the country, all aspects of innovation should be taken into consideration. Further examination of employee's ICT skills in order to increase innovations could provide important insights. Also, correlation between different management styles and diffusion of innovation in the firms could exploit new horizons. Finally, how investment in ICT results in innovations activities and how those innovations impact firm's financial results could explore new important facts, which would help in further increase of competitiveness of the companies.

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# Existence of “Urban canyons” as the innovative solution for better quality of life and business developing in Podgorica city

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**Introduction:** Communal noise is common nuisance that affect people in their homes and offices. Construction of tier buildings along the main traffic roads or streets could increase the people quality of life and make opportunity for business developing.

**Objective:** Analysis presence of communal noise in residential and business premises settled along Boulevard Sava Kovacevic in Podgorica city. Propose solution for solving negative effects and developing business.

**Methods:** Tier building was selected for the experiment. One hour noise measurements, on five positions inside the building and three positions outside, during three different periods (7-8h, 15-16h, 20-21h) were performed according to Montenegrin legislative for environmental noise exposure and occupational health and safety at work.

**Results:** Outdoor measurements (positions near Boulevard) showed that traffic noise exposure exceeds limits for 5dB. Difference, between measurements on ground level position and noise level on seventh floor position, was negligible (0.5dB). Situation caused by presence of “urban canon”. Results for all indoor (working) positions exceeded limits for about 5 dB. As the main sources for such noise were detected heating/cooling system and frequent traffic.

**Conclusion:** Experiment results show that communal noise represent nuisance that negatively affect people in business and residential premises across Boulevard Save Kovacevic - Podgorica. Pollution is caused by very frequent traffic and industrial noise sources (generators, climate units). Pollution problem could be solved by providing activities on better traffic regulation (roundabout instead of traffic lights), “green barriers” implementation and some technical improvements. Best way for noise problem solving will be assignment of residential and office premises strictly for commercial purpose (home stores, markets, etc.). This solution offer best opportunity for increasing people quality of life and business development.

## Keywords:

Business development, communal noise, innovative solution, quality of life.

## 1. Introduction

National technological development brings benefit to all citizens who are generally pleased with the progress and the things that this technological development brings. A typical example of this progress can be seen throughout the development of means of transport, different machines and devices that make life enjoyable to modern man. The consequence of this rapid progress has been rapid growth in both the environmental noise and noise at work environment, which results in stagnation and quality of life decreasing. City of Podgorica is an ideal example of rapid technological development and progress, which results in increased communal noise which adversely affects the quality of life of citizens. The application of urban-technical measures can eliminate the negative effects that noise has on the quality of life. Application of measures to eliminate excessive noise inevitably requires

additional financial resources, which call into question the economic viability and do not guarantee a permanent problem solving due to the fact that the noise level is constantly increasing. Problems with increased levels of communal noise are particularly pronounced in the residential and business areas located close to the frequency traffic roads. A common practice is to build tier buildings next to the city's boulevards, which are used as residential and commercial (office) space. The existence of such facilities on both sides of the city boulevard, which performs very frequent road traffic, has resulted in the production of so-called "urban canyons" that eliminates the effect of noise attenuation with increasing distance from the source. That resulted in the presence of noise which is almost identical within building regardless of the number of floors and the distance from the road marked as a source of noise. In order to practically confirm the above facts, traffic noise assessment was performed in Boulevard Sava Kovacevic-Podgorica. The goal is to effectively check the noise levels generated in the "urban canyon" along the Boulevard, and to determine whether we have the existence of excessive noise that adversely affects the quality of life, interferes with the living and working activity, and find an innovative solution that permanently solves problem.

## **2. Choice of facility for the noise measurement**

Commercial building located in a metropolitan area with very frequent road traffic, with the obvious presence of other sources of community noise (air conditioning, industrial sources, etc.) represented an ideal choice for carrying out the experiment. Other forms of transport (air and rail) are not present in this part of the city. Selected building is adjacent to the Boulevard "Save Kovačević" on the north side. On its east side is adjacent to residential-commercial buildings, and on the south side is a parking space.

## **3. Selection of measurement sites**

Given that the north side of the building directly exposed to noise coming from the direction of the Boulevard is determined by five positions. Three positions inside residential part and two positions inside office part of building, in order to measure the value and impact of noise generated by very frequent traffic. Selected the three measurement positions in the flats on the second, fourth and seventh floors, two positions on the ground floor and first floor used as office premises. To determine the effect of noise on the building facade were chosen positions close to the main entrance on the ground floor, and two positions close to the Boulevard were used to determine the value of traffic noise. Therefore, the impact of noise was measured at eight different positions in order to encompass the entire impact of all sources of noise which the utility business and residential building exposed.

## **4. Choice of instrument for measuring, measurement intervals**

Noise is measured by precision modular analyzer Brüel & Kjaer 2250 that meets the prescribed standard IEC60804. Tuned frequency range from 6.3 Hz to 20 kHz frequency range corresponds to 1/3 band noise analysis. Degrades gracefully is A- weighted frequency weighting curve for the fast response time of 0.125s. Dynamic range of the instrument for a tone frequency of 1 kHz is set for maximum value of 140 dB. Before and after the monitoring device was calibrated with a sound calibrator, model Brüel & Kjaer 4230, which produces noise levels of 94 dB at a frequency of 1000 Hz, with an accuracy of  $\pm 0.25$  dB. During the measurement used is "free-field" microphone size of 0.5 inches, the working range of 2.6 Hz to 20 kHz. During measurements of weather conditions were good, sunny and quiet time. In selecting the measurement interval was followed instructions from Article 6 Ordinance on the methods and tools of measurement to be met by the organization to measure noise. Under this Ordinance changing the noise level is measured at three intervals during the day (06-22h) and two intervals during the night (22h-06h). Given that this is a residential-business building and that it was not possible to measure the night, all measures within the building carried out in three day intervals for a period of 1 hour: The first measurement interval from 07:30 h to 08:30 h; second interval measurement from 11:30 h to 12:30 h; third measurement interval from 15:00 h to 16:00 h. Measurements in front of the building were performed in three intervals of 30 minutes: The first measurement interval from 08:00 h to 08:30 h; second measurement interval from 15:00 h to 15:30h; third measurement interval from 21:00h to 21:30h.

## 5. Applied legislation

States of Montenegro's declaration of the Law on the Protection of Environmental Noise (Official Gazette No. 45/06 of 17.07.2006.) regulates noise in the environment, identifies measures to combat the harmful effects of noise on human health, precise data on permitted levels of environmental noise and ensuring their availability to the public. Article 9 this Law, defines the obligation of a competent government authority to issue regulations for limited values of noise, methods of assessment and measurement methods. Ministry of Health, Labor and Social Affairs adopted the Regulation on the methods and instruments of measurement noise (Official Gazette nr 24/95, 42/2000, 25/2003), which is used as a reference for making this work. Besides these, we used Regulations used to check the limit values of environmental noise (Official Gazette of 08/12/2006 nr.75/06) and Regulation on measures and safety standards of noise in work areas (Official Gazette SFRJ nr.21/92).

## 6. The results of performed measurements

The results of noise measurements performed at the monitoring positions are classified in three categories. The first category is the results of measurements that show the obtained values of the equivalent noise level during the measurement interval. These results are shown in diagrams and tables, and presents values for the total equivalent noise level - LAeq. The second category is the results which represent the cumulative distribution of noise level during the entire period of measurement. Tables shows the values of parameters LAF1, LAF10, LAF50 and LAF90 which represent the percentage prevalence of noise during the measurement and are used in the statistical analysis of the excess over the permitted level of noise. The cumulative value of these parameters for the total period of time defines the impact of background noise (L90) or impulse noise (L1). The third category of instructional results represent the results of sound pressure level at a given frequency range at certain frequencies. This category results will be used in the analysis of noise in those areas where measurement is to determine whether the obtained values do not exceed allowable limits. Analysis results determine: Is the value obtained at selected measuring points exceeds the value of exposure to noise in the environment; Do values obtained at selected measuring points exceeds the value of exposure to noise at work.

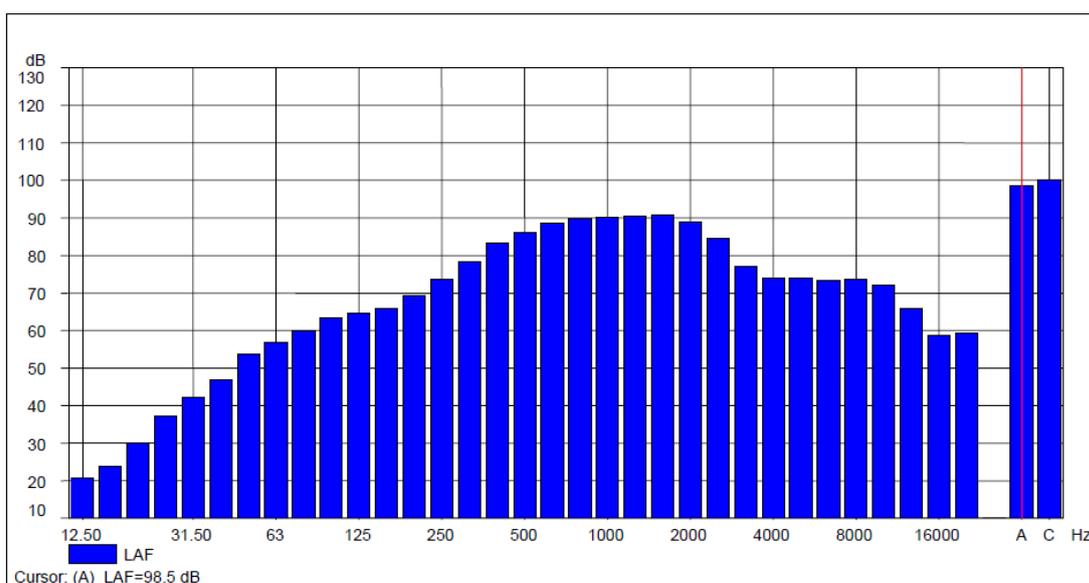
For the measurement position within the work premises is necessary to determine if the results exceed the permitted levels defined in the Regulations on the safety standards of noise in the workspace (Official Gazette of SFRJ 21/92). In accordance with these rules allowed noise level is determined based on the type of work being done on the said working position. Employees in these positions perform work that requires concentration, right speech and telephone communication, and has allowed noise level of 50 [dB]. For the assessment of noise levels we used the method of assessment of noise by normative curves. As the allowable noise level is 50 dB, it is a normative curve represents the reference value curve N-45. Allowed values of sound pressure at the reference frequencies are given in Table 1 and for the normative curve N45 are:

**Tabel 1** – Sound pressure levels on referent frequencies for the normative curve N45

<b>Frequencies (Hz)</b>	31,5	63	125	250	500	1000	2000	4000	8000
<b>Permitted (dB)</b>	86,0	71,0	61,1	53,6	48,6	45	42,2	40,0	38,3

The results obtained by measuring on the first selected position in a time of 7:30 to 8:30 pm are presented in Figure 1:

**Figure 1** – Results obtained by measuring on the first selected position in a time of 7:30- 8:30 pm



Frekvencija	Hz 31,5	Hz 63	Hz 125	Hz 250	Hz 500	Hz 1000	Hz 2000	Hz 4000	Hz 8000
L <sub>AF</sub>	42 dB	58dB	63dB	73dB	85dB	90dB	89dB	75dB	75dB

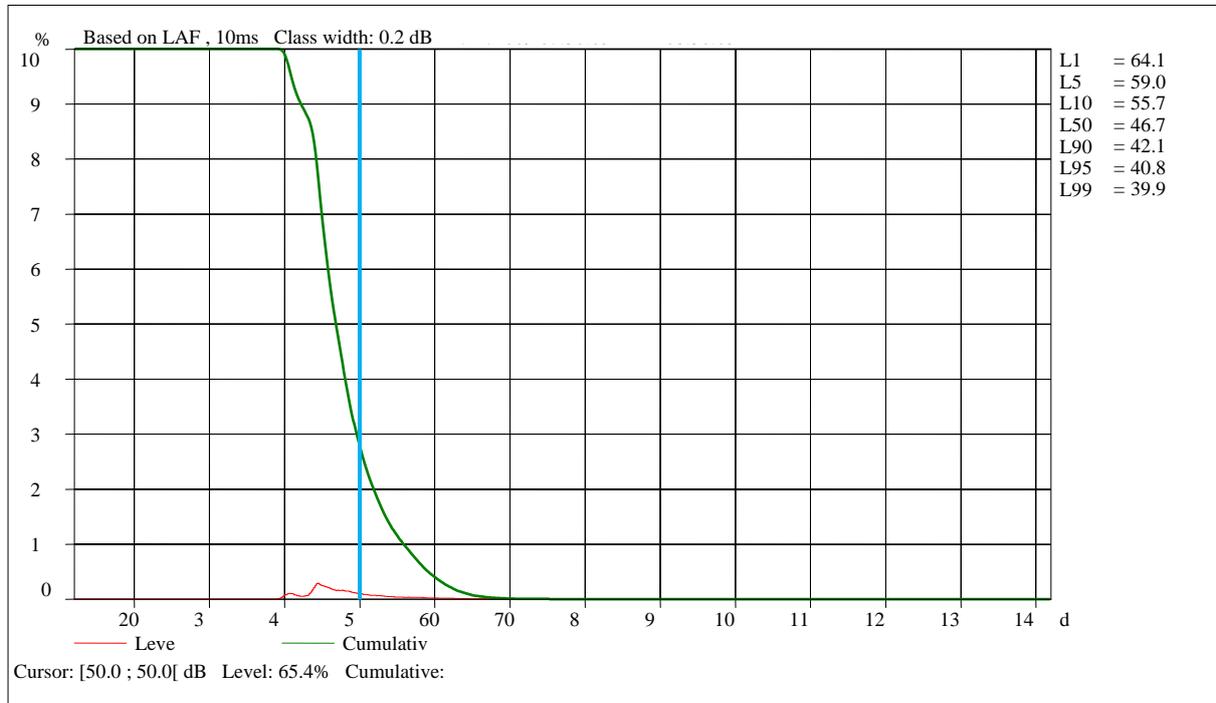
After analyzing the measurement diagrams and reading results for all three terms, we compared measured values with acceptable values for the curve N45 (Table 2). In accordance with the Regulations on safety standards of noise in the workspace (Official Gazette of SFRJ 21/92), the measured values of sound pressure for each frequency level, must not exceed the values given as a reference, or in one of frequency levels. If the value of even a single measured sound level for a given frequency exceeds the permissible level, it is considered that the noise exceeds the limit. To compare our results with reference values allowed for the curve N45, points to the fact that almost the entire frequency range measured values significantly exceed the permitted limits in all three terms of measurement. In the field of lower frequencies there is no deviation from the allowed value, which indicates that the Boulevard traffic of heavy vehicles is minimized. The measured values of sound pressure at frequencies of 1 kHz, exceeding allowable by approximately 30dB-45dB. The difference is particularly strong. Therefore, it is evident that the above mentioned position measuring noise level does not meet the criteria defined in the Regulations on the safety standards of noise in the workspace.

**Table 2** Comparison of measurement results in all three terms, with the permitted values for the curve N-45

Frequency	Hz 31,5	Hz 63	Hz 125	Hz 250	Hz 500	Hz 1000	Hz 2000	Hz 4000	Hz 8000
Permitted level	86,0dB	71,0 dB	61,1 dB	53,6 dB	48,6 dB	45 dB	42,2 dB	40,0 dB	38,3 dB
Measurement results 7:30-8:30h	42 dB	58dB	63dB	73dB	85dB	90dB	89dB	75dB	75dB
Exceeds	No	No	Yes						
Measurement results 11:30-12:30h	38 dB	52dB	68dB	74dB	78dB	82dB	88dB	72dB	60dB
Exceeds	No	No	Yes						
Measurement results 15:30-16:30h	44 dB	55dB	60dB	65dB	88dB	72dB	90dB	70dB	65dB
Exceeds	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes

Almost identical data were obtained for the second working position, which was selected as the second test point for which comparisons were made of the measured and allowable values of noise at work. From cumulative diagram for Position 2 (Figure 2) in the period from 7:30 to 8:30 leads to the conclusion:

**Figure 2** – Cumulative distribution of noise levels for the period from 7:30 to 8:30 pm



- At 72.3% of total recording time, a condition that the noise would be below 50 dB was satisfied. If one takes into account the term morning shooting noise ratio and percentage of satisfying a given criterion of 72.3%, expressed as a time duration of about 43 minutes, it was concluded that the increase in noise caused by the arrival of the position of employees and their mutual communication after terms of 08:15 h.
- The value of L1 = 64.1 dB points to current events (1% - 6s) pulse character whose influence is negligible in real terms;
- The value of L10 = 55.7 dB points on the noise from the environment. The only source of noise is the environmental transport in the Boulevard.
- The value of L90 = 42.1 dB, the background noise by 7.9 dB lower than allowed. This low value of the background noise is explained by the size of the room where the high walls and open space, noise impact of air conditioning and IT equipment does not come into play.

In order to verify the accuracy of the conclusions would compare the value of L1, L10, L90 for the remaining terms of measurement noise on Position 2. The document results are given in tables(Table3).

**Table 3** - Values of L1, L10, L90 for Position 2 at all terms of measurement

	L1[dB]	L10[dB]	L90[dB]
<b>Term 1</b>	64.1	55.7	42.1
<b>Term 2</b>	70.3	61.5	47.6
<b>Term 3</b>	70.8	62	42.6

It is clear that the value of L90 is almost the same for terms 1 and 3. The value of L90 in the term 2 is higher by about 5 dB which is attributed to the activation of all computer and printer in the room during working hours. It is evident that the value of L10 = 62 dB in term 3, is consistent with the fact that in

this period is increased traffic and the impact of traffic noise as a source of noise from the environment. We see that the level of L10 in term 3 is higher than in term 2 and the term 1.

In order to be comparing the measured values in positions that are located within residential premises used by the Regulations on Limit Values of Environmental Noise (Official Gazette of br75/06 12/08/2006), in which the equivalent noise in the visitors' room at no time of day exceed a value greater than 45dB for daytime. Obtained values of equivalent noise at all three positions in all three terms were above the allowable amount of 7-15dB (Table 4) depending on the terms of measurement, which indicates the need to apply appropriate measures to eliminate or reduce noise

**Table 4** - Equivalent value of the measured noise in residential areas

	Pos.3 L <sub>Aeq</sub> [dB]	Pos.4 L <sub>Aeq</sub> [dB]	Pos.5 L <sub>Aeq</sub> [dB]
<b>Termin 1</b>	59.2	60,3	58,7
<b>Termin 2</b>	55.1	54,3	53,8
<b>Termin 3</b>	52.5	53,8	51,7

What can be noted from Table 4 is that values of measured equivalent noise in all three terms in all three positions are approximately the same. It is evident that the values at the measuring position 5 is slightly less (0.5 dB) compared to the other two positions, although as a rule be as Position 5 on the seventh floor of the building. Cause of this phenomenon would be presence of "urban canyon" that eliminates the effects of reducing noise by moving away from its source.

Measurements that were conducted in three daily terms for a period of thirty minutes on the positions in front of the building, gave results that exceed the limit value of the equivalent noise level for residential and business zone of day of 65dB. Measurement results presented in Table 5 supporting the fact that the facilities built next to the road traffic are exposed to increased noise, and specific values indicate the excess in the range of 2.5 dB to 5dB. What is characteristic for all three terms of measurement at all three measurement points, is the fact that in any case we do not have a result less than or equal to the allowed values of equivalent noise of 65dB.

**Table 6** - Equivalent value of the measured noise in front of building

	Pos.3 L <sub>Aeq</sub> [dB]	Pos.4 L <sub>Aeq</sub> [dB]	Pos.5 L <sub>Aeq</sub> [dB]
<b>Term 1</b>	70,3	70,1	69,7
<b>Term 2</b>	68.8	68,2	68,9
<b>Term 3</b>	70.8	70,6	70,7

## 7. Solutions for problem elimination

Analysis of the results of measurements on the selected measurement positions, which also represent the working position, showed that the conditions defined in the Ordinance on the measures and safety standards of noise at work areas are not being met. To obtain an adequate working environment it is possible to implement the following measures and activities: relocate or isolate computer equipment from offices, implement an additional layer of monolithic glass on existing glass facades or make corrections to the facade of the building by a glass facade that will be replaced by facade of solid materials with higher degree of noise insulation, examine the possibility of installing a central ventilation system for an office building in order to eliminate the way of natural ventilation by opening windows. The elimination of noise in residential areas can be performed with better facade windows, which will eliminate the penetration of noise that exceed the allowable value of 2.5-5dB. A permanent technical solution for the problem would be installation of central ventilation and facade windows fixed to avoid the penetration of natural ventilation and noise in the living room. Unfortunately in this particular case it is not feasible and economically viable. Measurement results, related to the measurement sites in which the problem is noise from the point of environmental protection, have

shown that the present environmental pollution would be noise generated in the Boulevard. Measures to eliminate noise could be noted by better regulation of traffic flow, because the traffic is regulated by light signals, which inevitably causes long delays in the Boulevard especially during rush hour. One possible solution is to regulate traffic throughout the roundabout. Construction of roundabout to reduce congestion along the Boulevard and inevitably led to the elimination of traffic noise that has a pulse character (audible warning, move quickly from the station and emergency braking). Reduction of traffic noise implementation of artificial barriers in this case would not produce satisfactory results due to the presence of "urban canyon". It would lead to an increase in noise level of 3-7 dB with increasing altitude of the object relative to the barrier. Natural barriers (form of trees) are completely acceptable and represent the most effective form of struggle with the noise coming from the direction of the Boulevard. Implementation of green barriers achieves good result but only to a certain height, because of the presence of "urban canyon". All these measures for the elimination of excessive noise are mostly technical in nature and require significant investment. What is evident is that regardless of the implementation of these measures, there is no permanent solution, and the facts point to the certainty of escalating the level of noise increases the number of qualifying vehicles. Innovative solutions such as introducing the electrically-driven vehicles are now a distant future. As the only solution imposed by the implementation of planning and zoning measures that would stimulate business development, and all through the introduction of innovative policies to a major thoroughfare to build multi story commercial type facilities (supermarkets, furniture showrooms, art salons, bars, restaurants and the like. ). Regarding the aspect of improving quality of life and eliminating the harmful effects of noise, this solution is absolutely acceptable, because objects on the road would be an ideal sound barrier for the facilities that would be built behind them, and used in residential / commercial purposes.

## 8. Conclusion

The presence of communal noise in the facilities are located close to city road is a health concern that affects the normal limits of human activity. Noise pollution is evident, and indicates the commitment to implement the measures for its elimination or reduction to the level allowed by law. There are a number of technical solutions that can be implemented but it calls into question the durability of such solutions and economic viability. The only permanent solution, which also stimulates business development and improve quality of life of citizens, are planning and zoning measures to introduce a rule that is the only major thoroughfare build multi story buildings that will be used for commercial purposes.

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# The Macedonian labour market and the role of university business incubators

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The aim of this paper is to assess the perspectives of the Macedonian labour market with respect to the dynamic changes in the higher education system and, particularly the role of the university business incubators. During the two decades long period of transition Macedonian labour market has been characterised with depressed conditions manifested by high and persistent unemployment rate, strong labour market segmentation and prevalence of long-term unemployment. In such circumstances, the higher education system in Macedonia has been challenged to change its role in the society. During the period of transition we have witnessed a dramatic evolution of the Macedonian higher education system that has been characterised with proliferation of university centres, growing number of study programmes and development of new concepts such as introduction of dispersed studies, clinical education, compulsory internship etc. In this context, the role of the universities as generators of knowledge and promoters of entrepreneurial spirit has been repeatedly emphasised by both academics and policy makers. Although the idea for university business incubators in developed western economies is not new one, Macedonian higher education system is lacking sufficient experience about their role and socio-economic implications. In order to fill this gap, the focus of the applicative part in this paper will be development of a model for appropriate university business incubator. Hence, we would like to explore the feasibility of this model for developing entrepreneurial skills among students and to evaluate its potential impact on the Macedonian labour market. As a consequence, we will formulate suitable policy recommendations as guiding principles for policy makers in designing more competitive higher education system that would respond to the needs of the Macedonian labour market.

## Keywords

Business incubator, Entrepreneurship, Higher education, Labour market

## 1. Introduction

One of the most important development goals of economic policy is the goal of full, productive and sustainable employment, *i.e.* employment for all those who are able to work, wish to be employed and actively looking for a job. This commitment becomes even more pronounced in the case of transition economies where economic shocks have contracted the level of employment and redistributed wealth. Having in mind the social implications of persistent open unemployment manifested in rising poverty and social exclusion, all transition countries have placed unemployment reduction among their most important macroeconomic goals. However, policy measures intended to reduce unemployment have to be based upon previous comprehensive analyses of the labour market characteristics and have to be implemented by credible governments.

In the circumstance when unemployment is high, the policy measures should simultaneously focus on both demand and supply side of the labour market [1]. This means that efforts for creation new jobs in the economy should be accompanied by accumulation of appropriate knowledge and skills of the workers and potential labour market entrants. In this context, almost all transition countries have paid

particular attention to reforms of their education systems in order to provide more competitive and marketable skill generation. Alongside the introduction of compulsory secondary education, we are witnessing dramatic changes in the higher education system in Macedonia that are still subject to criticism. One form of reconciliation of the demand and supply labour market policies is by creation of university business incubators as viable tools for development of entrepreneurial skills and creation high quality jobs.

Given the Macedonian labour market conditions and the on-going reforms of the higher education system, in this paper we aim to develop an appropriate model of university business incubator and to assess its potential impact on the labour market performance. Hence, with this research we intend to fill the gap in our literature about the implementation of university business incubators. For this purpose the paper is structured as follows. In the second section we will present the main features of the Macedonian labour market as a contextual framework of the research. A critical elaboration of the higher education reforms in Macedonia will be given in the third section. In the fourth section we develop an appropriate model of university business incubator for the case of Macedonia with giving emphasise to the potential stakeholders, supporting services and phases of incubation. Finally in the fifth section we conclude and formulate some policy recommendations.

## 2. Macedonian labour market performance

The main source of data for the Macedonian labour market is the Labour force survey. The first Labour Force Survey (LFS) in Macedonia was conducted in 1996, and since then we have detailed data concerning labour market trends [2]. The LFS is one of the most valuable sources of information regarding trends in the labour market. This survey is conducted according the methodology recommended by the International Labour Office (ILO) and the recommendations of the European Statistical Bureau (Eurostat). The goal of the LFS is to provide comparable data concerning the size and the structure of the active population with respect to international standards. According to the LFS the general trends in the Macedonian labour market are presented in Figure 1.

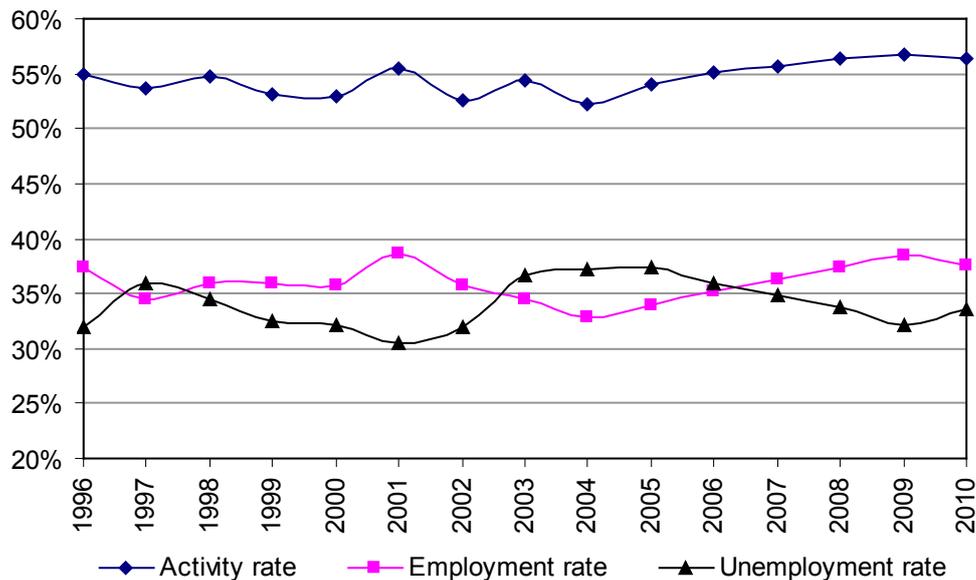


Figure 1 General trends in the Macedonian labour market

From Figure 1, we can notice that the unemployment rate in Macedonia during the period 1996-2010 is high and persistent. Moreover, the unemployment and employment rates manifest procyclical changes throughout the whole period of transition. Based on the LFS data, the unemployment rate in 1996 was estimated to be 31.9 percent, followed by period of steady decline until 2001 and a sharp increase thereafter. The unemployment rate steadily declined since 2006, but recent economic downturn has again reversed this trend. The unemployment measures based on the registered number of unemployed is even higher than the unemployment rate estimated from LFS. For instance, registered unemployment in 2000 peaked at 44.9 percent of the total labour force, which to our knowledge represents the highest registered unemployment rate among all transition countries.

The Macedonian labour market is characterised by a relatively stagnant unemployment pool that has been translated into increasing long-term unemployment[1]. For instance, long-term unemployment accounted for 80.7 percent of total unemployment in 1996 and it grew steadily until 2005 when it accounted for 86.7 percent of total unemployment. Moreover, the so-called very-long-term unemployment comprising the unemployed who look for jobs for more than four years is outstandingly high [3]. For instance, in 2005 the proportion of very-long-term unemployed accounted for 65.4 percent of total number of Macedonian unemployed population.

Long-term unemployment has significantly contributed to an erosion of skills and motivation of unemployed workers, making them less employable over time [4], [5]. The deterioration of skills further reduces the attractiveness of the labour force and contributes to a blurring of the difference between the states of unemployment and non-participation. After remaining unemployed for a long period of time, a considerable part of unemployed workers stops looking for jobs and quits the labour force. This is known as the phenomenon of 'discouraged workers,' a characteristic for depressed labour markets where labour demand is insufficient and unemployed workers face poor employment prospects. Discouraged workers do not fulfil the requirements of job search as a precondition to be counted as unemployed. On the other hand, they can easily re-enter the labour force if, conditions on the demand side of the labour market improve. The empirical literature has recently documented the problems that statistical offices in transition countries encounter in estimating the unemployment rates in the presence of large numbers of discouraged workers [3], [6]. How to categorise those that lie on the borderlines between unemployment on the one hand side, and employment or inactivity on the other side, may significantly influence the officially calculated unemployment rate.

Although we are unable to undertake a separate analysis, we also acknowledge the existence of underemployment. The term underemployment is used to designate the state of those workers who are able to find employment only for short periods of time, such as involuntary part-time workers, seasonal workers, day or casual workers, whose relative shares in the total workforce typically increased during transition [6]. In Macedonia this is the situation not only for many legally employed workers, but also for those who work in the informal sector. The category underemployed also includes workers whose level of education and professional skills make them overqualified for their jobs. This is the case of the workers with a strong educational background forced to perform various types of 'unfavourable' jobs in order to secure their basic existence [7]. Therefore, two basic forms of underemployment are persistent: visible underemployment, which is characterised by insufficient working hours and, invisible underemployment, associated with productivity losses due to insufficient use of human capital.

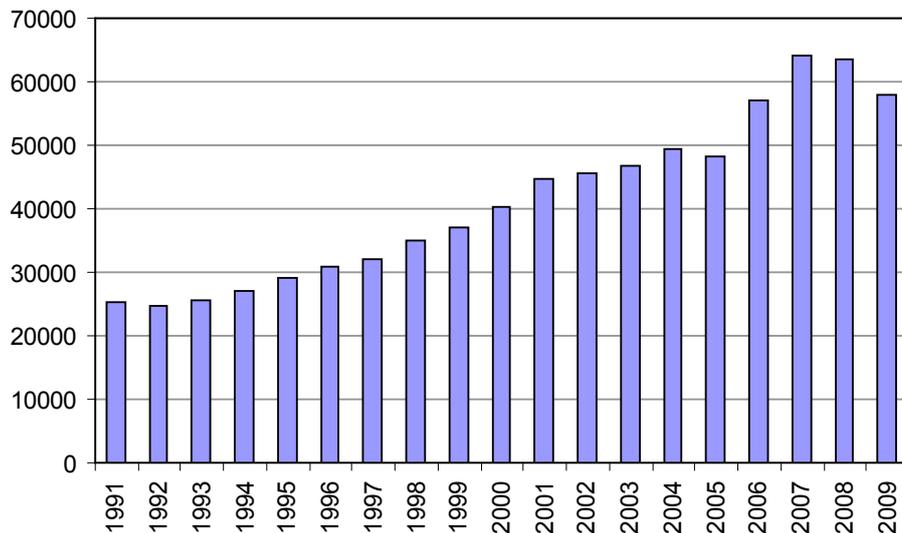
Having in mind the above-mentioned characteristics, we can argue that the labour market in Macedonia is affected by striking segmentation, meaning that certain social groups such as: youths, less educated workers, and women, face a much higher risk of unemployment and/or non-participation than the rest of the labour force [5]. This conclusion is in accord with the findings for some other transition countries [8], [9]. The high Macedonian unemployment rate has enormous social implications such as rising poverty and income inequality. For example, the estimated percentage of the population living below the poverty line in 2003 was 21.7, whereas the Gini coefficient in the same period stood at 0.373 [10]. Long spells of unemployment often leads to the degradation and dehumanisation of individuals in society, causing social exclusion and increasing the burden for the government of providing the necessary safety net. Consequently, the problem of unemployment is not only a personal problem for the people who experience it, but it has become a problem for the economy as a whole. Today, the Macedonian government bears a big part of the responsibility for the poor labour market performance that can be partly improved by undertaking appropriate policy measures. In this context, we next examine the reforms in the higher education system in Macedonia.

### **3. Challenges of the higher education system**

Having in mind the depressed characteristics of the Macedonian labour market, the higher education has faced a challenging task to become a generator of competitive and marketable skills for students in order to promote greater employability. On the other hand, the insufficient demand on the Macedonian labour market prevents the policy makers from getting relevant feedback of the reforms efficiency. During the two decades long period of transition in Macedonia we have witnessed a variety of changes in the sphere of the higher education. The main features of this transformation will be briefly explained as follows.

First, the most striking feature of the higher education in Macedonia has been a proliferation of a number of new institutions and study programmes. For instance, twenty years ago in Macedonia

existed only two state universities and total absence of private initiative, whereas today there are 5 state universities and about 18 private higher education institutions [11]. Alongside this process, the existing universities have permanently diversifying their curricula by offering new and more competitive study programmes. The rising number of higher educational institutions and study programmes has contributed to increase of competition and creation of critical academic climate. As a consequence, the number of enrolled students in higher education in Macedonia marks an increasing trend which can be noticed from Figure 2. Recently, the number of enrolled students in higher education exceeded 60000 students per year, opposed to only 25000 students enrolled each year at the beginning of the 90's.



**Figure 2** Number of students in Macedonian higher education

Second, all universities in Macedonia by 2010 have adopted the European credit transfer system and adhered to the Bologna process whose goal is 'to create a European space for higher education in order to enhance the employability and mobility of citizens and to increase the international competitiveness of European higher education'. This trend has been crucial for the process of harmonisation of the Macedonian higher education with the common European standards. However, the recent evaluation of this system shows a number of weaknesses that imply needs for further revisions and improvements.

Third, the adoption of the new 'Law for higher education' in March 2008 and the latest changes and additions in February 2011 have brought a number of novelties among which the most prominent are dispersed studies and compulsory study programmes in English [12]. Most of these reforms are dubious in their nature since they are not initially engendered from the academic milieu and are not widely supported by all members of the academic community. For example, the model of dispersed studies has been criticised because of its detachment from the concept of concentration of knowledge similar to that applied in university campuses. Taking into account that dispersed studies in Macedonia have been launched without providing the necessary technical and personal equipment, this model of studies is discriminatory in nature because it deprives the students in dispersed classes of their basic academic needs.

Finally, clinical education and compulsory internship have been promoted by the Ministry of education and science in Macedonia as most prominent ways for achieving a greater competitiveness of the higher education. However, these changes have not been accompanied by appropriate analysis of the capacity of Macedonian economy to serve/host all students for such forms of practical education. Having in mind that most of the Macedonian companies are small and medium in size and in the same time permanently face financial, technical and personal problems, it is clear that these intentions should be realised with more soundness for the current economic performance.

#### **4. A model of university business incubator**

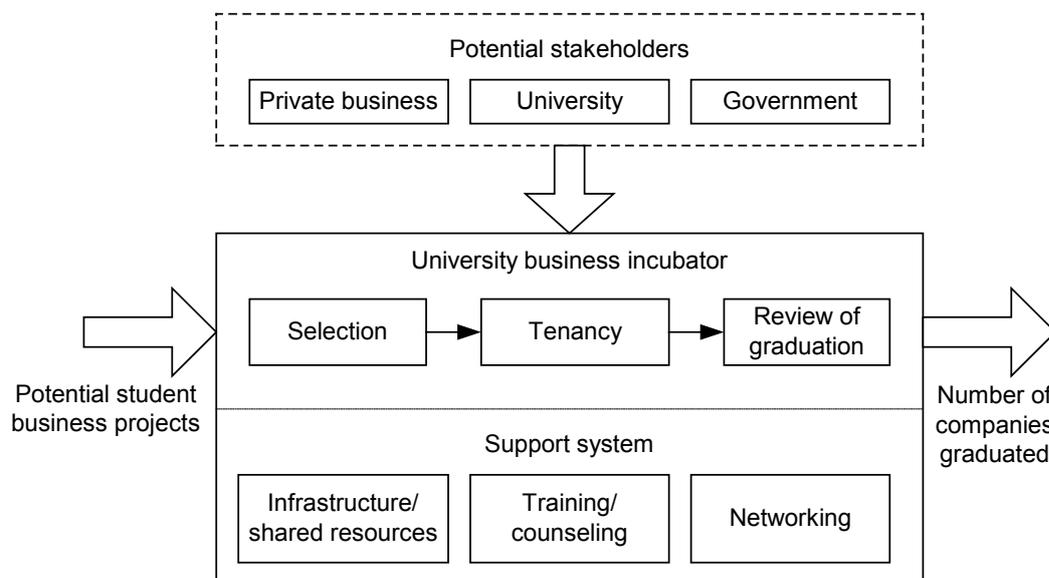
From the previous section it is evident that higher education system in Macedonia has been recognised as an important factor for generation of essential knowledge and skills that give students advantageous position in the labour market. However, as previously noticed, the higher education system in Macedonia is lacking an establishment of suitable relationship between the practical needs

of the students and capacities of the Macedonian economy real sector. Therefore, in this section we propose a particular strategy consisting of establishments of university business incubators (UBI) that would help enhancing the students' entrepreneurial skills and, in the same time, would corroborate with the functioning of Macedonian economy.

Historically, incubators appeared in developed countries in the early 1980s, whereas in developing countries they are a quite recent phenomenon [13], [14]. Incubators can be differentiated according to several criteria such as: their mandate (for profit or non for profit), the type of sponsorship (private, public or mixed), their focus (mixed use or niche), geographic area (rural, urban, suburban) etc. The goals of the incubators may also vary but, generally encompass economic development and generation of new jobs, property venture development, fostering entrepreneurship in transition countries, development of export production etc. [15], [16].

An university business incubator is a particular type of incubator because it has a purpose to bring together various stakeholders in order to offer a variety of services to the students who have potentially successful business ideas and help their start-ups to get established and evolve to the point where they can operate independently. To our knowledge, such type of business incubator in Macedonia has still not been established hence, in our effort to develop a suitable model of UBI we address the experiences from similar types of incubators in developed countries and use the best proven practices around the world.

The role played by universities consists of linking research, technology, capital and know-how to leverage entrepreneurial talent, accelerate development of new technology-based firms and speed up the commercialisation of technology [17]. The evidence from the developed countries shows that university link to the incubator reduces the probability of new venture failure [18]. In particular, the UBI should provide a number of support services for students business projects and assist them toward becoming sustainable business entities. The potentially successful business projects should pass through several phases starting with selection, tenancy, reviewing of graduation and eventually leaving the incubation process. The conceptual framework of the proposed model of UBI is presented in Figure 3.



**Figure 3** A model of University business incubator

From Figure 3 we can notice that our model of UBI generally consists of three building blocks namely, potential stakeholders, supporting services and phases of incubation. In what follows we separately analyse each of these elements.

#### **4.1 Potential stakeholders**

Alongside the universities as potential stakeholders in the university business incubator may appear the government authorities and private businesses. Therefore, in order to meet the interests of all potential stakeholders, we recommend that personnel should have mixed background ranging from academic, local government and business area. The management function should be delegated to a

director who is full time university professor and has considerable experience in the domain of business advising. In this context, UBI would help strengthen interactions between university and industry, promote research commercialisation, and give opportunities for university staff and students to better utilise their capabilities [19].

Particularly susceptible partner in this model of incubation are local government authorities that can contribute to the functioning of the UBI by providing a variety of services such as premises and other logistic support. In return, the benefits of a well-managed UBI for the government can be viewed in the fact that incubators help overcome market failures, promote regional development, generate jobs, incomes and taxes, and demonstrate political commitment to small businesses.

Private businesses may also cooperate with the business incubator in finding potential partners, engage in research-based technology, developing new products etc. In return, businesses can benefit from UBI by developing opportunities for acquiring innovations, supply chain management, and helping them meet their social responsibilities.

## **4.2 Supporting services**

According to experience from several successfully established UBI their main goals include providing variety of services such as office space, shared facilities, business consulting, access to capital, networking and, resources, so that the companies within the incubator learn how to develop and grow their business in order to be competitive in a market economy. Furthermore, the proposed model of UBI may allow two types of incubation i.e. physical and affiliate incubation. Students involved in full incubation would receive physical space, whereas affiliate businesses would receive all of the services except physical space. Students in the affiliate program may not be ready to occupy physical space in the incubator or the nature of the business may not warrant physical space.

Since, all beneficiaries of the UBI will be enrolled full time students, the university may gradually incorporate the UBI activities as an extracurricular programme. Once accepted into the UBI programme, students will be required to participate in variety of activities that we shortly describe. First, as part of the learning process, programme staff needs to be able to review the financials of the company with the student in order to assist in their growth and strategic planning. Second, students have to select and attend relevant seminars to his/her business offered by the university. If the student needs specific course which is not offered, it would be provided by outside consultants. Third, periodically all UBI tenants will meet to hear a guest speaker, network and discuss their ongoing business endeavours. Finally, each tenant will be required to meet with the UBI director individually according to a previously prepared schedule.

## **4.3 Phases of incubation**

Process of incubation consists of several phases starting from selection, tenancy, review of graduation and eventually exit from the incubation and starting post-incubation period. The phase of selection is one of the most sensible parts of the incubation process since it largely determines the outcomes of the incubation. In order to make correct selection decision, the process of selection should be done by a competent committee consisting of several experienced members. The applicants should have opportunity to apply on a regular basis once or twice a year, whereas the projects will be evaluated according to a number of indicators.

The period of incubation or tenancy should be limited to one year with or without possibility to be extended after the reviewing of graduation. As successful businesses will be classified those who demonstrate potential ability to operate in a market environment without supporting services from the UBI.

The assessment of the performance of business incubators has been stressed as a critical element to its success [20]. With an effective assessment the incubator may continually improve its functioning, attending and exceeding the expectancies of all the players involved in the process. For this purpose we propose a number of indicators for the assessment of UBI such as indicators of pre-incubation process, indicators of selection process, indicators of residence period, indicators of the graduate companies and indicators of the management of the incubator.

## 5. Conclusions and policy recommendations

From the previous analysis we can draw several concluding remarks that can be used as guiding principles for policy recommendations. First, the depressed characteristics of the Macedonian labour market impose needs for creation of global agenda for fighting high and persistent unemployment. Having in mind the pronounced labour market segmentation, the measures have to target mainly the disadvantaged labour market segments. Second, the reforms of the Macedonian higher education system have not been proven to have significant positive impact on the labour market performance. As a consequence, we stress the importance of undertaking a large scale empirical assessment of the reforms with purpose to identify the existing gaps. Third, the concept of university business incubator that so far has not been tackled in Macedonia may play crucial role in the reconciliation of the labour market policies that should be simultaneously undertaken on both demand and supply side. Having in mind that university business incubators as a target group have younger and educated population, they can be used as alternative strategy for creation new productive jobs and fighting youth unemployment.

As a suitable strategy we recommend launching a pilot project of university business incubator that can be utilised in assessment of strengths and weaknesses of the proposed model. In this context, the policy makers have to be aware of the modest entrepreneurial potential in post-transition countries and adequately to project the potential development scenarios. The potential effects from implementation of UBI can be divided into direct or short-term and indirect or long-term effects. Among the direct effects the most important are creation of new companies and jobs, increased generation of revenues from taxes, decrease of unemployment etc. On the other hand, the improvement of the business climate and creation of entrepreneurial spirit are most important spin-off effects that on the long run may exert positive influence on the Macedonian economy.

From this perspective, the adoption of the model of UBI as a standard in both state and private higher education institutions in Macedonia will have large positive impact on the Macedonian labour market performance in several manners. First, creation of new and sustainable businesses will absorb a part of the young and educated labour force that would otherwise remain unemployed. Since, the young and educated segment of the labour force marks a continuous growth, we hope in the near future to see at least substantial decrease of the unemployment rate for this segment of the labour market. Furthermore, increased budget revenues from taxes, if adequately utilised will improve the infrastructure and further exert positive impact on the investment climate. In this way, the economy would enter the so called 'virtuous circle' that reinforces itself through a feedback loop and has favourable results in terms of moving the Macedonian economy from the sub-optimal to an optimal equilibrium. Finally, increase in the awareness of self-employment opportunities will stimulate the entrepreneurial endeavours and induce creation of new jobs.

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# PPP experience in Macedonia

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According to the World Bank, in the period 1990-2001 year, the world invested about US\$754 billion annually for PPP projects. In 2009, 241 infrastructure projects (include primarily medium-size and large projects) with private participation reached financial or contractual closing in 42 low- and middle-income countries. These projects involved investment commitments of US\$83 billion. Studies from international financial institutions indicate that although the authorities provide various subsidies to the private investors, still there is restraint among investors to invest in developing countries, because involuntarily are accepting part of the commercial, financial and political risks. In such circumstances, central governments are developing special funds in order to provide reduced transaction costs, increased transparency and consistency in evaluation and allocation of public support. Here should be considered that the PPP as an option for increasing the quality of the services and range of people who use these services requires increased awareness of this instrument, first strengthening the partnership between central and local governments, and then between the public and private partners.

However, it is necessary for Macedonia to strengthen the legislation, not so much for the concessions as for the private finance initiatives, taking into consideration, how Macedonia is organized and what is the intergovernmental legal framework. At central level economy Macedonia has macroeconomic stability as public good that can be used as an argument for attracting investors and private partners. Financial capabilities of local governments are generally modest, and there can be considered establishment of a fund for investments in infrastructure who will not only provide funds but will assist as knowledge centre in the preparation of tenders and contracts for PPP.

This paper will give overview of the legislative and institutional set up of the PPP in Macedonia, the challenges and needs for PPP and the experience and lessons learned so far by analysing the few PFI attempts in Macedonia.

## Keywords

Public private partnership, public sector comparator, public services, risk management, value for money.

## 1. Introduction

According to Private participation in infrastructure – PPI database of the World Bank, while remaining strong, private activity in infrastructure declined and became more selective in 2009. Investment commitments to infrastructure projects with private participation in 2009 were at their third highest level, but most of the new activity was concentrated in projects of US\$1 billion or more and in a few countries. Brazil and India saw a strong growth in investment and they attracted half of the total investment in 2009. If Brazil and India are excluded, total PPI investment to developing countries would have fallen by 26% in 2009 compared with 2008.

In Macedonia, the Public Investment Programme – PIP 2009-2011 [1] consists of 90 ongoing investment projects. The total cost of these projects is estimated at 2,492 million EURO. A part of the costs, amounting to 533 million EURO has been executed by the end of 2008. The fulfilment of certain investment activities, estimated at 478 million EURO, will be shifted beyond 2011. It is said in the PIP

that the Government's imperative is to engage foreign investments primarily through concessions, donations, public private partnerships – PPP, direct and joint ventures. PPPs are mentioned in the main text of the PIP for projects in the following sectors: hydro power plants and road network construction. In the PIP there is also a priority list of PPP projects in the sectors of energy and health in amount of value of 381 million EURO.

In the Fiscal strategy 2010-2013 [2] PPP is mentioned in the context of the local self government-LSG: *"...a proper effect is expected from the initiative of the private sector in the public sector through the PPP as incentive to improvement of the local service quality and increase of the revenues"*. Center for economic analyses'-CEA study [3] on the role of LSG in economic development and macroeconomic stability from 2007 shows that only 7 out of 13 municipalities (at that time only 13 municipalities have had viable strategic plans to analyse) have defined medium-term capital expenditure framework with explicit estimates of their fiscal needs. Most projects are focused on improvement of the infrastructure, employment creation, agricultural and tourism development, support of local businesses and entrepreneurship, social inclusion activities.

The investment needs in Macedonia both at central and local level government are already confirmed not only by the World Bank PER documents [4] and domestic researchers [5] but with the anecdotal fact of lesser satisfaction with the public services quality by the citizens of Macedonia. The needs for investment are relatively high given the relatively low fiscal space at the central and LSG budgets and low domestic and foreign direct investments-FDIs in Macedonia. The donors are downsizing their engagement in Macedonia, the capacity to utilise the IPA is weak and it seem that the PPP can be the instrument to settle the often contradictory goals among the government, investors and consumers. This paper will not go into the definitions of the PPP or deeper into the needs of it instead will give an overview of the strategic institutional and legal set up needs so that Macedonia might attract more structured investors interested in PPP opportunities.

## 2. Legal and institutional set up of PPP in Macedonia

The concessions and the PPP concept were institutionalized in Macedonia with the Law on concessions and other types of PPP ("Official Gazette No. 7/08,139/08, 64/2009 and 52/10). There is a draft new law available at the Ministry of economy web site for almost 2 years (<http://www.economy.gov.mk/WBStorage/Files/Predlog%20zakon%20za%20JPP.pdf>) but not yet adopted by the Parliament.

The Law on concessions and other types of PPP regulates separately concessions from PPP and allows for institutional and contractual PPP. The state help is not allowed in PPP case. Institutionally the Law regulates establishing a PPP Council for: *"...efficient policy making of the Government in the area of PPP"*. The Council should prepare suggestions, opinions and initiatives that should be the base for preparing the Strategy for realization of PPP and concession projects in Macedonia.

Members of the Council are representatives from the central government and the local government and two experts of which one in law and the other in economy. The experience is that the Council was established but apart from the one meeting they had that I am aware of nothing else has been done so far. Its role is also blur and of less need the way it is prescribed in the law.

The strategy should be adopted by the Macedonian Parliament upon Government's proposal but not one has been prepared so far. There was one attempt for preparing PPP Strategy with a help from USAID [6] but it was not successfully ended by the Ministry of economy.

The new draft law has been prepared after thorough considerations from the Sigma project [7] especially lining it with the Law on procurement and introducing the appeal as a right for the private partners. The new draft law propose establishing a unit within the Ministry of economy which among other things should manage a PPP register for implemented PPP projects and record for started but not implemented PPP projects as well. The Ministry of finance will control the collection of the concessions. It is also prescribed that the public partner should ask for approval for the annual financial obligations that arise from the PPP contract from the Ministry of finance. Thus, the law is prepared by Ministry of economy but it seems that there is significant role of the Ministry of finance as well. Given the experience of coordination (in)efficiency in coordinating the economic sectors in Macedonia this set up of PPP responsibility is challenging for Macedonian PPP law.

As a result of the draft law it is expected the following by laws to be adopted: elements and contents of the PPP feasibility study, the content of the PPP contracts, the framework and content of the registry and proper reports for PPP.

### 3. PPP implementation and challenges in Macedonia

There are challenges to PPP implementation in Macedonia. Sigma project [7] emphasises the lack of understanding and expertise in project financing, which is an essential requirement for many PPP structures and that public bodies in Macedonia do not have the expertise to negotiate a PPP project.

The EBRD report [8] is ranking Macedonia in the middle, with medium compliance of the Law on concessions and other types of PPP compared with the international concession standards and principles.

When considering the PPP effectiveness in Macedonia we must take into account the fact of lower than potential economic growth, slow transition to efficient market economy, relatively high poverty and unemployment rate in Macedonia. Given this set up, there are few questions we should at least discuss:

- Is there political will and champions for implementing PPP in Macedonia?
- Does Macedonia have needs assessment at local and central level as a precondition to discuss PPP or it is just pushed forward as a latest political toy?
- Do we have the right legislation and by laws at place?
- Are the projects commercially attractive to financial institutions and commercially attractive to private partners and are they affordable to the public partner?

Discussion follows upon these questions.

As for the political will and champions we cannot identify neither will nor a champion that can foresee the strategic importance and ask for system approach to make the ambient for PPP in Macedonia more transparent. There are few examples from our experience. First are the often questionable initiatives of public partner to go for/initiate PPP without proper feasibility study stating that the PPP study is just unnecessarily expense? This of course is because of the lack of knowledge and awareness of what PPP is exactly and that PPP requires trust and real partnership between partners, sharing risks and proper expertise to allocate risks, circle the financial structure and foreseeing all the aspects systematically in the contract. At all the times PPP has been seen in Macedonia as a “pocket bank’ where the public sector can take money from the private partner so that the public sector can continue to work as usual and more, stigmatizing the private partner if searching for profit. Another example is when the private partner does not receive the PPP compensation from the public partner on time as agreed and by that not only not complying with the contract but also creating liquidity problems for the private partner. The private partner, in order to attract attention to the public partner, stops delivering the service and the public partner treats to raise formal charges against the private partner. This of course, is not best practice of PPP in Macedonia. Recommendation here is that there is a need for one minister at the government to lead an all encompassing system for PPP implementation starting first with training on what PPP is for decision makers. The public sector in Macedonia, both administration and politicians should know that PPP is not and cannot be used by politicians to transfer liquidity problems of public sector to private sector. This will ruin the credibility of the country and will detract potential investors both domestic and foreign.

On the question if Macedonia has central and local level intergovernmental relations for introducing smooth PPPs the experience is not so good. The decentralization in Macedonia is more of a deconcentration than devolution type. For example, if a municipality wants to go for a PPP say for kindergarten, the municipality can use in theory the block transfers from the central government for child protection for its best use. The risk arise because if the public partner pledge the block transfer to the private partner in order to achieve value for money the private partner cannot employ people in the newly kindergarten as it must wait for Ministry of finance’s approval for those new employees and also, if it is privately run it is under risk that this kindergarten will not be considered in the fiscal plans for block transfers for the next fiscal year. In that way the quasi devolution of the fiscal decentralization creates such risks that makes risky and/or practically impossible to exercise PPP at local level for “decentralized” competencies such as education and child care in Macedonia.

Next issue is if there is really a proper needs assessment at central and local level for infrastructure projects in order to make pre-feasibility PPP assessment as of what project are affordable and what projects provide good value for money so that it can be considered as PPP projects. One modest attempt is made with the PIP (even though not transparent and without knowing under what criteria or analysis the list of priority PPP projects are selected in the PIP) but at local level the author is not aware of systemic analysis of strategic plans of municipalities in direction of identification of what projects can be considered as PPP projects. Recommendation here is again for the top decision makers to identify one champion for PPP that can drive the necessarily reforms especially for

decentralization and proper needs assessment for PPP. Maybe to make the PPP identification a part of the budget process both at local and central level government i.e. part of the preparation of PIP could be a good start.

As for the legislation and institutional aspect of PPP we are still waiting for the new law, the council is not operational, the registry does not exist, there is no strategy adopted etc. Next I will discuss one important strategic issue about how PPP national unit should be organized: one unit or in nodes. As it is envisaged in Macedonia the idea is to have one unit at Ministry of economy (with significant involvement of the Ministry of finance). In the next table I give overview of the pros and cons as if it can be organized as nodes or as one national unit.

**Table 1** Pros and cons for establishing a national PPP unit versus PPP departments (called “nodes” or “cells”).

PPP unit	PROS	CONS
<b>Nodes/Cells at ministries and LSGs</b>	<p>It can provide more efficiency through existing specialization and sector knowledge</p> <p>Can easier identify, prepare and offer sector PPP projects to investors.</p> <p>Can easier work with Project development facilities-PDF</p>	<p>Usually keeps important information to itself until it is too late</p> <p>Not good for “approval activities”</p> <p>No formal network with other nodes/cells</p> <p>Not good for functional development (technical, legal, procurement)</p> <p>Not good for standards, manuals</p>
<b>National at Ministry of economy</b>	<p>Private developers work best when they can negotiate with one single governmental committee or representative group, rather than having to pursue completely separate negotiations.</p> <p>Infrastructure project financing can be politically controversial; a high level of political leadership and clout is usually needed to head the government’s steering committee. Placing existing infrastructure line ministries in charge of this process themselves is a conflict-of-interest that can result in projects failing to be completed or implemented.</p> <p>Project financings involve a different kind of evaluation of government risk exposure (over the entire term of the project), and as such our Government can get the best results when we can retain experienced outside line ministries PPP government specialists to help them with the large and specialized tasks of analyzing, structuring, tendering, negotiating, and contracting for project financings.</p> <p>PPP don’t require sovereign guarantee and they appear more “affordable” to the line ministries. Ministry of finance can more efficiently monitor and calculate the affordability of government PPP payments to the private sector thus, it can provide consistent management and monitoring of the PPPs and keep the macroeconomic stability</p> <p>Can easier make needs assessment for training, research and analysis of the PPP status in the country.</p>	<p>Doesn’t have the sector knowledge</p> <p>Can be too administrative and bureaucratic in a fiscal devolution set-up</p> <p>More expensive PPP-knowledge archiving</p> <p>More difficult to measure the key part of its performance on the actual PPP transactions completed, not just on promotional and capacity-building activities. Line ministries can do it better</p> <p>Not good for ‘promotional activities”</p> <p>Not good for sectoral development (energy, roads)</p> <p>Look only on the budget and not on the long run development</p>

At this moment it is difficult to give clear cut recommendation on what is proper for Macedonia. The criteria to make a choice can be if we have more information and proper analysis about the level of knowledge in PPP in the country, the commitment of the decision makers, the needs assessment of the infrastructure and services needs assessment, the government priorities, political will etc.

Next important issue is the financial aspect and establishment of so-called project development facilities-PDF. Usually PPP requires well prepared PPP pre and feasibility studies that on the other side require knowledge in project finance, PPP finance structures, sectoral knowledge, tender and

contract preparations etc. At the moment in Macedonia there is no PDF for PPP. Having PDF requires a clear commitment and seriousness about implementing PPP at higher scale in Macedonia. Such a PDF can work as a knowledge centre as well and giving trainings, paying and matching costs for studies and research in PPP etc. So far, the municipalities are paying out of own budgets and/or with donor help PPP studies but this is incidental and there is no track record from the central government or the association of LSG – ZELS about the PPP initiatives, contracts, on-going projects, projects stopped etc. The central government on the other side also pays out of the budget or through IFIs feasibility studies.

Last but not least is the political acceptability of PPP given the level of poverty and unemployment in Macedonia and especially the bad experience with the privatization we had. In that regards what can be done in Macedonia at least is: Clear pro-poor targets for the private partners, proper pro-poor tariff systems if needed, PPP linked to performance output, credible, transparent, independent, experienced and knowledgeable regulatory agency for regulated sectors. Also, proper risk allocation might bring good value for money (risk adjusted Public Sector Comparators-PSC) that can be used to mitigate adverse effects of poverty.

### 3. Conclusions

The need for modern infrastructure and better services is evident in Macedonia. The lack of proper fiscal space both at central and local level budgets makes the PPP an opportunity to meet the citizen's needs for better services and value for money for the taxpayers money. On the other side there is a risk in going for PPPs if there is a general lack of political will and proper legislation at place. In Macedonia few issues should be considered. First, it is not enough to have proper law (which by the way Macedonia do not have) if there is lack of awareness and knowledge of what PPP is and if there is a lack of accountability from the central and local governments and lack of performance culture at the public administration. Then, there is a need for knowledge centre that will be immune of political appointees and that can help in preparation of tenders, studies, researches, contracts and training materials for PPP. The mixed competencies between Ministry of economy and Ministry of finance in the area of PPP especially when there is a lack of proper law and by-laws creates additional risks especially given that PPP is off-budget category that can create macroeconomic risks.

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# Innovative Entrepreneurship – basis for getting involved in the globalization and regionalization processes

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The economy of the Republic of Macedonia, if it persists in remaining competitive, needs to rely on the competences of its entrepreneurs, i.e. the small and medium enterprises. When describing an entrepreneur, the most commonly used characteristic is the readiness to undertake risk with a desire to make profit. However, the basic characteristic of the entrepreneur and entrepreneurship in general, is the innovativeness and readiness to apply innovations. The application of innovations enables the entrepreneur to offer something new on the market, be competitive and increase his market share. In this context, innovative entrepreneurship is central in the market oriented economies. Numerous examples of technological and economic transformation in the world confirm the big role of the entrepreneur, his creativity, determination and persistence.

The paper will also review the activities of the Agency for Entrepreneurship Support of the Republic of Macedonia, directly connected to the relevant subject.

## Keywords

Competitiveness, strategy, human resource, small enterprises, training

## 1. Introduction

The openness towards the world market and the inclusion in the globalization processes and regionalization is certainly the road towards economic development of a small country like the Republic of Macedonia. Today, technology erases economic boundaries, thus nations, if they insist on remaining competitive, have to rely on the dynamics and ability of their entrepreneurs. In spite of the fact that multinational companies used to play the key role in economic growth and development, today small and medium enterprises (SMEs) are becoming ever more so significant in all industrial economies.

The most frequent feature used to describe an entrepreneur is the readiness to undertake risk in order to make profit. However, the thorough analysis of the entrepreneur, and/or entrepreneurship, points to innovativeness and readiness to accept innovation in the broadest sense of the word. Innovativeness enables the entrepreneur to offer something new or better and:

- Be competitive,
- Extend the market,
- Be a step forward compared to others.

Thus, the entrepreneur is a person who, by applying innovation on the market and by accepting the business challenge makes an attempt to make profit. We say “makes an attempt to make profit” because the absence of profit does not mean that someone is not an entrepreneur. There are a large number of successful people who did not make their dream come true in their first attempt.

Joseph Alois Schumpeter, a representative of the Austrian school, has placed the entrepreneur in the centre of economic development and considers the entrepreneur to be the force causing that development. In his theory of creative destruction, the innovative entrepreneur is the main cause of the market imbalance. In contrast to this theory, the neoclassical theory understands a systematic activity on the market, i.e. the sellers and buyers by adapting to the supply and demand react to the

change of prices and in this way establish the market balance. The latter is called by Schumpeter a "circle flow process" where the entrepreneur is unnecessary because economic life goes on always in the same way.

It is with the entrepreneur that development takes place, which practically means disruption of the circle flow. According to Schumpeter's theory, the entrepreneur brings innovation to the existing markets which destroys them by creating new demand. Development includes introducing innovation which Schumpeter considers the same as new combinations of production sources:

- Introducing new doctrines,
- Introducing new production methods,
- Opening new markets,
- Conquering new markets for raw material supply or semi products,
- Introducing new organization.

The entrepreneur is the person introducing new combinations, i.e. he/she is the one with the innovative role.

## 2. Innovation and company growth

In contrast to the importance of innovation, small enterprises have a rather limited possibility for their implementation and even smaller possibility to invest in the necessary research which precedes them. In this sense, this inability needs to be compensated for by public institutions and organizations for supporting businesses. On the other hand, small enterprises do not have information and knowledge on the research which is being done by the academy, universities, faculties and institutes. This gap must also be overcome by the public institutions. In this sense, the Agency for Promotion of Entrepreneurship of Republic of Macedonia (APERM), being one of the leading institutions at local level, provides this information to their end users through a network of local and regional centers, company incubators and other business support organizations.

Enterprise development as a long or short term process, is primarily a necessary and indispensable response to the changes which take place daily in the company's surrounding. If there is no adequate response to the market change, or there is no response for a certain period, possible negative implication for the company will occur, which may result into the need of serious efforts.

Each enterprise has its own life cycle. Depending on the stage of the life cycle, adequate interventions are necessary, i.e. elements of suitable restructuring which will result into suitable development. The practice points to the following:

- Small company managers most often decide to design and implement their own business development plan,
- The relevant decisions for achieving the planned development are most often based on insufficiently valid data and information.

Within the given information one should also have in mind that the institutional network for SME development is in the process of continuous capacity improvement and increase. In these conditions, one can say that in many cases the entrepreneurs' behavior to approach the establishment and development of their businesses on their own is acceptable. On the other hand, the entities included in this institutional network accept the challenge of permanent training and education in order to achieve a higher level of skills in providing quality services. The latter needs to be positively accepted due to the fact that each of these institutions are also in the stage of their own development in line with their clients' requirements and the market demand. What needs to be achieved in the upcoming period is higher level of transparency of information for the various opportunities offered by these institutions. This is more so because it is recently the case that entrepreneurs do not know how and where to find certain information.

The business support offered by the AESRM in their work so far provided for the possibility of successful SMEs development in the state. By supporting SMEs development, APERM contributes to the improvement of the overall social and economic environment in the Republic of Macedonia.

**Innovative enterprises** is one of the latest trends in Europe. It means that innovative approach is used in the management and leadership in order to achieve better results, both regarding profit and human resource relationships. According to Peter Drucker "innovativeness is an economic and social category rather than a technical term". German economists J.H.Pichler, J.H.Pleitner, K.H.Schmidt, point to the fact that "innovativeness includes all improvements, enhancements and novelties in the processes and works in general which result into a concrete economic and social benefit."

It can be concluded that innovations are in the essence of the entrepreneurial process and are defined as being the main changes aimed at:

- Improving competitiveness and
- Enhancing the ability or know-how for further development.

The following stages are distinguished from innovation idea to its commercialization:

- Innovation idea,
- Concept,
- Product/process elaboration,
- Pilot product/process
- Idea-innovation marketing or commercialization.

Without the last stage (implementation/commercialization) we cannot speak of innovation.

While going from one to another stage (transfer point), there is threat of ceasing or impeding the process due to:

- Understanding the idea,
- Lack of adequate concept,
- Lack of adequate knowledge, methods and other capacities for initiating and successful end of the pilot stage, and
- Failures in the designed promotion and marketing activities.

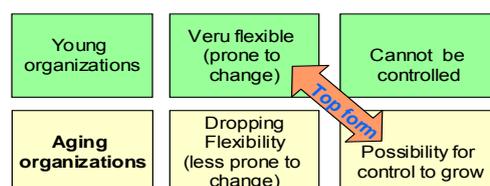
The following obstacles for introducing innovation may be accompanied by others, but these will be the main ones:

- Emotional impediments,
- Cultural impediments,
- Environmental impediments, and
- Impediments regarding the individual's ability to manage the process of implementing the innovative idea.

In conditions of overall globalization, the product life cycle is continuously shortened. On the other hand, there is a need for permanent innovation – improvement in every stage of the company life cycle. This is exactly why only companies with innovative staff and creative culture will survive. This particularly refers to the stages of company development, i.e. its management and fitness, a stage in which the company, if managed successfully, may stay for a long time.

Numerous young organizations, including those which are in the aging stage, have the following in common:

- Flexibility, i.e. inclination towards change, and
- (in)ability to control the organization.



**Figure 1** Flexibility and control with growth and aging

Young organizations are characterized with high flexibility (prone to change) and inability to control. Aging organizations are characterized with low tendency towards change (with falling flexibility) and growing control. The achievement of top form is practically a combination of the mentioned typical features. This is a permanent challenge of any managerial or management structure.

When the company growth and development, i.e. competitiveness, are discussed, the following elements are very important:

- Research and development (know-how design),
- Innovation (know-how implementation, i.e. commercialization).

Unfortunately, the companies in the Republic of Macedonia tend to believe that resources devoted to research and development (R&D) are considered to be a waste. These funds are never treated as investment or anything that would improve the business in the future.

### **3. Agency for Entrepreneurship Support (AES)**

AES is a state agency and important institution at national level for the implementation and coordination of domestic and international support for the small economy sector.

In the following text I am going to highlight some of its priorities in the period 2004 – 2010:

- Self-employment support, a project by the government of the Republic of Macedonia: Credited self-employment and grant self-employment,
- Expert assistance in the transfer of new technology, know-how and resolving difficulties in small and medium size enterprises in their operations,
- Incentives for counseling and assistance through a voucher program for giving advice to unemployed people and small active enterprises,
- Information services for entrepreneurs from “info point“ organizations for business support,
- Raising SME awareness of the value of introducing quality standards.

#### **3.1 GTZ – technology transfer**

The aim of this project was to provide expert assistance in the implementation of the transfer of technology and know-how and resolving challenges in 10 small enterprises in the following production areas: rubber production, furniture, food, chemical products, construction, and machinery and equipment production.

#### **3.2 SME support – project of the European Agency for Reconstruction (EAR)**

This project helped over 100 mainly small companies with domestic and international experts and trainers to implement know-how in certain production conditions. The results were multiple, not only for the beneficiaries, but also for the experts and the public sector, i.e. the institutions which were involved in the process of supporting entrepreneurship in general.

#### **3.3 European Information and Innovation Centre in Macedonia (EIICM)**

The government of the Republic of Macedonia is permanently proposing a large number of activities to help small and medium size enterprises in their operations and in this respect is implementing a large number of projects and measures to enhance the business environment. One of the projects related to SMEs is the support for the one-stop shop system for small and medium size enterprises – the European Information and Innovation Centre in Macedonia (EIICM).

EIICM was established in 2008 as part of the Enterprise Europe Network. The Macedonian small and medium size enterprises were thus provided with the opportunity to network and achieve cooperation with over 400,000 enterprises in EU and companies from other non EU member states which are included in this network. The objective of the project was to enhance SMEs' competitiveness and innovativeness, increase access to information on doing business and improve their technological level. Since the network, in addition to enterprises, also includes scientific and research institutions, a large number of applied scientific and research projects will be implemented, which is beneficial not only for the SMEs, but also for the academic and research potentials of the Republic of Macedonia.

EIICM is a key instrument for the implementation of numerous projects related to competitiveness and innovativeness not only in the domain of SMEs, but elsewhere too. This Centre is directly linked to the European Commission, and provides for the opportunity to implement a lot of joint programs and projects. Enterprise Europe Network, is also a key tool for the implementation of the Competitiveness and Innovation Framework Program (CIP) of the European Union.

The project in the Republic of Macedonia is managed by a Project Consortium composed of four partners, one of them being the APERM. The following is a presentation of the activities related to the transfer of know-how, technology, innovations and research and development:

- Promotion of programs and funds for funding innovation;

- SMEs support for finding/offering an innovative technology through: profiling (profiles placed in the internal base of the network), company missions, multilateral broker meetings, fair exhibitions etc.,
- Support for other target groups (academies, scientific and research centers, large companies, innovators) to find partners for joint projects for innovative development;
- Conducting technology audits of SMEs, innovation management training, intellectually property rights;
- Cooperation with other organizations for innovation in the state, and support for young companies through product development training, innovation management etc.;
- Information for SMEs about EU programs for research and development (FP7 program);
- Stimulation for SMEs to take part in the research and development programs by distributing calls for project proposals, project proposal design training and support in finding potential partners for EU programs through the Net.

## 4. Conclusions

It is indisputable that the SMEs sector is one of the main pillars in the economy of any country. The SME and entrepreneurship development in the Republic of Macedonia is accompanied with all challenges, problems and directions of movement as part of a global and long-term strategy. Within these processes the Agency for Entrepreneurship Support has established a position in the past period which is becoming stronger and is recognized both in the Republic of Macedonia and abroad. On the other hand, entrepreneurs and SMEs' needs are sizeable and require a high level of professional approach in providing various types of support for their development. In this respect, it is necessary that the APERM is in the future more involved in increasing opportunities for entities to enhance their participation in the network already established.

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# Innovation support framework for SMEs in Serbia

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Recent EU effort in building a knowledge-based society revealed problems connected with the utilization of R&D results within production facilities. Unwillingness of researchers to work closely with production facilities, and SME's lack of resources to track technological development were two main causes of this situation. Answer, which provided a good solution to the problem, was the establishment of Innovation Relay Centers. The mission of the IRCs is to support innovation and transnational technological co-operation in Europe with a range of specialised business support services. The initiative was successful and soon spread among more than 33 countries. Enterprise Europe Network (EEN) was developed as the integrating framework that incorporates all local initiatives and provides unified gateway to all required information.

The paper illustrates innovation support framework for SMEs in Serbia. The first phase of framework's development was the formation of the IRC Serbia, through gathering of interested domestic partners around Innovation Centre of Faculty of Mechanical Engineering (ICMF) along with signing of Consortium Agreement with chosen partners. The second phase was development of EEN-Serbia by formation of the Consortium, successful submission of the project proposal (ref. ENT/CIP/07/0001a), followed by signing of the Contract with EU Commission. Today activities of IRC Serbia and EEN-Serbia are coordinated. The IRC Serbia has developed and maintains Content Management System that provides all necessary services for EEN-Serbia Web portal. The EEN-Serbia continually disseminates information, raises awareness among SMEs, and organizes meetings among interested parties. Their joint efforts resulted in the growing presence of Serbian firms on relevant fairs, matchmaking events, and online partner search databases.

## Keywords

Innovation, networking, IRC Serbia, EEN-Serbia

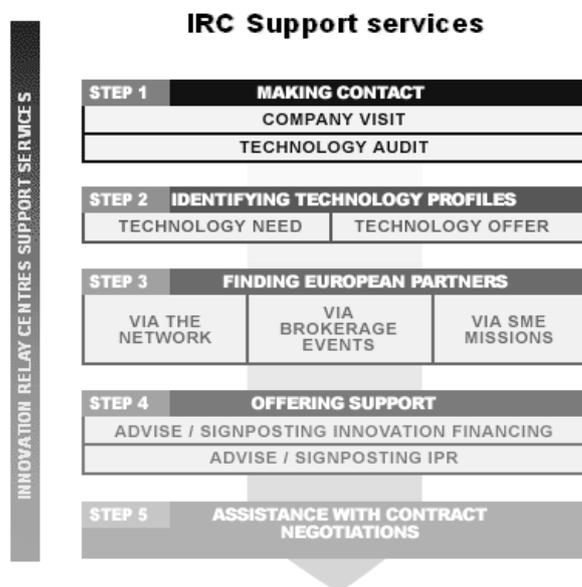
## 1. Introduction

Division onto so called "white" and "blue" collars was very well noticed within industrially developed countries. Studies conducted to investigate reasons for that dichotomy demonstrated that the major obstacle lies in the decreased flow of scientific and technical achievements from R&D institutions into the production, due to the unwillingness of researchers to work closely and/or within the production facilities themselves [1]. Answer, which provided a good solution to the problem, was the establishment of Innovation Relay Centres (IRC) [2].

The mission of the IRCs is to support innovation and transnational technological co-operation in Europe with a range of specialised business support services. IRC services are primarily targeted at technology-oriented small and medium-sized enterprises (SMEs), but are also available to large companies, research institutes, universities, technology centres and innovation agencies. The first Innovation Relay Centres were established in 1995 with the support of the European Commission. The aim was to create a pan-European platform to stimulate transnational technology transfer and

promote innovation services. Today, 71 regional IRCs span 33 countries with 240 partner organisations and 1200 consultants.

Methodology of IRCs work is depicted in Figure 1, with the main forms being Technology Offer (TO) and Technology Transfer (TT), which, after preparing, are being posted and exchanged between the network members.



**Figure 1** Methodology of IRCs work

Formation of EU, made apparent other issues concerning new legislative, establishment of cooperation, new markets and regulations linked with them, financial instruments and their availability, etc. Generally, information considering new and ever changing business environment were needed. This implies especially to SMEs, which represent 99% of all legal persons in EU, generating 47% of the income. The answer was founded in creation of Europe Information Centres (EICs). Still, both networks have showed certain shortcomings. Mainly, there was no one place to get all of the needed information and support, again predominantly needed by SMEs.

Through combination of these two networks, along with added value for the clients, with the utilization of “no wrong door” concept, a new network (Enterprise Europe Network-EEN), providing full range of the services to its clients, arose. Today, this network is constituted by more than 580 member organisations across the EU and beyond, whose role is to provide full support to the clients, dominantly SMEs.

## 2. Framework development in Serbia

The realization of the activities started with the preparation of National Strategy of Innovations and the project “Feasibility study for the founding of scientific-technological parks in Serbia”, no. TR-7026A financed by the Ministry of Science and Environmental Protection. Through these activities following issues were identified:

- Building of infrastructure for innovations in Serbia is at the very beginning, and there is small number of organizations within it: few incubators and scientific-technological parks (NTPs), with constituted Business-Technology Incubator of Technical Faculties of Belgrade University.
- Restructuring of Serbian economy along with the transition towards market economy implies the necessity of more innovative oriented company behaviour. Lack of knowledge on available technologies, as well as the knowledge on mechanisms for market realization of own technologies, is present.
- Lack of knowledge on how innovative system in of one economy functions, along with its mechanisms is widely spread. Non existence of appropriate infrastructure with the role of

supporting the innovative system and its functioning is one of the major constraints in further development.

- Especially difficult situation is within the sector of SMEs, which do not possess personal, material and financial resources to develop and/or obtain the technologies needed for further improvements.

These reasons created a need for the implementation of proven solutions, which led to the innovation project "Development of the infrastructure for Innovation Relay Centre in Serbia". Project's success led to the second project "Support of the innovation society development process in Serbia by capacity enhancement of the IRC Serbia." Both projects were financed by Ministry of Science and Technological Development - Republic of Serbia.

Creation of infrastructure for offer and demand of technologies and innovations is an important segment of innovation infrastructure and way of promotion of the culture of entrepreneurship and innovation activities within the Serbia's society and economy. It is a constitutive part of realization of the National strategy of building of national innovative system. Formation of IRC Serbia initiated gathering around Innovation Centre of Faculty of Mechanical Engineering (ICMF) of interested domestic partners, along with signing of Consortium Agreement with chosen partners. The project enabled following results:

- Creation of data bases on national innovative resources and results of innovation work
- Promotion and offering of technological solutions and innovations of domestic R&D institutions and individuals, in Serbia and abroad – through the IRC network in EU
- Infrastructural support to technological development of SMEs within the process of choosing the necessary technologies for their field of engagement
- Promotion of their own technological solutions and innovations, on domestic and foreign markets through the IRC network in EU.

Through the realization of the project, the following was and is being set up:

- Part of the missing infrastructure within the economy of Serbia
- Process of learning and knowledge transfer on innovation activities in the economy of Serbia
- Mechanisms for providing help to SMEs in the organization of their technological development

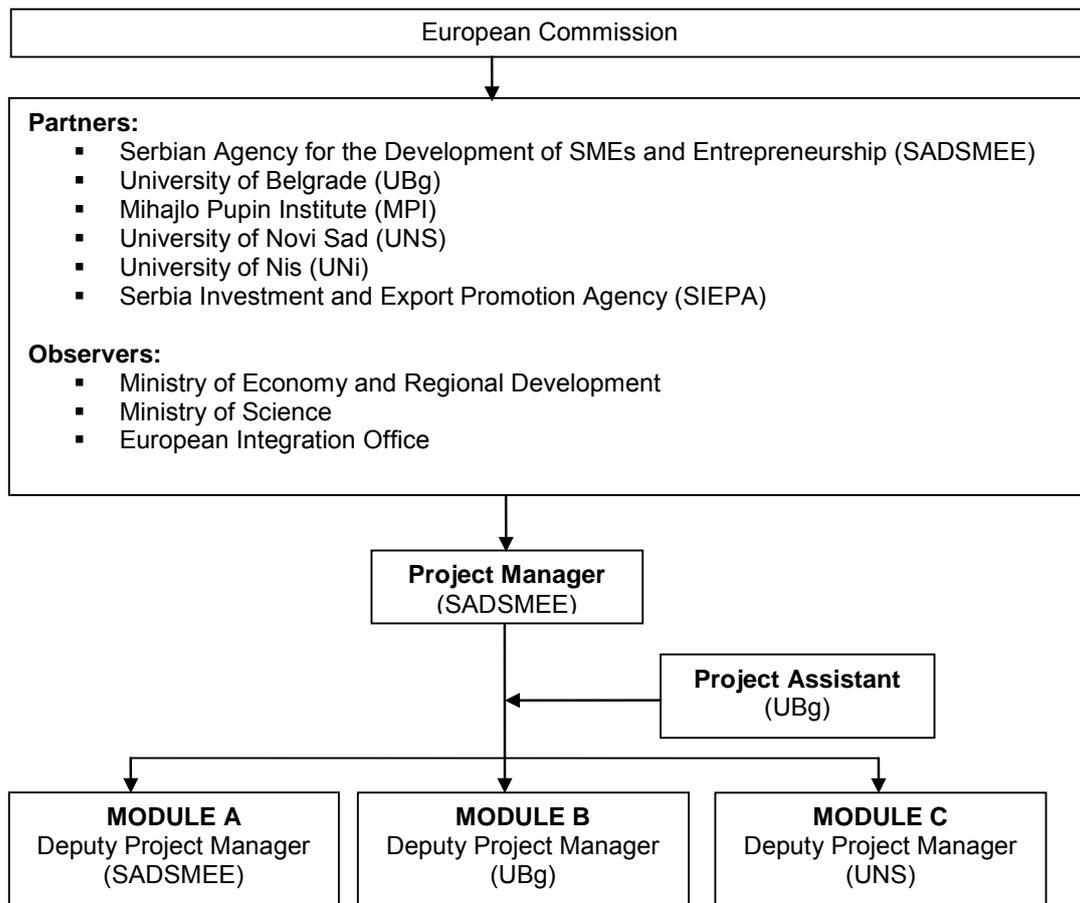
Successful implementation of the IRC Serbia enabled formation of the EEN-Serbia. After formation of the Consortium, and successful submission of the project proposal (ref. ENT/CIP/07/0001a), followed by signing of the Contract with EU Commission, formation of EEN-Serbia, began. Macro organizational structure of the project is depicted on Figure 2. The work, itself, is divided into three modules (A, B and C). Generally speaking, Module A represents information dissemination (area of the EICs network), and the load it carries is approximately 47%; Module B represents technology transfer (area of IRCs) enriched with the business cooperation and carries approximately 47% of the engagement; while Module C represents offer of support to clients in connection with EU programmes, such as FP and CIP, and present approximately 6% of the total project engagement.

The main project objective is establishment of integrated services in support of business and innovation for SMEs in Serbia, as the main client, in order to help them increase their competitiveness on EU and domestic market, and the enhanced information access considering EU and domestic RTD possibilities. Specific objectives are:

- Raise awareness about technology transfer opportunities and increase competitiveness
- Raise awareness among SMEs regarding Community policies and opportunities
- Participate in the creation of the Europe-wide network of excellence

Special emphasis is on:

- Support to the female and young entrepreneurs
- Stronger regional cooperation in Western Balkans
- More uniformed regional development across Serbia
- Promotion of innovation culture through the SMEs
- Building capacity for applied R&D, innovation and technology transfer



**Figure 2** Starting macro organizational structure for the project realization

Since the official start of the project in Serbia, January 01, 2009, activities of the Consortium vent into two directions. First direction was defining of the micro organizational structure and defining of the work methodologies and procedures and their bringing into accord with EU Commission. Parallel with this, endeavours to promote the network were undertaken. Such actions were comprised of printing of the promotional material, participation on TV and radio shows, publishing of articles, etc. Second direction was the work with clients, either through direct approach for promotional purposes, or through particular services, such as: providing the information on EU directives, recommendations and regulations, presentation on possibilities provided by EU market, and markets of other countries included into the Project, presentation on possibilities for business cooperation establishment, providing information on the programs and funds available to SMEs, creation and posting of technology and business request and offer profiles. In January 2011, the list of EEN-Serbia partners is enlarged with the Serbian Chamber of Commerce.

The ICMF developed Web content management system that is used to operate EEN-Serbia Website [3]. The site regularly provides information on upcoming events, innovations, and R&D news. The site also maintains internal database of domestic SMEs interesting in collaboration, and keeps their portfolio.

The EEN-Serbia continually disseminates information, raises awareness among SMEs, and organizes meetings among interested parties. Their joint efforts resulted in the growing presence of Serbian firms on relevant fairs, matchmaking events, and online partner search databases.

### 3. Gained experience

The innovation system is the concept that fits needs of the developed economies [4]. When facing markets emerging from centrally planned economies the concept faces many obstacles. Innovation is mainly a bottom-up process [5], and actors in those markets expect top-down directed business approach. That way they often confuse activities of IRC and EEN network with supposed controlled

business approach and consequently they underestimate need to develop their own innovation capabilities. Both innovation projects conducted so far and regular EEN-Serbia activity solved many problems arising from the implementation of innovation strategy in Serbia, but also they generated new questions.

The first innovation project implemented core of the future innovation infrastructure in Serbia, and created following questions:

- The need to expand the number of clients
- Unsatisfactory awareness on the need and advantages of using the newly developed innovation infrastructure, and accompanying networking mechanism.
- The lack of information on the possibilities to find relevant business partners and to develop cooperation with interested parties.
- General ignorance of the opportunity of acquiring EU funds.
- Insufficient knowledge of the mechanisms of the establishment and realisation of the cooperation, with significant legal implications.
- Lack of ability for real-time information monitoring.
- Inhibition from the appearance on the foreign technical-technological and economical arena and lack of realistic self positioning.
- Absence of tendency and practice of grouping and/or common appearance on the market in the legal sense.

The second innovation project provided mechanisms for coping with above mentioned problems and revealed new questions that will be addressed in the future:

- Association with value-added partners based on the projected compatibility and self positioning.
- Commitment to single innovators and persons.
- Application and adherence to the HSE (Health Safety Environment) concept.
- Intellectual property protection
- Technology audit

### 3. Conclusions

Despite that innovation system is established concept with worldwide implementation the literature on innovation studies is still struggling to understand the linkages between innovation networks, the performance of the firms that participate in these networks, and all relevant variables [6]. Based on our experience on developing innovation framework in Serbia it is evident that any particular solution does not lead to complete elimination of the related problem, but only defines successful mechanism that provides answers to the needs of the existing interesting groups, i.e. it provides established instrument to cope with the needs of relevant target group.

These results are consistent with the nature of the innovation process that strives for continual development and improvement, and it is evident that both related framework and accepted methods should follow same strain of continued enhancement to provide relevant support for all interesting parties.

### 4. Acknowledgments

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# Composite Index for measuring level of introduction of an Integrated Product Policy in countries under certain circumstances

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**Integrated Product Policy (IPP) is an approach which seeks to reduce the life cycle environmental impacts of products from the mining of raw materials to production, distribution, use, and waste management. IPP focuses on those decision points which strongly influence the life cycle environmental impacts of products and which offer potential for improvement, notably eco-design of products, informed consumer choice, the polluter pays principle in product prices. It also promotes instruments and tools which target the whole life cycle of products.**

**The aim of this paper is to propose methodology for developing of Composite Index for measuring level of introduction of an Integrated Product Policy in countries under certain circumstances,**

**Composite index is developed as a mix of pressure and response indicators derived from available data combined with the set of proposed IPP indicators from the literature. Special response indicator for countries under certain circumstances is proposed, as a sum of the levels of transposition of relevant IPP related directives into legal system.**

**Composite index aims in measuring, monitoring, analyzing and comparison of the level of introduction of an IPP policies in countries.**

## **Keywords:**

Integrated Product Policy (IPP), indicators for IPP

## **1. Introduction**

Integrated Product Policy (IPP) is an approach which seeks to reduce the life cycle environmental impacts of products from the mining of raw materials to production, distribution, use, and waste management [1 to 7]. The driving idea is that integration of environmental impacts at each stage of the life cycle of the product is essential and should be reflected in decisions of stakeholders. Strategic documents adopted on the EU level regarding IPP are several [8 to 11].

IPP focuses on those decision points which strongly influence the life cycle environmental impacts of products and which offer potential for improvement [16,17,18], notably eco-design of products, informed consumer choice, the polluter pays principle in product prices [23,24,25]. It also promotes instruments and tools which target the whole life cycle of products.

In this article countries under certain circumstances refers to the countries with status candidate countries for full membership into EU, which has to transpose all relevant EU legislation into their national legal system on one hand but they have very limited data and no system for systematically collecting of data at the other hand. Some interim approach for measuring the level of introduction of an Integrated Product Policy was proposed combining available data and selection of the proposed indicators for IPP in the literature. The weigh for each area was chosen as an equal (0,25). Scoring

was proposed based on deviation from the set values of proposed variables. Margins of tolerance for scoring were proposed based on the deviation from the EU levels for proposed variables.

## 2. The IPP Approach

The IPP approach [3,6], which has been developed gradually over the last decade, is now generally recognised as being a potentially very effective way to address the environmental dimension of products. This approach is based on five key principles:

1. Life-Cycle Thinking – it considers a product's life-cycle and aims for a reduction of its cumulative environmental impacts - from the "cradle to the grave". In so doing it also aims to prevent individual parts of the life-cycle from being addressed in a way that just results in the environmental burden being shifted to another part. By looking at the whole of a product's life-cycle in an integrated way, IPP also promotes policy coherence. It encourages measures to reduce environmental impacts at the point in the life-cycle where they are likely to be most effective in reducing environmental impact and saving costs for business and society.
2. Working with the market – setting incentives so that the market moves in a more sustainable direction by encouraging the supply and demand of greener products. This will reward those companies that are innovative, forward-thinking and committed to sustainable development.
3. Stakeholder Involvement – it aims to encourage all those who come into contact with the product (i.e. industry, consumers and government) to act on their sphere of influence and to encourage co-operation between the different stakeholders. Industry can look at how to better integrate environmental aspects in the design of products while consumers can assess how they can purchase greener products and how they can better use and dispose of them. Governments can set the economic and legal framework conditions for entire national economies and also act directly on markets, for instance by purchasing greener products.
4. Continuous Improvement – improvements can often be made to decrease a product's environmental impacts across its life-cycle, whether in design, manufacture, use or disposal, taking into account the parameters set by the market. IPP aims for a continuous improvement in these rather than setting a precise threshold to be attained. As a result, companies can set their own pace and can focus on the most cost efficient improvements.
5. A Variety of Policy Instruments – the IPP approach requires a number of different instruments because there are such a variety of products available and different stakeholders involved. These instruments range from voluntary initiatives to regulations and from the local to the international scale. Within IPP, the tendency is clearly to work with voluntary approaches, although mandatory measures might also be required. The determining factor is the effectiveness of the tool to achieve the desired result with regard to sustainable development.

## 3. IPP Indicators

The UN's Department of Economic and Social Affairs has established a Theme Indicator Framework with indicators for SD. There is no product orientation in the framework, as these are classical environmental indicators.

The OECD has been working in the field of environmental indicators for more than 10 years. The work is divided into Core Indicators, Sectoral Indicators and indicators derived from environmental accounting. Indicators are structured by the PSR approach (pressure-state-response) which has formed the basis for the EEA's DPSIR approach. The OECD's indicators are much aggregated and not at all relative to products. In the two-yearly Environmental Outlook Reports the indicator framework is used as the basis for the structure, and the OECD has developed models for the prediction of the effects of specific policy measures on specific environmental indicators, e.g. CO<sub>2</sub>, SO<sub>x</sub> and NO<sub>x</sub>. There are no IPP-related policy measures included in the models. At EU level, Eurostat, in co-operation with the EEA and other units, has developed different sets of environmental indicators:

- The structural indicators (SI), first presented in 2000 in order to monitor the Lisbon strategy (which sets economic, social and environmental objectives). In 2004, two lists of SI were presented: a short list, including one environmental indicator and a long list, including 7 environment-related indicators (and a total of 15 sub-indicators, which are listed in the current text).
- The environmental pressure indicators

- The integration indicators, which aim at monitoring the progress achieved in the Cardiff strategy. At present the following indicators are available: the transport-environmental (TERM) indicators, the agri-environmental indicators (IRENA project) and the energy-environmental indicators. Four other sectoral indicators (fishery, industry, economy and development) are under development.
- The Sustainable Development Indicators, which aim at monitoring progress in achieving the objectives of the SDS, which are currently under development.

Several countries (UK, Sweden, Finland, Denmark) have developed several indicators for relevance on IPP. In the Study on IPP indicators, the following selected existing indicator types were proposed of relevance to an IPP (literature IPP indicators)(22).

**Table 1** List of selected existing indicator types proposed of relevance to an IPP

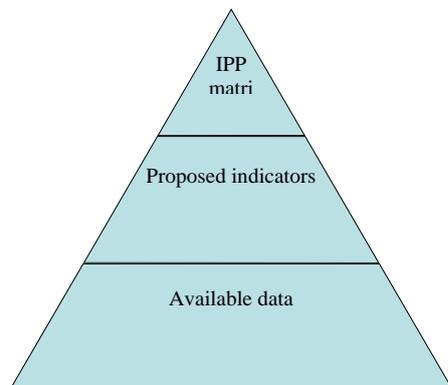
Indicator	Theme	DPSIR	Note
<b>Number of eco-labeled products</b>	Industry, production, consumption	R to R or partly R to D	Since the mid 1990s this indicator has been the only one with clear reference to greener products. Its steadiness makes it a cheap parameter, because the figure is published regularly by the eco-labelling bodies. The disadvantage is that it does not link to changes in impacts on the environment; maybe not even to changes in industry (D).
<b>Number of products with environmental product declaration (EPD)</b>	Industry, production,	R to R or partly R to D	This indicator is very similar to the number of eco-labelled products. A problem with this indicator, however is that EPD is a pure quantitative information and documentation system. There are no end-points in EPDs, so it is not possible to follow parameter's development over time, unless the specific product or a line of products is followed as an example.
<b>Number of EMAS or ISO 14001 certified installation</b>	Industry, other sectors	R to R or partly R to D	This indicator is a fair measure for the dissemination of environmental aspects in general in industry. Though a certificate in itself does not indicate the level of environmental impact, it is an indication of the interest from management in the company. The disadvantages are that it is not a measure of the environmental impact, nor is it product-oriented. As for eco-labels and EPDs, there is no link to changes in impacts on the environment.
<b>Energy intensity or resources intensity for economic sectors</b>	Energy, resources	D to P	These types of efficiency indicators provide benchmarking platforms for environmental issues within an economic sector. Underlying such indicators are normally very detailed and bulky data on the energy aspects of specific processes. They can be product-oriented, but are most often related to production units and aggregated from this level up. However, basic information like this normally provides valuable input to LCA case studies, and ground-level data may fairly easily be translated into product-related data
<b>Transport efficiency</b>	Transport, energy	D to P	See above for "energy intensity"
<b>Recycling degree and resource flows</b>	Waste, resources	R to R or partly R to D	Recycling degrees are typically aggregated for waste fractions, like newspapers and magazines or electronic scrap. The indicator is, however not easy to transform into changes in impacts, because recycling may imply extra energy consumption, chemicals etc. for the recycling processes, which in some cases generate greater impacts than disposal or incineration. Therefore, such indicators are mostly pure R-to-R indicators.
<b>Environmental investments as direct investments or companies in e.g the Dow Jones Sustainability Index</b>	Financial	R to R or partly R to D	The degree of environmental investments is very difficult to relate to environmental impacts, like for management systems. It is a pure response indicator, which only tells us how much money has been channeled into companies that meet simple criteria. The advantage of this indicator is that it involves the financial sector, which has not otherwise been very interested in environmental issues. Such indicators could be product-oriented if the criteria in the indexes were changed into product-oriented issues, like for example investments in specific cleaner technology, producing a certain amount of products or saving a certain amount of emissions. As for eco-labels, there is seldom any link to changes in impact on the environment, and such indicators are, therefore, mostly pure R to-R indicators
<b>Emissions factors</b>	Substances	D to P	The classical emission factors indicate the emissions we can expect from a specific industrial process. Thus, they link together D and P. There are numerous databases of emission factors today, of which the EPER is the most widely known in the EU. Emission factors are very specific and tell us only about one process and one substance at the time.

Indicator	Theme	DPSIR	Note
<b>Biological indicators</b>	Biological parameters	S to I	The classical biological indicators, like the presence of a species, the concentration of nitrate in a lake etc. provide a picture of the state in nature. If they are related directly to humans, like the concentration of a substance in groundwater for drinking, then they indicate the impact. Such indicators form the core of environmental monitoring, but have little relevance to IPP.
<b>Environmental impact of consumption per citizen per year (energy, CO<sub>2</sub>, or other parameters)</b>	All	D,P,S and I	Such indicators are extremely aggregated and require large statistical tables, covering all industrial activities etc. They may also be seen as combinations of some of the other indicators. For an IPP such indicators give interesting pictures of the impacts from products, but none of the effects of implementing an IPP measure politically. Further, the conversion from the aggregated citizen unit to a product unit would be quite complicated. On the other hand, underlying such indicators are numerous data, which may comprise input to useful indicators for IPP.

#### 4. Composite index for measuring level of introduction of an Integrated Product Policy in countries under certain circumstances

The so called composite Index for measuring level of introduction of an Integrated Product Policy was proposed using available data (bottom-up approach).

Statistical data, data from different other sources (National Strategy for sustainable development, National environmental indicators, National Strategy for complex energy development, National Industrial policy, OECD/IEA, [2008], IEA Online Database: Energy Balances of Non-OECD and OECD Countries and Energy Statistics of Non-OECD and OECD Countries reports etc, EEA reports on inventory of emissions, Reports on GHG emissions etc) were used put in the correlation with proposed IPP matrix [28, 29]



		EU	MK
1.	Consumption of primary energy/capita (toe/capita)	2,45	0,8
2.	Energy consumption in industry sector per GDP (10 <sup>3</sup> toe/1000 UDS\$)	45	145
3.	Intensity of energy consumption in traffic sector (ktoe/capita)	780	170
4.	CO <sub>2</sub> eq emission per capita (2000)	0,5	7,16
5.	Carbon intensity per GDP, (tCO <sub>2</sub> eq./mil. USD GDP)	443	700
6.	% of RES	20	15,3
7.	Number of companies with adopted ISO 14001	450	25
8.	% investments in environment	3,2	0,25
9.	Number of municipalities with adopted local development plans	150	55
10.	Emission of SO <sub>2</sub> (k t)	99	90
11.	Emission на NO <sub>x</sub> (k t)	60	35
12.	Emission на VOCs (kt)	51	25
13.	Emission of amonia (kt)	20	14

## 5. Results for the Republic of Macedonia

For the Republic of Macedonia, an environmental indicators as well as proposal for indicators on sustainable development have been developed (24-27 )

Within the proposed indicators, 40 environmental indicators have been developed out of which 5 for energy, 2 for climate change, 4 for air pollution and ozone depletion. In the proposed indicators on sustainable development there are no product related indicators proposed.

Therefore, data from different sources have been used which are of relevance for the IPP. Areas were chosen based on the available studies for IPP (1-12). The weigh for each area was chosen as an equal (0,25). Scoring was proposed based on deviation from the set values of proposed variables. Margins of tolerance for scoring were proposed based of the deviation from the EU levels for proposed variables.

Subject	Weight	Variable	Score	Sub weight
Legislative and fiscal measures	0,25	% investments in environment from budget <0,5      0,51-2      >2	0/0,5/1	0,25
		Carbon Tax (y/n)	0/1	0,25
		Developed guidelines for public procurement (y/n)	0/1	0,25
		% of transposition of IPP aquies*		
Industry, production, consumption	0,25	Number of products with eco-label <10      10-30      >30	0/0,5/1	0,5
		Number of companies with introduced EMS <10      10-35      >35	0/0,5/1	0,5
Energy, resources, transport	0,25	Carbon intensity per GDP, (tCO <sub>2</sub> eq./mil. USD GDP) <200      201-500      >500	0/0,5/1	0,25
		Intensity of energy consumption in traffic sector (ktoe/capita) <100      100-500      >500	0/0,5/1	0,25
		Energy consumption in industry sector per GDP (10 <sup>3</sup> toe/1000 UDS\$) <50      50-150      >150	0/0,5/1	0,25
		% of recyclable waste <10      10-50      >50	0/0,5/1	0,25
Substances, (emission)	0,25	Emission of SO <sub>2</sub> (k t) <50      50-100      >100	0/0,5/1	0,25
		Emission на NO <sub>x</sub> (k t) <20      20-50      >50	0/0,5/1	0,25
		Emission на VOCs (kt) <20      20-50      >50	0/0,5/1	0,25
		Emission of amonia (kt) <20      20-50      >50	0/0,5/1	0,25

\*level (%) of transposition means % of transposition of directives listed bellow (13-20). Regulations have no transposition just implementation

## 6. Conclusions

For the countries under certain circumstances, a mixed approach which combine available data from different sources which are of relevance for the IPP combine with the set of indicator and areas based on the internationally available studies for IPP was used to propose a matrix for measuring level of introduction of an Integrated Product Policy. Into the matrix, % of transposition of IPP aquies\* was proposed as a characteristic variable for the countries with candidate status for full membership into the EU. Following the differences into scoring through the years, the level of introduction of an IPP into the country can be monitor and assess. Proposals for changes in some policies can be also made.

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# Industry and Academia Collaboration towards Sustainability

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The focus of this work is the collaboration between Industry and Academia in the process of building of the Sustainability Science. The idea is that Industry can contribute to the achievement of a more sustainable world, by adopting processes that assures profits but respect interests and values of environment and society. This implies a common vision across the globe and a strong willingness to face challenges and complex issues related to sustainability. Sustainability Science has the ambitious aim of overcoming the theoretical discussion on sustainable development that clashes with the difficulty of achieving tangible results by involving actively in a process of real change the main actors: the civil society, the private sector and the policy-makers. The industrial sector can play a crucial role in this scenario, but to do so effectively and to accelerate the process, a close collaboration with Academia is not only needed, but represents a win-win solution for both, industry and academia but also for the entire society. In the work will be described the central features of Sustainability Science and why insert the I&A collaboration process in the framework of Sustainability Science, the previous and next steps of the I&A collaboration process towards sustainability, which instruments are useful to finalize the collaboration.

## Keywords

I&A collaboration, Sustainability Science

## 1. Introduction

The global financial crisis, the climate change and the increasing of geo-politics conflicts are some of expressions of a development model not sustainable. It is clear the importance of a reverse course. Several definitions of sustainable development exist, one of most important is: "Sustainable development is realized when current society does not compromise with its development the possibility of development for future generations" [1]. Since '80s appeared clear the challenge of the 21st century, the transition toward a future sustainable world.

In a process toward a sustainability society is really crucial the involvement of different stakeholders and of different disciplines. In the process of change the dimensions are simultaneously social, technological, economic and political. Became necessary a trans-disciplinary approach with the aim to understand the linkages between the different dimensions. Sustainability Science with its feature of problem-solving and trans-disciplinary approach can help in understanding these linkages.

In this context policy-makers, academics, representatives of industries and civil society have to work together to find concrete solutions to risks to human well-being and security issues.

Industry may give a fundamental contribution in the process of building of Sustainability Science, changing the way to achieve profits with respects interests and values of environment and society.

CIRPS Sapienza University of Rome, in organizing ICSS 2010[1] and in particular the Industry Panel, started a tighter collaboration with industries in the framework of Sustainability Science and in this work will be described the process of collaboration.

## 2. Sustainability Science

Sustainability Science is a new science, emerged in last years as one of the most important avant-garde of international scientific research. Based on an integrated and trans-disciplinary approach, it is oriented to study and understand the complexity of the interactions between economy, society and nature in order to propose concrete solutions to complex problems locally and globally threatened the very survival of humanity. Sustainability Science can help in create methods and visions for analyzing the trade-offs and develop policy-making support tools to solve the concomitant risks to human well-being and security issues [2].

As pointed out Clark and Dickson [3], sustainability science is not yet a traditional discipline, but rather a vibrant arena that is bringing together scholarship and practice, global and local perspectives, and various disciplines. It aims to overcome the traditional mono-disciplinary approach, in order to allow us to see phenomena in their entirety and facilitates the identification of integrated solutions.

A characteristic of Sustainability Science, moreover, is its problem-solving perspective. Komiyama and Takeuchi [4] stated that a problem unique to sustainability science is the process of shifting from the stage of phenomena identification and analysis to that of problem-solving. To attain a goal we must seek a fundamental understanding of the system as well as solutions [5].

Sustainability science is a new field that seeks to understand the fundamental character of interactions between nature and society [6]. Such an understanding must include the interaction of global processes with the economical, political, ecological and social characteristics of particular places and sectors. Sustainability science is trying to explain means that relevant research will have to integrate the effects of key processes across the full range of scales from local to global. Combining different ways of knowing and learning permit different social actors to work in concert. The role of sustainability science is also the distribution of knowledge to society through communication among experts, decision-makers, academics, politics. The participation of diverse stakeholders in setting and implementing solutions is indispensable, because as science and technology advance, knowledge tend to be centralized, sustainability science tend to involve different expertises.

In this context is crucial the role of industry in order to pursue sustainable economic patterns, to create well being and to reduce environmental impact of the economic activity. Representatives of the industry sector may give an important contribution to the process of foundation of this new Science and to the creation of its definition. The adoption of production processes and dynamic socio-economic and environmental gains that ensure interests and values while respecting the environment and the society implies a shared global vision of sustainability.

### 2.1 I&A collaboration in the framework of Sustainability Science

#### 2.1.1 I&A collaboration

Different approaches exist to analyze the Industry Academia collaboration. Lee [7] focus on sustainability of University-Industry research collaboration, analyzing the so called behavioural outcomes (e. g. degree of satisfaction), the reasons for academics and for firms to create a collaboration.

Most studies of industry-university collaboration have framed the analysis of such partnerships in terms of research project outcomes, defined here as a result that create opportunities for a company, such as a guidance for the direction of technology development. From a business standpoint, however, research outcome is of only incidental importance. What matters is not outcome but impact, how the new knowledge derived from the collaboration with university can contribute to the company's performance. With the focus on the impact of the collaboration on company products, processes or peoples, an important three year study of MIT [8] determined seven best practices for university-industry collaboration:

- Define the project's strategic context as part of the selection process;
- Select boundary-spanning project managers
- Share with university team the vision of how the collaboration can help the company;
- Invest in long-term relationships

- Establish strong communication linkage with the university team;
- Build broad awareness of the project within the company;
- Support the work internally both during the contract and after, until the research can be exploited.

To identify the best practices MIT analyzed 100 university projects sponsored by the companies, so the best practices can be applied for different kind of I&A collaboration.

Our approach was practical, asking to the two protagonists of this challenge to sit at the same table and to work on it, and structuring the I&A collaboration sharing the choices. We focus our attention to the question on why is important and necessary structuring a I&A collaboration in the field of Sustainability Science.

### **2.1.2 Sustainability Science and I&A collaboration**

It is clear that to move on a sustainable world Industry will have to face several challenges like contributing to education enablement and economic empowerment, particularly of women; Developing radically more eco-efficient solutions, lifestyles and behaviour; Taking into account the cost of externalities following the life-cycle approach; Doubling of agricultural output without increasing the amount of land or water used; Strongly reduce carbon emissions worldwide through a shift to low-carbon economy; Delivering a four-to-tenfold improvement in the use of resources and materials.

To do so effectively and to accelerate the process, a close collaboration with scientist is not only needed, but represents a win win solution for both, industry and academia. This virtuous cycle will benefit and be supported by the three main innovative characteristics of Sustainability Science that firstly, addresses complexity with a trans-disciplinary approach, secondly, is problem-driven and it uses both, scientific and local knowledge, to resolve contextualized problems and thirdly, it promotes the active involvement of the different stakeholders - civil society, the private sector and policy makers - in a process of scientific co-production.

The I&A collaboration could be at different levels, on a specific project or several projects, on a process of building of a specific field. In this work we describe the I&A collaboration process to obtain a shared definition and structuring of Sustainability Science. Behind the idea that, to move toward a sustainable society and in the involvement of different stakeholders, Industry has a key role and can lead with academia the change of route considering an appointment that cannot be postponed.

### **2.2 I&A collaboration process description**

To involve the private sector in the process of building of Sustainability Science, CIRPS Sapienza University of Rome, organized the panel "Industry and Academia for a transition towards sustainability" within ICSS 2010, starting a close collaboration with some important companies before and after the conference.

The central idea behind the Panel was to follow a fully cooperative way of working, by ensuring the involvement of all participants in the process of structuring of collaboration and in the definition of content to be discussed.

### **2.3 Before ICSS 2010**

The modus operandi chosen was to cooperate with involvement industries before and after the conference to begin the collaboration.

Academia provided a background documentation which served as a first input to participants: the *Guidelines*, gave necessary information about objectives of the Panel and panelists role prior, during and after the conference; the *Working Points Concept Paper*, outlined central themes of the Panel discussion and guided the invited panelist to the preparation of their contributions for the session.

Single meetings with each company have been organized to discuss about the Panel objectives described in the guidelines, that are the following:

- *To share a definition of Sustainability Science: going beyond sustainable development*
- *To clarify what sustainability means from a business perspective*
- *To identify "what industry asks and offers" to Sustainability Science: exploring room for collaboration with academia*

- To edit a “*Paper of wills*” synthesizing achievements and challenges of the Panel and to pave the way forward: next steps towards New York meeting (USA, October 2010) and towards continuative collaboration
- To provide a “*toolkit*” for sustainability.

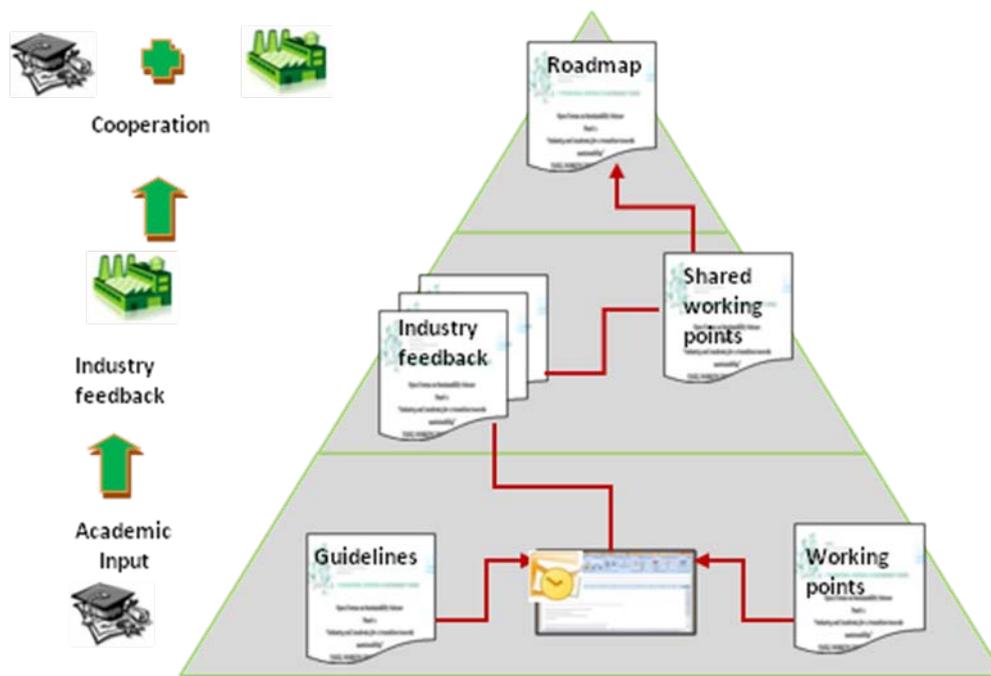
Moreover, Academia and Industry discussed also on five working points, previous identified, as the base of Panel discussion, that are:

- “*Sustainable profits*”: history cases of “sustainable business activities” as a part of industry strategy
- *Deployment of new technologies*: effective policies to promote sustainable business
- *How to measure sustainability*: indicators for assessing progress and development beyond GDP and ‘conventional’ business profits
- *Industry and Sustainability*: reaching a shared definition of Sustainability Science
- *How to enhance Industry & Academia collaboration*: making research findings useful to industry and industry needs feasible for the academic world.

With Industry feedback on the proposed working points, as outcomes, have been edited two documents; the Background document, and the Working points concept paper, both distributed at the conference.

The *Background document* described the objectives of the Panel and the modus operandi in the structuring the Industry-Academia collaboration (Figure 1).

In the *Working points concept paper* have been explicated the points of Panel discussion, with the aim to outline the central themes of the discussion, to guide the invited panelist to the preparation of their contributions, and to ensure a structured and productive discussion.



**Figure 1** A synthetic description of the modus operandi

## 2.4 After ICSS 2010-New York Workshop

The final result of the process of collaboration and of the Panel discussion was a Roadmap to finalize the I&A cooperation, identifying the future steps and the key topics to be discussed in the possible future workshops and in ICSS 2012.

As a second step in the process of collaboration, after fourth month, CIRPS, co-organized a workshop *A Roadmap for Industry-Academia collaboration towards sustainability*[2], with the aim to involve not

only Italian companies in the I&A collaboration process. Three company and three universities, coming from Asia, Europe and America, met to continue the collaboration process at a global level within the International Network for Sustainability Science[3].

The workshop was animated with a broad debate with an audience coming from several countries. Two important points have been revealed to develop and to improve the I&A collaboration:

- The necessity to create a common platform to plan next steps
- The necessity of new approaches to involve more stakeholders.

### 3. Conclusion

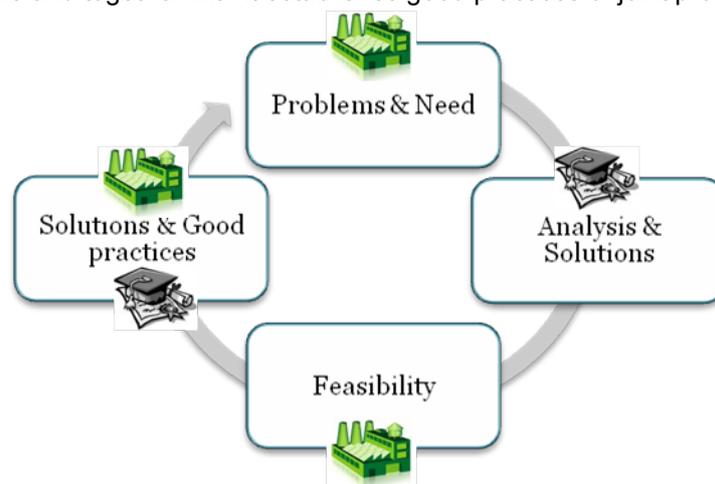
Industry and academic collaboration takes place in different ways: it may granted by partnerships, promoted by foundations or public institutions, to origin from crucial technological discoveries and encouraged by clusters or spin-off. When this happen both gain and there is margin for transferring benefits to entire society. However, too often the work of researchers faces some limits (i.e budget or dissemination constraints), staying behind business needs.

A solution to this trade-off must be addressed in order to accelerate the achievement of sustainability and that's why we ask the two protagonist, Industry and Academia, to sit at the same table and to work on it. Brainstorming about the best ways to enhance the collaboration is the first necessary step. Strengths and weakness of collaboration experience reported from the panelist revealed the main issues to tackle. Consequently, the debate has to focus on concrete tools that may reduce the distance, filling the gap between the industry and academic needs.

On the basis of best practises identified by MIT and of our directly experience, we consider important to achieve a profitable collaboration:

- the knowledge exchanges between Industry and Academia
- the importance of a multiyear collaboration
- to establish strong communication linkages with university team (visits of researchers to the company, scheduled video or conference call)
- to build broad awareness of the project within the company with the involvement of professionals from different functional areas.

To do so we thought a *closed cycle collaboration process* (Figure 2), where Industry identifies problems, asks Academia to analyze and to find solutions for them, evaluates its feasibility from a corporate perspective and together with it establishes good practices of joint problem-solving.



**Figure 2** The *closed cycle collaboration process*.

After the New York Workshop and ICSS 2010 we identified the topics to be analyzed and deepen studied according with the Sustainability Science methodology (trans-disciplinary approach, problem-driven, active involvement of the different stakeholders, civil society, private sector and policy makers. A first list of key topics can be the following:

- Education for Sustainability

- Research activity
- Problem solving by topic for Sustainability
- Energy
- Transport and mobility
- Manufacturing
- Food
- Water
- Banking
- Sustainability Indexes
- Reporting

Identified the topics, to structure a closed *cycle collaboration process* it is necessary create working groups able to support with due contents the cooperation between I&A on each key topic and improve the knowledge and the analysis of the different aspects to be addressed.

Each workgroup must involve at least an academic institution and major international industries from relative fields. It will accelerate with a “by doing” method the necessary cooperation between Industry and Academia to seek and experiment solutions and alternative approaches to the different matters in order to meet the final objective of a full sustainability of human activities.

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- 2 For further information regarding the workshop “ A roadmap for Industry-Academia collaboration toward sustainability”, visit the UNU website page: <http://www.ony.unu.edu/events-forums/new/WWNY/2010/sustainability-science-worksho.php>
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# Impact of retail on the competitiveness of tourism destinations [1]

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Each tourist country is in some ways limited with the possibilities of providing basic services related to housing, nutrition, and part of the transport. Maximum capacity, which is expressed in the number of beds and seats (in the capacity of vehicles not in the form of foreign tourists who travel by own vehicles) are determined to a certain limit of the accommodation and catering facilities and they cannot be crossed, in order to achieve higher spending tourists in the destination. I.e. the accommodation and catering facilities were previously given, and when it reaches the maximum level of their coverage, there are limiting factors in the achievement of profit. On the other hand, extra services, which refers to the retail offer of various goods, tours, entertainment and leisure activities is unlimited. Offer in tourist destinations could largely be expanded in the retail and other sectors, which offer a wide range of opportunities for achieving a much higher level of tourist spending. At retail stores could be directly settled the various needs of tourists. This applies especially to sale of souvenirs, newspapers, photographs, books, textiles, cigarettes, flowers, fruits, sports goods, then perfumery shops, jewelry stores, etc. This paper aims to analyze the level of retail development in Vojvodina. The goal was to show the connection between retail and volume of tourist spending in destinations, as and the retail impact on increasing the competitiveness of tourist destinations.

## Keywords

Competitiveness, impact, retail trade, tourism destination

## 1. Introduction

There is no doubt that tourism impacts on development of many sectors and in general it could not be expected its development without a corresponding with retail trade. Complementarities of trade and tourism development have become inevitable, as evidenced by numerous examples of the most developed tourist countries. On the one hand, there is great interest in travel to countries as far as possible to ensure exportation of goods and services through tourism business, because of the great advantages of such exports has, on the other hand the development of tourism in a particular tourist site or region would have been difficult and taken to without question the proper development and inclusion of trade in direct and indirect marketing of goods and services. Direct marketing of goods includes retail, wholesale and indirect sale, which supplies major customers in the tourist areas [1]. Retailing trade in small countries has decreased if it's not disappeared entirely. In recent years major changes have occurred in how and where tourists shop. Targeting more of tourist money is one of strategies that could help some communities in Serbia and its retailers as shopping and tourism often go hand in hand. Successful retailing is often rooted in a growth of innovative businesses both local residents and visitors [2].

Retailers that sell to tourists are unique because their potential customer base is often, much larger than traditional trade area of local residents. Many retailers appreciate the importance and potential of visitor market. Most, however, could benefit from further exploration of the links between the tourism market and retail businesses. These links can have significant implications for a retailer's operating and marketing decisions [3].

Each country is in some ways limited with the possibilities of providing basic services related to housing, nutrition, and part of the transport. Maximum capacity, which is expressed in the number of beds and seats (in the capacity of vehicles not in the form of foreign tourists who travel by own vehicles) are determined to a certain limit of accommodation and catering facilities and they cannot be crossed, in order to achieve higher spending tourists in the destination. I.e. the accommodation and catering facilities were previously given, and when it reaches the maximum level of their coverage, there are limiting factors in the achievement of profit. On the other hand, extra services, which refers to the retail offer of various goods, tours, entertainment and leisure activities is unlimited. Offer in tourist destinations could largely be expanded in the retail and other sectors, which offer a wide range of opportunities for achieving a much higher level of tourist spending. At retail stores could be directly settled the various needs of tourists. This applies especially to sale of souvenirs, newspapers, photographs, books, textiles, cigarettes, flowers, fruits, sports goods, then perfumery shops, jewelry stores, etc.

## 2. Tourism Impact on Retail Development in Developed Countries

The diversity and richness of Spain's tourism offer has been affected in the fact that in this country expenditures of tourists in accommodation and food, considered in relation to other expenditures, are relatively low. Particularly, there is a high share expenditure on the purchase of various types of products (especially souvenirs), entertainment and leisure, and various forms of extra services spending, especially on the well-equipped beaches, and the like. It is estimated that trade in Spain takes part in the total tourist consumption, with about 30%. On example of Palma de Majorca could be seen what kind of attention is paid to the development of retail in the tourist destination. Palma de Mallorca, actually Mallorca Island is one of the most popular tourist destinations in Europe and has about 270,000 beds, which can still be increased by another 100.000 beds. The tourist accommodation capacities very efficiently are supplied 111,000 of various retail stores and over 60,000 objects of so called mobile commerce. These objects are main suppliers of five specialized wholesale organizations, they are supplying whole retail network and catering [3] [4]. Hong Kong is, with Singapore and Dubai, well-known shopping destinations. A key factor in the development of tourism in Hong Kong was a performance increase in retail sales. Importance of integral development of tourism and retail trade is reflected in the fact that in 2006<sup>th</sup> retail revenues from tourism amounted to purchase \$ 6 billion, which represented 22% of the total value of retail sales. When the alleged spending of tourists, it should be noted that in Sydney purchase of foreign visitors is 15% of total retail sales. The author of The Strategy of Trade Development of the City of Belgrade emphasizes that it is not necessary to be a city shopping destination in order to speak about the importance of tourism for retail development [5]. This statement can be viewed from another perspective that without adequate retail "package" deals it is not possible further development of tourism. Thus, foreign visitors represent a quarter of all buyers in central London, which is a little more than the share of customers who come from the rest of the UK. It is estimated that the value of foreign visitors spending at retailers in London is between 1000 and 1700 pounds. It should be borne in mind that London is not a shopping destination because only 1% of foreign visitors come here for shopping. As for the German cities, the one in seven visitors says that shopping is a key activity on their travel. Shopping tourism accounts for only about 3.5% of the total retail stores in Germany. However, with the exception of Berlin and Munich, which is an attractive shopping a significant factor, other cities for now, mostly; do not play on that card. In this connection, it can be said that among the tourist destinations there are differences in the development of extra services. Research has shown that those countries where the share of catering to absorption of the overall tourism spending relatively less than the share of other activities (especially retail, leisure and recreation), and have a higher level of tourism development in general [3] [4].

## 3. Suitability of Retail Development in Tourist Destinations

Purchasing of goods and services by tourists in the tourist destination are achieved by exporting goods and services through this activity. This export has several advantages: it exports without tariff barriers, transport costs and the like. The data show that sales of various goods and services makes up 40% of foreign exchange earnings and total foreign tourism expenditure in some countries, which confirms their export orientation, which yields significant profits [6]. Particularly through the additional spending by tourists, which is a significant factor in retailing, each country tends to export more of its

products and services. The tourism developed countries, exports through tourism and stimulate it with specific measures. Thus, many countries encourage the purchase of foreign tourists with making the return of VAT (Value Added Tax), when living the country, immediately at the cross border or mailed to their home. They draws attention of tourist in special brochures in which everything is explained, and where are also retail stores that sell goods free of duties, marked especially noticeable tax-free stickers. These brochures are divided to tourists at border crossings, when entering the country, tourist info centers, agencies, airlines and others. In Serbia, unfortunately, travel and retail companies do not show much interest in such exports, thereby losing the opportunity to domestic goods are marketed and offered to foreign tourists, which best shows an example of the free shops, which were in late 80's opened and the mass not only at border crossings, but also in the interior of the country in hotels, shopping streets and malls. These facilities were supplied by foreign goods, while our domestic goods, unfortunately, was not represented in these stores, although in our produce items made of crystal, leather, gold, handicrafts and other products, which have the quality, design and prices correspond to world standards and would be interesting offer for the tourists. In recent years, especially the emergence of new retail stores (shopping malls, outlets, hypermarkets, department stores, etc..), the release of the tourist fees and encourage the export of this type was established and in some tourist destinations in Serbia [7].

#### **4. The Role of Retailers in the Supply of Tourism Market**

Retail has a key role in the supply, as local residents of tourist destination (like regular consumers), as well tourists, which, depending on the season, are visiting the destination. There is the role of retail expressly for it, as part of a tourism destination provides settlement needs more massive and heterogeneous tourist demand. The main task of retailing is, therefore, that its material-technical base and organizational staffing structure and mode of service delivery, adapt to the growing demand requirements of the local population and tourists, as a special customer. Adjustment of retail organizations, the demands of the tourist trade depends on the size of the tourist destinations of the local population and the number of tourists visits. On the basis of previously performed analysis of the market, in the tourist area, of an estimated potential market and trade goods in the content structure, and is based on planning and organizing retail network in the tourist destination. It is very important to the same analysis to determine the purchasing power of tourists in order to develop and therefore offer appropriate goods and services. What is a distribution network with its size, structure, spatial layout, external appearance and more features on the second largest adjusted frequency, socio-economic structure of the customer, route, and places to keep the tourists, this tourist destination is more developed and richer in terms of tourism and trade deals. It can be said that the development of trade and retail in a tourist destination, is a reflection and measure of its tourist development. Shopping of local and foreign tourists in Austria makes 23% of the total tourist spending, 21% in Paris, over 20% London, and in Singapore 50%. From tourism development and the purchase by tourists, a key benefit have the city's central commercial area, shops nearby and convention centers, shopping malls and lifestyle centers (shopping malls, open spaces, often as a simulation of the traditional shopping area, with wide promenades, street cafes, entertainment and sometimes the apartments and offices above shops), and airport shops [5]. The number, size and structure of retail outlets have to be aligned with the number of tourists and residents of certain tourist areas, otherwise it may lead to adverse consequences, such as making jams, overburdened staff, who, because of that tired more quickly and more easily can lead to conflicts and misunderstandings. How will the product be marketed to tourists through its retail network depends on several elements, namely [1]:

- Range, quality, size and price of the products and method of payment,
- Readiness of the economy or the service sector to export their products through tourism,
- Working time of shops,
- Structure of retail stores,
- Personnel and Human Resources,
- Technical equipment of buildings.

With the rapid development of tourism in the twentieth century souvenirs have become mass products for final consumption and tourist souvenir shops have suddenly started to "sprout" some famous tourist attractions [8]. Also, air travels becomes increasingly popular form of transport, airports and expand their services including retail, intended for tourist consumption. These trends could be more and more spread, but most important is to emphasize that the more the world's population participates in the tourism and travel; new places for shopping are beginning to develop. As already previously

stated, recreation and shopping tourists was caused by social and psychological factors that tourists choose to purchase, and which have a strong influence of location, environment and characteristics of retail stores. These facts, together with the growth and development point of purchase indicating the great importance of understanding the location in which to place tourist shopping. Therefore it is necessary to explain what the organizational forms are and retail space for shopping, which meets in a tourist destination [3] [9] [10].

## 5. Presence of Retail in A Different Types of Tourist Movements

In one tourist destination an offer of variety of goods for sale may be organized differently i.e. may be presented different forms of retailing. In the more developed tourist destinations present a streamlined and modern retail outlets such as supermarkets, hypermarkets, then ever-increasing number of specialist shops-boutiques, jewelry, filigree, and a variety of small shops catering trade and profession (such as drugstores, snack-bars) , kiosks and stalls at intersections, beaches and busy places. Often, in tourist resorts appears Retail Street with a number of different tastefully decorated shops and boutiques, craft shops, souvenir shops, art salons, flower shops, cafes, snack bars. There is then located, also exchange offices and banks, as tourists would come as soon as the necessary funds for the purchase.

Special attractions for tourists are old town on the tourist areas. These narrow streets and intimate squares, which form a high quality offer in tourist places, become meeting places, for exchange of opinions, information, presenting fashion achievements. They have a dual role-supply, and fun. With this, it is necessary to ensure that it will be shops with distinct aesthetic elements and entertainment, and that their construction and adaptation fit on the maximum to the specific architecture of tourist destination. In the hotels of higher category are present souvenir shops and luxury goods [11] [12]. In tourist areas, especially those types of apartment complex and resorts are very popular so called "Green Market", that offer fresh fruits and vegetables, fish and other agricultural products. In addition to being used to supply the local population and tourists in agricultural products, "Green Markets" are one type of tourist attractions. On the "green market" farmers successfully sell their products and a tourist destination completes its offer with fresh agricultural products. Big stores cannot have profitable operations in the tourist areas, where there are many villages with little population and many small beaches and other places where tourists go in the season. So it should be gone for a simpler and less visible retail outlets, such as smaller shops, stalls with seasonal goods, novelty shops, souvenirs ... It is advisable to go to various forms of mobile trade, such as kiosks of light material that can be moved if necessary. Demand for goods and a range of different types differs depending on the different types of tourist movement and therefore he must be taken into account when creating a range of retail offer. This is depending on whether it is about tourism in already-developed tourist destination-a classic tourist spot, or just transit tourism, conference tourism and shopping tourism, which is becoming increasingly popular in recent years. Under-developed tourist destination means the destination that is most visited by tourists and where the infrastructure and superstructure is adequately developed. In developed tourist destinations are clearly differentiated tourism products and are complemented with additional content. Most often these are the tourist spots in the coastal areas (especially the Mediterranean countries), the famous ski resorts, spas and cities as a special City Break offer. As for the "city break" or short breaks in cities, it should be noted that the main motives of tourists in the city is business, heritage, and culture. Analysis of the number of tourists in season and out of season in a tourist destination, taking into account the maximum record in meeting and satisfying the needs of tourists as consumers, could be planned the offer the widest goods. Travel trends in the World are increasingly focused on large urban centers [13] [14]. Concentration of demand in time and space is, especially related to large cities, which will, as tourist centers, have a positive development. In addition to the tourist attractions that tourists show interest (e.g. cultural, historical and artistic value of these areas), large cities are important for maintaining large sets of content with various cultural and sports events. These are centers for the organization of mass entertainment and they are rich in offering various products [15]. In tourist areas, in which is primarily represented hotel accommodation, tourist expenditure takes place primarily through board services, or quite often, through half board. With full board, space for Additional spending is somewhat narrowed by the fact that tourists all their needs, for beds and food will meet in a hotel. The half board room, which is much more pronounced recently, tourists themselves leave the possibility for optional dinner at their option, a la carte, in places where they most like, and which is typical, they are often changing places to meet many objects. The Additional spending is very important, because tourists in their nights out not only meet their need for food, but expressed a desire to experience and curiosity to discover new things, for which if they are

satisfied, would pay much more. Various goods in this case can cause a desire to buy to the consumers-tourists. This particularly refers to the postcards, souvenirs, jewelry, books, clothes, pictures, etc... Tourists, who have opted for private accommodation, are consumers in the retail supply of food stores and markets, because they often prepare themselves food. The most attractive recently and the most wanted classic form of staying in the tourist area are the apartment complexes so called "resorts". This form of stay is advantageous for the retail supply of various commodities, especially food. In these objects, the supply of various commodities is significant, because in such settlements. Additional spending often exceeds the basic rental price of apartments and therefore in any analysis is extremely important. Of course, there is a possibility of a significant increase in spending, because of the fact that the rent of apartments has fixed character, and its accompanying spending has no limit. When is planned the supply of consumers goods in a classic tourist destination, it should be taken extra care of mentality and habits of its visitors, so it could be prepared an adequate supply of goods [16]. Of course, the analysis of tourist clientele and evaluation of its purchasing power must be provided with market offer to meet all its needs and desires and thus achieve substantial additional consumption through the retail supply of various commodities.

## 6. Ways for Retail Development in Tourist Areas of Serbia

Retail companies and enterprises that operate in tourist areas of Serbia, and in conditions far from equilibrium, will have to adapt to volatile and turbulent conditions that occur in the tourism and commercial market. They should be except instability, as innovative condition and as condition of accepting the default change, and only in this way will have the opportunity and chance of success [17]. The success of retail businesses in tourist destinations, and general trading companies themselves, will result in increasing the efficiency of management, retail companies, and the ultimate goal of developing tourism and increasing profits in the enterprises themselves, and all key stakeholders that appear in one destination. Taking into account that the tourist scene of Serbia, as relatively new and is subjected to adjustment, will be the same case with the management of retail companies, which will be easier to deal with changes in the product range, market demands, technology and the like. Special emphasis will be on the operational management of retail companies because management is the one who is directly responsible, that the various inputs and transform in output, through external factors, and the managerial functions of planning, organizing, staffing, leading and controlling [18]. Retail companies will be in activities related to retail management "package" offer, use different types of business policy- marketing policy, procurement, personnel policies, etc... In each of them worked out more detailed policies. The task of management is to create harmony between them. Also retail management should be also responsible for promoting of complete retail management "package" deals, and it is necessary to successfully lead the policy of assortment of goods, quality policy, procurement policy, the policy of the mark, the price policy, the policy site, promotion policy and personnel policy.

Successful policy of assortment of goods in the tourist destinations of the Republic of Serbia relies on desires and needs of visitors, based on which will be planned to make a selection of articles from the overall retail offer, and that they suit their needs and requirements. The future development of retail in Serbia, and thus the development of tourism mean a better understanding of tourists as a segment of consumers, particularly bearing in mind the growing trend of visitors to tourist destinations in Serbia. Marketing strategies must be directed to the segment of tourists, which until now in Serbia was not the case. Also, successful retail managers need to know your customer well, in terms of demographic characteristics, habits and lifestyle [1]. The existence of luxury products, which are currently scarce, when the retail offer of tourist places in Serbia is concerned, primarily intended for foreign markets, must be a key determinant of successful guided assortment policy. Dimension range depends on the profiles of market segments, which are determined on the basis of motive into a tourist destination.

## 7. Conclusion

When the retailer in Serbia is observed, seen as an integral part of tourism, it can be said that not much attention was paid to creating a retail "package deals", which means that there is no awareness of its importance for the development and improvement of tourist destinations. This means that the planning of tourist destinations, are not even take into account the additional activities that tourists do, and therefore there is no knowledge of the participants in the tourist industry, what is the importance of retail to tourism development in Serbia. Because of this so far and haven't been achieved significant

results, based on tourist purchases, and the same is true for other additional activities of tourists. A good part of the tourist in a, for these reasons, their time spent on activities in which it does not spend money, and undoubtedly reflects the fact that the existing tourism offer is not adequate, that is not presented in an appropriate manner (information, labeling, brochures, etc.). An additional problem is that tourists who go shopping spending, about the same as those, that take more attention to other activities suggesting that those who intend to buy do not have enough places where they could spend their money. For this reason it is necessary to examine tourism demand of Serbia, in order to obtain a realistic picture of the state of retail in tourist destinations and directed retail "package deals" to the wishes and needs of tourists, all in order to develop tourism in the Republic of Serbia and achieve significant economic effects of tourism and its complementary services, such as retail trade.

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# Innovative marketing tools for growth - brand extensions and brand portfolio strategy

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Brand extensions is seen by companies as a profitable growth strategy, and it has been a hot subject among marketing academics in the recent research. Previous research showed that the extension success depends on the perceived fit between the extension and the parent brand. If consumers perceive high fit, the extensions would be more favourably evaluated. The case of lower fit between extension and parent brand may be considered as a mismatch between the attributes of the extension and the schema that represents knowledge structure about the parent brand. The basis of this study is the impact of brand portfolio strategy and differentiation on consumer evaluation of incongruent extensions, or extensions perceived to have low fit with the parent brand. The main issue addressed in this research is: how choice of extension's brand portfolio strategy and differentiation strategy from its parent brand can compensate for the problems caused by lower perceived parent-extension fit?

The study was designed to test the interaction between three independent variables (perceived fit, brand portfolio strategy and differentiation) and their impact on one dependent variable (brand extension attitude). The study was a 2 (perceived fit: low vs. high) X 2 (brand extension portfolio strategy: subbrand vs. endorsed brand) X 2 (extension's personality differentiation: same vs. different) randomized between subject factorial design. The interaction of perceived fit, brand portfolio strategy and differentiation, which is the main prediction in the hypothesis, was significant ( $F(1, 150) = 4.49, p = .036$ ), supporting the predicted increased sensitivity to brand portfolio strategy and differentiation strategy in the lower perceived fit condition. The results of the additional tests indicate that using subbrand strategy and same personality for the extension as the parent brand can help to create more favourable brand extension evaluation despite the lower perceived fit. Therefore, brand managers may overcome problems caused by lower perceived fit, and succeed with business expansion opportunities that might be found in lower fit categories.

## Keywords

brand portfolio strategy, brand extension, differentiation, personality, perceived fit

## 1. Introduction

Launching brand extensions is seriously considered by companies as a profitable growth strategy, and it has been a hot subject among marketing academics in the recent research. There are many studies on both consumer evaluation of brand extension and the impact of the extension on the parent brand. Companies tend to launch brand extensions with short or long stretch, thus building wider brand portfolios. Dove has extended from soap bar to shower cream and shampoo, Bulgari has extended from jewellery to perfumes to hotels, Courvoisier has extended from cognac to perfume etc. Previous research showed that the extension success depends on the perceived fit between the extension and the parent brand. If consumers perceive high fit, the extensions would be more favourably evaluated. But, it is naturally to ask what happens when the fit is perceived as lower. Do consumers automatically create negative attitude and reject the extension? How do they react to the information when they are exposed to advertising material for an extension with lower fit with the parent brand?

The case of lower fit between extension and parent brand may be considered as a mismatch between the attributes of the extension and the schema that represents knowledge structure about the parent brand, and therefore this incongruity case may be analyzed through the perspective of the Lee and Schumann's theory [1]. They propose an integrative framework for better understanding of the effectiveness of incongruity when it is employed in advertising, which is based on and combines Petty and Cacioppo's Elaboration Likelihood Model (ELM) and Mandler's Schema Incongruity Theory [2]. Congruity (incongruity) is defined as a match (mismatch) between a stimulus element (e.g. product, brand, or endorser) and the existing schema that one holds about the advertising stimulus. A schema represents the knowledge or semantic network structure regarding an object, which serves as a frame of reference in forming judgments. Depending on motivation and ability, consumers may respond differently to incongruent messages: they may ignore it, put relatively low effort (peripheral processing), or put relatively high effort (central processing). An individual that has motivation and ability to process the incongruity will try to find resolution. Mandler [2] has suggested four types of processing strategies: assimilation, alternative schema, successful accommodation, and unsuccessful accommodation. The basis of this study is that brand portfolio strategy and differentiation influence consumer evaluation of incongruent extensions, or extensions perceived to have low fit with the parent brand.

A key issue brand managers should address when launching brand extension and expanding the brand portfolio is the brand naming strategy, or the brand portfolio strategy for the extension (branded house, subbrand, endorsed brand, and house of brands). Subbrands and endorsed brands give the possibility to stay in a relationship with the parent brand, but still gain some independence. Subbrands allow some distance from the parent brand, and endorsed higher distance. Many leading companies have decided to extend their already established brands, using them as parent brands, and are successfully developing and managing brand portfolios. However, when brand portfolios become complex, distinction between brands becomes more blurred and consumers become confused. Customers switch when brands are similar; as a result, brand extensions may often cannibalize their parent brands [3]. Consequently, the brand portfolio strategy, choosing a name for the extension that signals close connection to the parent brand, may not necessarily improve the extension evaluation.

A second issue that brand managers are concerned with is the decision on position of the extension in the portfolio and the relationship with its parent brand: how distant should the extension be from the parent brand, should it have similar identity or slightly different identity from the parent brand? Many studies address the importance of fit between the parent brand and the extension in order the extension to be favorably evaluated by consumers and not to have negative feedback on the parent brand. Some studies support the impact of moderating variables that can facilitate to create fit between the parent brand and the extension. Although many companies have succeeded to create fit, there are examples where they fail to create a distinctive extension. The basic logic is that besides fit, differentiation from the parent brand [3] is another key factor in order to successfully launch an extension. This leads to one of the main issues to be addressed in the research: how choice of extension's brand portfolio strategy and differentiation strategy from its parent brand compensate for the problems caused by lower perceived parent-extension fit? While fit means creating similarity, differentiation refers to creating dissimilarity between the parent brand and the extension. While fit puts the parent brand and the extension under same brand platform, differentiation gives them a unique role in the brand portfolio. The need for two opposing factors in order to have successful extension and enhance the parent brand creates a paradox. The main goal of this research is to explore this paradoxical situation when positioning extensions in the portfolio, and the impact on the extension evaluation.

Finally, this study explores the impact of personality as a differentiating factor on consumers' attitude. Kapferrer [4] suggests that, as we move from product related to more abstract associations, the extensions can be more distant from the parent brand. Consequently, personality can be considered as one of the key differentiators. For example, Nike produces a range of sport products and equipment and has several subbrands such as Nike Football, Nike Golf, or Nike Air, all with same rugged personality. In Sony portfolio's case there are subbrands which have different personalities: Sony Bravia is sophisticated and elegant, but Sony Playstation has more youthful and exciting personality. After introducing the "natural" process of launching extensions and the strategic issues that need to be considered by brand managers, it is logical to put a research question that will bring together perceived fit, brand portfolio strategy and differentiation and discuss their interaction: *Can choice of an extension's placement in the brand portfolio relative to the parent brand, and the extension's degree of differentiation from its parent brand compensate for the problems caused by lower perceived parent-extension fit?* This research should give an insight how differentiation and portfolio strategy can be wisely used to overcome problems lower fit extensions might face. In many cases, interesting

business opportunities might be found in lower fit categories, and the study can give directions for how to succeed despite lower fit.

## 2. Literature review

Brand extension is one of the most commonly used strategies for growth and requires less support than launching new brands. Past research has identified different factors that influence consumers' evaluation of brand extension and the parent brand. Volckner and Sattler [5] find that fit between the parent brand and the extension is the most important driver of brand extension success, but some moderating variables can directly affect fit. Some studies challenge the view that congruent extensions usually enjoy success, but incongruent do not, or that as previous research demonstrates, unless consumers see bases for fit, they usually disapprove the extension [6]. Some further research implies that elaborative processing can influence consumer perceptions of brand extension fit and thereby change consumer evaluations of incongruent extensions. Maoz and Tybout [7] hypothesize that the relation between the congruity of an extension with the parent brand and extension evaluation will be moderated by factors that affect the cognitive resources that respondents devote to evaluating the extension. The findings are compatible with Mandler's schema congruity theory, showing that increasing involvement motivates cognitive elaboration and leads to the resolution of moderate incongruity and increases task satisfaction.

Consumer extension evaluation may be influenced by 'brand portfolio characteristics'. Volckner and Sattler [5] state that, although extension products do not guarantee success on the basis of the brand name alone, parent-brand characteristics, such as consumers' parent-brand experience and conviction, have an important impact on extension success. Several other studies consider some of the portfolio characteristics, such as various products and different categories with which the brand is associated, as moderating variable on the impact of fit on extension evaluation [8]. Meyvis and Yaniszewski [9] found that broad brands tend to have more accessible benefit associations than narrow brands and can therefore, engage in more successful brand extensions than narrow brands, even though narrow brands are more similar to the extension category. DelVecchio [10] argues that the number of product affiliated with the brand and the quality variance are important characteristics in evaluation of brand reliability. Additionally, alternative branding strategies can be used to increase consumer evaluations of an extension [11, 12, 13]. Still, there is need for evidence how brand portfolio strategy (brand name strategy) influences extension evaluations.

Differentiation of the extension from the parent brand is the second important issue when making decisions where to place the extension in the portfolio. In cases of incongruent extension fit is perceived as lower and the extension and the parent brand are not very similar. This indicates that there is no need for differentiation, since similar abstract associations may help for creating fit between the extension and the parent brand and may improve the consumers' evaluation of the extension. On the other hand, when the brand portfolio strategy signals that the extension is more distant from the parent brand, than it is expected of the extension to be different and similar associations may evoke confusion. Differentiated extension in this case may clarify the relation between the parent brand and the extension and generate more positive extension evaluation.

## 3. Conceptual framework

Based on the managerial problem I have identified in the Introduction section, and gaps in theory reflecting extension evaluation issues, I propose a conceptual framework that integrates the variables I have identified. The main purpose of brand managers is to maximize the market performance with optimized brand portfolio through building strong brand extension equity by leveraging parent brand equity and creating distinctive identities for individual brands in the portfolio. As previously discussed, alternative strategy seems to differentiate the extension from the parent name, while at the same time providing brand equity benefits. Besides, this strategy appears to affect customer perceptions of brand extension's similarity to the existing parent brand. Still, it is interesting to discuss the differentiators that can create sufficient differentiation of the extension from the parent brand, and thus result in more favourable attitude towards the extension and the parent brand. This study puts a particular interest in exploring the impact of the extension's level of personality differentiation on consumers' attitude to the portfolio strategy for a brand extension (subbrand vs. endorsed brand). In case of lower perceived fit or incongruent extension, subbrand strategy indicates closer position to the parent brand and same personality may strengthen the perception of closer relation between the extension and the parent

brand. On the other hand endorsed brands have higher distance from the parent brand and different personality may help to explain the relationship to the parent brand and avoid confusion, but at the same time endorsing strategy may help to leverage parent brand's equity.

In sum, this study predicts a three-way interaction between perceived fit, brand portfolio strategy and differentiation. More specifically, there is interaction between brand portfolio strategy and differentiation in low fit condition, and the interaction will not be significant in high fit condition. In order to test this interaction (perceived fit x brand portfolio strategy x differentiation), a 2x2x2 experiment study was conducted.

#### 4. Overview of design, participants and procedure

Testing the research question requires a design that allows manipulation of the level of the brand extension portfolio strategy and personality differentiation, and control of the perceived fit measure. The prediction is that there will be interaction effect between these three variables. Additionally, internal validity is priority of this research, and also previous research in this field is based on experimental studies. The most proper way to examine the effect of three-way interaction is an experimental study with between-subject factorial design. The need to control perceived fit, brand extension portfolio strategy and personality differentiation on two levels each leads to eight conditions and a 2 (perceived fit: low vs. high) X 2 (brand extension portfolio strategy: subbrand vs. endorsed brand) X 2 (extension's personality differentiation: same vs. different) experiment. Personality differentiation and brand portfolio strategy were controlled on two levels each. To avoid unwanted associations, participants responded to only one brand portfolio strategy, and one differentiation strategy, either extension with same or different personality than the parent brand. Additionally, to reduce effect of potential confounding variables, participants were randomly assigned into different groups. A total of 160 students from BI Norwegian School of Management Oslo were selected to participate, randomly assigned to one of the four conditions (A-D), with a total of 40 respondents in each condition. Brand portfolio strategy and differentiation were used as factors to create those four conditions, and based on the level of perceived fit which was the third factor participants were additionally divided into eight conditions (A1-D1, A2-D2). The study is demonstrated in table 1.

**Table 1** Experiment design

		Low fit		High fit	
		Same Personality	Different Personality	Same Personality	Different Personality
Brand Portfolio Strategy	Subbrand	Condition A1	Condition B1	Condition A2	Condition B2
	Endorsed Brand	Condition C1	Condition D1	Condition C2	Condition D2

Perceived fit was not manipulated, but it was measured and participants were identified and grouped depending on the perception as high or low fit. Lee and Schumann [1] argue that perceiving levels of incongruity (or fit) could be a subjective process. Therefore, participants completed question related to perceived fit and were identified as high or low on that measure by a mean split (Mean = 4.1329).

The brand portfolio strategy was manipulated through the name and visual identity of the extensions. Two portfolio strategies for manipulation were selected: subbrand and endorsed brand. Subbrands include the parent name and additional name related to the extension. The parent name and logo are included into the extension's logo through the original Nike logotype and swoosh logo. Endorsed brands consist only the extension name and are visually connected to the parent brand only by the Nike swoosh logo, playing a minor identification role.



**Figure 1** Brand extension logos

The personality differentiation manipulation is concerned with the question if the extension has the same personality as the parent brand or it has new personality and identity. Based on the Jennifer Aaker's [14] five dimensions of brand personality (sincerity, excitement, competence, sophistication and ruggedness), the personality of the parent brand was identified and used in the further manipulations in the experiment. The pre-test showed that Nike has rugged personality, and therefore the extensions were designed and communicated with either same (rugged) or new (sophisticated) personality selected from the five aforementioned dimensions. Sophistication was selected as a new personality since it had the smallest beta coefficient in the regression analysis in the pre-test ( $\beta = .009$ ,  $p = .959$  n.s.), meaning that sophistication has the least significant role in attitude formation of the brand Nike.

In order to develop the experiment stimuli, previous Nike advertisements were analyzed. The same personality was communicated in the same manner as the previous advertising. The name "Eleven" was written with a number only and the logo was designed in a more sporty style. The message that the energy drink gives you power to reach the top was communicated through a rough image of a guy that climbed the top of a mountain. The slogan "Aim higher" was positioned vertically using Arial font with bigger size. The copy of the ad was also written with Arial font, using more rugged words "The new energy drink that gives you strength and max power". The differentiated extension was communicated with more sophisticated personality, which differed from previous Nike ads. The name "Eleven" was written with letters and the logo was designed in a more elegant style, giving associations of a more sophisticated product. The message that the energy drink gives you power to reach the top was communicated through a witty image of a guy that reaches the top of a building – the elevator goes to floor number 205. There was no slogan, but the message was rather visually communicated. The copy of the ad was also written with Times New Roman font, using more subtle words "The new drink that elevates your mind".

After being exposed to manipulation, the participants responded about their attitude towards the extension, as well as attitude towards the parent brand, ad attitude, personality of the extension, and purchase intention. The parent brand attitude was measured both before the manipulation and after the manipulation to identify the change. Therefore, participants first were asked to point out on the 7-point numerical scale their attitude towards the brand Nike, and then to answer the same question regarding the extension. Subjects were asked to rate their overall impression of the brands (parent and extended) on three seven-point semantic differential scales: bad-good, negative-positive, unfavourable-favourable. Ad attitude was also measured on three seven-point semantic differential scales: dislike-like, bad-good, favourable-unfavourable. Furthermore, extension personality was measured on 15 seven-point scales provided by Jennifer Aaker [14], grouped in five personality traits.

## 5. Results

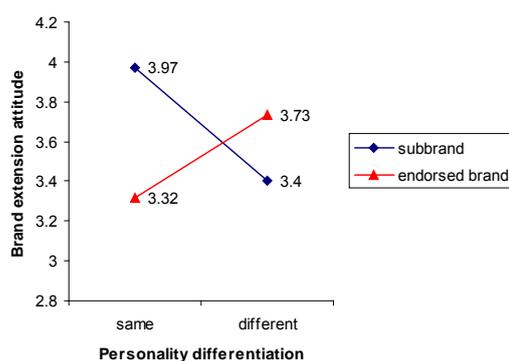
The factor analysis with maximum likelihood extraction method and varimax rotation confirms that the three brand extension attitude measures are highly interrelated and yielded a one-factor solution accounting for 84.1% of the variance. Therefore, the brand extension attitude measure was calculated by averaging the three measures, or adding the three items and dividing the sum by three. Table 2 shows the cell-means of brand extension attitude measured in the study.

**Table 2** ANOVA results - Effect of perceived fit, brand portfolio strategy and personality differentiation on brand extension attitude

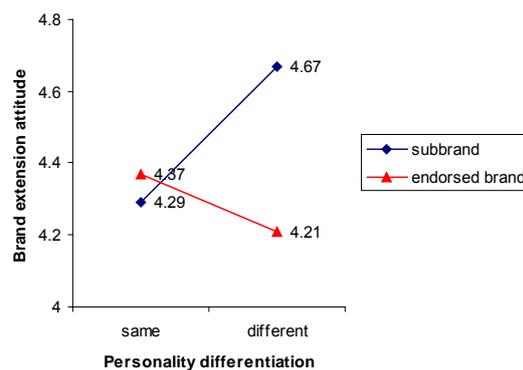
		Low fit		High fit	
		Same Personality	Different Personality	Same Personality	Different Personality
Brand Portfolio Strategy	Subbrand	3.97 (1.27) n = 12	3.40 (1.26) n = 19	4.29 (1.04) n = 28	4.67 (0.87) n = 21
	Endorsed Brand	3.33 (1.16) n = 20	3.73 (.95) n = 25	4.37 (.99) n = 19	4.21 (1.11) n = 14
Marginal means		3.61 <sup>a</sup>		4.39 <sup>a</sup>	

<sup>a</sup>: Main effect of perceived fit sig.  $p = .000$   
Std. deviation in parentheses

A 2 (perceived fit) x 2 (brand portfolio strategy) x 2 (personality differentiation) between subject ANOVA on the brand extension attitude index gave the following results. A significant main effect of perceived fit ( $F(1, 150) = 19.43, p = .000$ ) showed that respondents rated the brand extension more favorably in the high fit condition ( $M_{\text{high fit}} = 4.39$ ), than in the low fit condition ( $M_{\text{low fit}} = 3.61$ ). This effect correlates with the previous theory that fit is necessary to have extension acceptance. The interaction of perceived fit, brand portfolio strategy and differentiation, which is the main prediction in the hypothesis, was significant ( $F(1, 150) = 4.49, p = .036$ ), supporting the predicted increased sensitivity to brand portfolio strategy and differentiation strategy in the lower perceived fit condition. In the case of high perceived fit, participants did not show such sensitivity which correlates with the prediction that brand portfolio strategy and differentiation have no strong impact on extension attitude and perceived fit has the main impact. Simple effect tests within the low fit condition showed no significance in brand extension attitude, although within the same personality condition the attitude is more positive for subbrands ( $M_{\text{same, subbrand}} = 3.97$ ) than for endorsed brands ( $M_{\text{same, endorsed}} = 3.33, F(1, 30) = 2.1, n.s.$ ), and within the different personality condition the attitude is more positive for endorsed brands ( $M_{\text{different, endorsed}} = 3.73$ ) than for subbrands ( $M_{\text{different, subbrand}} = 3.40, F(1, 42) = .98, n.s.$ ). The pattern in figure 2 shows change in brand extension attitude in low fit condition when the extension is launched as a differentiated subbrand, meaning that subbrand with same personality as the parent brand has a higher attitude than the differentiated subbrand. In the case of selecting endorsed brand portfolio strategy, the differentiated extension has slightly higher score on attitude index than the undifferentiated extension.



**Figure 2** The interactive effect of brand portfolio strategy and differentiation on extension evaluation in low fit condition



**Figure 3** The interactive effect of brand portfolio strategy and differentiation on extension evaluation in high fit condition

The pattern in figure 3 shows that respondents were more sensitive to the manipulation of brand portfolio strategy in the differentiated condition, and this sensitivity disappeared when the extension had same personality as the parent brand. Still, there is no significance of the results in the high fit

conditions since, as previously said, perceived fit has the highest impact on brand extension evaluation.

Furthermore, additional test was conducted to check if the mean value of brand extension attitude for A1 condition (low fit-subbrand-same personality) was significantly different from the other high fit conditions. One way ANOVA showed no significant difference between A1 condition and the other conditions in the high fit case. The results indicate that using subbrand strategy and same personality for the extension as the parent brand can help to create more favourable brand extension evaluation despite the lower perceived fit. This supports the initial proposition that wisely using brand portfolio strategy and differentiation strategy might compensate for lack of fit.

## 6. Conclusion

As introduced at the beginning of this research, launching brand extensions has become extremely important and profitable growth strategy. There are plenty of examples where companies have created wider brand portfolios, multiplying their profit. However, there are many examples when companies have heavily invested in extension support, but have failed to succeed on market. Previous research has shown that if consumers perceive high fit between the parent brand and an extension, the extensions would be more favourably evaluated. But, brand managers have interest to launch extensions in more distant categories and in that case fit is perceived as lower. It is of key importance for brand managers to make right strategic decisions before launching and positioning and extension. As predicted incongruent extensions evaluation will be moderated by factors that affect the cognitive resources and impact the perception of lower fit between a parent brand and an extension to a more favourable evaluation. The expected three-way interaction between perceived fit, brand portfolio strategy and differentiation was supported. Namely, the results of the study suggest that when fit between brand extension and parent brand is perceived as lower, brand portfolio strategy and differentiation have an important role in brand extension attitude formation. More specifically, wisely using brand portfolio strategy and differentiation strategy might compensate for lack of fit, for instance using subbrand strategy and same personality for the extension as the parent brand may lead to more favourable extension evaluation, despite the low perceived fit.

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# The entrepreneurial spirit within the mission statements of vocational high schools in Republic of Macedonia

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The aim of secondary vocational education is oriented toward sustainable academics performance that can contribute the development of the country. A mission is of great importance to the organizations as well as for vocational high schools since it promotes vision, values and its goal. It communicates not only to the employees but to the stakeholders and thus provides the basis for the priorities, strategic plans and work tasks of the organization. The paper focuses on the mission statements of Macedonian vocational high schools which they posted on their web sites. With the use of content analysis, the research has the aim to evident the presence of mission statement and whether those statements contain words that support entrepreneurial spirit, like: entrepreneurship, innovation, creativity, self employment. Aside from determine the focus of interest of vocational high schools and their readiness to develop entrepreneurial skills, the research results can contribute to promoting the quality of the mission statements of the vocational high schools.

## Keywords

Content analysis, entrepreneurship, mission, vocational high school.

## 1. Introduction

The vocational education and training system is a very important for the economic development of the country. The basic aim is to educate well trained labor that will be productive, cohesive, motivated and capable of accommodating change and introducing new technologies. The authors agree that there is a need to establish link between vocational education and entrepreneurship. Vocational educators have recognized that starting a business is a natural outcome of vocational skills training, and they are moving ahead to encourage the entrepreneurial spirit in all kinds of young people education. During this period, secondary vocational education in Macedonia is undergoing changes as in terms of programs and the aspect of the intervention of the Government for compulsory secondary education. All this reflects the increasing need for continuous quality improvement of the education plans end programs. This situation requires a sophisticated set of objectives and reallocation of resources in these institutions. One of the goals is certainly to build school programs that will develop student's entrepreneurial skills. To achieve these goals vocational schools need to master the strategic management skills. An important aspect of strategic management is creating a solid mission statement.

## 2. Secondary vocational education in republic of Macedonia and entrepreneurship orientation

Macedonia education system can be classified into two broad divisions i.e., pre-higher and higher education system. The pre-higher education at Macedonia can be further classified into primary, secondary and high education system.

Secondary education in Republic of Macedonia comprises of the following : vocational education; high school education for disabled students ; classical high school education ; art high school education .

Vocational education and training is a part of the educational system, which provides individual development of the personality before acquisition of competencies, knowledge and skills necessary for involvement in the labor market or continuation of the education. It enables initial acquisition of first, second or third level of vocational qualifications. The vocational education and training is delivered through teaching plans and programs for the following types of vocational education:

- Vocational training for jobs with lower requirements which provides practical knowledge and skills for various labor areas. The vocational training programs can include students that obtained elementary education as well as those who have not obtained, but with an obligation, in parallel with the vocational training, to finish their elementary education. The vocational training, depending on the complexity of the occupation, can last up to two years. After the students have finished the vocational training, they acquire I level of vocational qualifications. The students that have graduated vocational training which lasted minimum one year, can continue their education into the second year of the appropriate vocational training for occupation. The students that have graduated in vocational training which lasted minimum one year, can continue their education into the second year of the appropriate vocational training for occupation.
- Vocational training for occupation is dedicated to meet the needs of the economy. Students that have obtained elementary education can enroll in the first year of vocational training for occupation. The vocational training for occupation lasts three years. The vocational training for occupation is delivered in a vocational education and training schools, while the practical training is delivered in the school and in the employers premises. After the students have finished the secondary vocational training for occupation, they acquire the II level of vocational qualifications.
- Technical education is education which mainly produces staff for employment in all fields of labor, but also for continuation of the education. Students that have finished elementary education, or have graduated in vocational training, can get enrolled in the first year of technical education. The duration of the technical education is four years. After graduating in technical education, the students acquire IIIrd level of vocational qualifications. The total number of education profiles is 42 into the frame of the 14 vocations. Students that have graduated technical education can continue their education into university institutions, if they acquire State Matura

Secondary vocational pupils are the number of secondary students enrolled in technical and vocational education programs. Republic of Macedonia has 27 mixed high schools with classical high school and vocational high school education and 38 only vocational educational schools. According to this the total number of vocational high schools is 65.

So far there is little interest in the two-year vocational training for work, the first, lowest level of professional qualification. Such programs are offered only in a small number of occupations: mechanical, construction, electro-technical and others. The three year vocational education programs, which are the second level of professional qualifications, recorded 9.99% of the students, a relatively small percentage compared to 39.3% students who attend high school and 50.8% students who are enrolled in four year programs in vocational schools.

Presently, the Macedonia vocational high education system is undergoing reformation. The system is getting much more simpler so that it can match itself with the educational systems of other European nations. The basic idea is to abolish occupations that are obsolete and archaic and to introduce new one that will satisfy labor market needs.

The recommendations from European Commission for Enterprise and Industry is that if Europe want to make a success of the Lisbon strategy for growth and employment, needs to stimulate entrepreneurial mindsets among young people, encourage innovative business start-ups, and foster a culture that is friendlier to entrepreneurship and to the growth of small and medium-sized businesses. The important role of education in promoting more entrepreneurial attitudes and behaviours, starting even at primary school.

Educational institutions have a responsibility to include in their curriculum techniques for helping students develop entrepreneurial skills. In order to be successful in this reform it is necessary to

develop partnership between business owners and vocational educators and to infuse entrepreneurial education in vocational education.

Entrepreneurship education should not be confused with general business or economic studies, as its goal is to promote creativity, innovation and self-employment.

According to analysis on the official education programs approved from the Ministry of Science for the secondary vocational schools, made for the purpose of this research, education for entrepreneurship can be found only in the subject named "business". This subject generally contains basic aspects of how to establish and run business. Components like creativity and innovation are missing. Students learn this subject in 3 and 4 year on secondary vocational education level. The exception is program in high school for the economy where students learn subject "business" starting first year.

### 3. Vocational high school and meaning of mission statement

Mission statements are created to represent organizational values and guide the actions of the vocational schools. With increased demands for school management and academic accountability, school leaders are under pressure to ensure and maintain high levels of academic performance, and respond to the needs of the environment.

According to Ireland and Hitt mission is important for all types of organizations because: effective mission defines the fundamental, unique purpose, distinguishes the organization from others that are in the same business, identify scope of business operations, in terms of products and markets. Mission statements serve to provide motivation, general direction, company image, color, set of attitudes that guide organizational actions. The mission has the soul of the company and it is inspiring the actions of the members.

The authors like Drucker, Pearce and David agree that the need for strategic planning appears to be a foregone conclusion to the changing demands of the environment. Mission statements represent the first step of strategic management to adapt to changing conditions of their environment.

The success of any business, including secondary vocational education is perceived in the supply of products and services that are competitive worldwide, not just locally. Global markets are becoming reality. Macedonian high schools need to change the value system and organizational culture to be able to meet the new demands of their environment. That is to shape the profiles of students who will respond to market demands, but will be able to follow the innovations in terms of technology and have the leadership skills to create businesses to run.

### 4. Scope and subject of the research

The survey is conducted in high vocational schools in Macedonia is the first of its kind and seeks to explain:

- Whether or not there is a mission and what is the focus of attention devoted to specific topics;
- Which words are contained in mission statements of vocational high schools with particular interest to: entrepreneurship, creativity, innovation, self-employment, small business.

In designing the *sample* survey, the official data was used - a document issued by the Ministry of Education and Science of the Republic of Macedonia (4.02.2011), with the current number of vocational schools in the country. According to the document, in the Republic of Macedonia officially registered 65 vocational schools.

The *unit of analysis* in research was the missions content of vocational high schools announced on their WEB pages. In cases where the mission is not released, was analyzed the contents of the parts: Address of the founder, for us, Objectives and History.

The *technique of research* was content analysis, because this technique allows discovering and describing the focus of individual, group, institutional or social attention. It also allows inferences to be made which can then be corroborated using other methods of data collection. Content analysis is also useful for examining trends and patterns in documents.

The survey was conducted in the period from 11:01. 2011th to 4.02.2011

The components of the content research were the following words: entrepreneurship, small business, innovation, creativity, self employment.

## 4.1. Results and discussion

The web search results suggest that only 12 from 65 schools have their mission statement published on their official web site:

- “D-r Jovan Kalauzi” – Bitola
- “Jovche Teslichkov” – Veles
- “Dimitrija Chuposki” Veles
- “Metodija Mitevski - Brico” Delchevo
- “Mitko Pendzukliski” – Kratovo
- “Car Samoil” – Resen
- “Georgi Dimitrov” – Skopje
- “D-r Panche Karagjozov” – Skopje
- “Lazar Tanev” – Skopje
- “Marija Kiri Sklodovska” – Skopje
- “Nikola Shtejn” - Tetovo

Some of the schools (total number: 18) have their official web site, and most of them (total number: 30) are integrated in the portal which is established by the Bureau for education development. The access to the portal doesn't have an open character, it requires user name and password to log in, and the information are generally not up-dated. Only 3 schools promote e-learning. E-learning is a new tool that helps students to study 24 hours a day. This means that the teaching content is available online and provides immediate feedback to help students to learn. At the same time helps teachers to produce web-based courses.

The content analysis of the mission statements, as it was required for the purpose of the specifically defined research objectives, was focused particularly on these following components:

- Entrepreneurship
- Innovation
- Creativity
- Self-employment

Therefore, the results from this type of research bring disappointment from entrepreneurship perspective, as there is no emphasis on development of that kind of behavior, skills and spirit in young people in Republic of Macedonia, as the components are not consisted in any of the mission statements, except in the mission of “Lazar Tanev”:

“The school's mission is directed to training young people to be responsible in social life respecting the principles of democracy, tolerance, constructiveness, patience, mutual understanding, *taking initiatives, being creative and being competent.*”

The conclusion implied by the content analysis conducted of the missions is that schools are still self-orientated, because the missions highlight as most important values the implementation of educational plans and programs, while missing outward orientation or sense of fulfillment of wider social goal and development of entrepreneurship spirit, as high level priority.

Although further research is needed to determine relationships between mission statements and the values which contribute to the development of entrepreneurship and students behavior that is actually manifested in a school, some practical implications may be drawn from this study. As such, vocational school leaders should support the collaborative development of school- specific mission statement. Furthermore, vocational high school principals need to share their personal vision with their staff that articulates the type of organization they desire to achieve. Also, mission statements should be readily identified on campus websites to enhance communication with parents and the community.

We believe, however, that having a shared mission statement is a starting point to re-culture schools. As we stated in the beginning of this study, mission statement represent organizational values and provide direction for the employees and it will contribute to development of the entrepreneurship spirit.

## 5. Conclusion

The development of entrepreneurial skills among students is an important aspect of vocational high education. Agreeing with Drucker that the entrepreneur is a person that maximizes opportunities, a person with this competency is also required as an employee and as founder of a small business, or agent of social change for further development of the country. There is no doubt that vocational schools have an important role in this process and the upcoming reforms. But no reform is possible without changing the organizational culture and mind set of employees. A mission has important role because it shows at least a little, the values that institution tries to uphold, also the meaning and direction of action. From conducted mission research it is clear that the function of strategic management in many vocational schools has been neglected. Here we can share the opinion of Kreber and Mhina that mission cannot be held as sure proof that institution will meet the goals and ideals that they publicly declared to meet. Nevertheless, analyzing the mission is important because the institution itself holds it important. This is way researching mission statement is a useful start to researching values that schools uphold. The current analysis showed that in vocational high schools lack awareness of building the entrepreneurial spirit. The essential elements and characteristics of entrepreneurship as innovation from which comes the power of entrepreneurship, learning to take the risk to self employment, creativity, are rarely represented or do not exist in mission statements. From the analysis can be seen the school attitude toward the information and communication technology. In most schools analyzed web pages are have not been updated since 2007. This research can be used as the basis for understanding the changing trends over time.

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# Innovation as the answer to the quest for regional progress

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Neoclassical Economics and Economic-Geography had the largest impact on the Slovenian regional development since the seventies in the 20th century. Joining the EU had its impact on regional development planning, especially with the preparation and implementation of Regional development programs, the first for the period 2004-06 and the second for the period 2007-2013. 12 development regions were established at the NUTS III level. The current economic crises shows, that the European and therefore also national development policies are not sufficient to shrink the divergence between the regions. But if the profit is not the ultimate goal (and neither is the competitiveness), what should be put in the centre of humankind's care?

With the Dialectical Systems Theory we can show, that the regional development is complex and complicated in nature and the humankind is endangered by entropy against which we can bet only with induction of innovative changes (that are constant parts of development). Consequently: if we strive for progress (and not only development in this or that direction) in regional development, the processes, the mechanisms and the tools for generating new and useful (and only such!) should be set up. Regional innovation therefore is in the centre of sustainable development. Without doubts, an adequate institutional framework should be established that would encourage the progress and would take into account all levels: individual – community – region – state – EU. Therefore we suggest establishing of two models: the first one for strategic regional management and innovation and the second for the implementation of the cohesion policy on the regional level for the period 2014-2020 that could be used for Slovenian region Podravje as well as other regions.

## Keywords

Cohesion Policy, Dialectical Systems Theory, Innovation management, Regional innovation, Regional development policy

## 1. Dialectical Systems Theory (DTS) and regional development

Mulej's DST [1] made the dialectical system concept (instead of a General System Theory [2] one) methodologically supported by becoming, formally, a dialectical system of three elements and three relations, in general. They are supposed to both influence humans as observers, thinkers, decision makers, and decision implementers, and to help them attain the requisite holism of their behaviour to enable the best possible results. Success is thus attained with no excessive effort and no crucial lack of insight and influence; this requires a well-managed process in which all crucial steps, interdependences and synergies are considered. In order to attain such a success, human attributes of both decision makers and decision implementers must support creativity and requisite holism with co-operation of complementary professionals. In this effort, it helps a lot, if application of theory can

take place in an informal style. This is why there are three relations and three elements in the DST as a dialectical system: all of them are both essential and sufficient; in other words, DST matches criteria of requisite holism. The three DTS applied to the regional development are shown below.

*The law of requisite holism* (it demands the author/s of the definition of a system representing the object under their consideration and/or control to clearly state what part of attributes of the object is included into their system; this is the mental picture of the object under consideration and/or control; one must do one's best to fight over-simplification by all available/crucial knowledge and skills as well as by ethics of interdependence).

Applied to regional development, the law of requisite holism shows, that the space-based policy [3] in which region is described as three spatial and one time component is not sufficient to capture region as nexus of individuals (which can be on the aggregated level described in terms of well-being that can be measured with objective as well subjective indicators). In the same context the RDPs as the strategic plans of regional development are complex in nature and even in mathematical terms. However, the sustainability which is still understood as the leading objective of regional development is still divided into environmental, economic as well societal development. The institutional aspects are usually left out. Even if we take into account all four strands, the same challenges (as the development issues are) are viewed from too narrow viewpoints. This problem is not solved with the so called horizontal measures such as innovativeness, gender mainstreaming etc. What should be done is to overcome the »silos« thinking and start to work in the trans-disciplinary teams if the new and creative outcomes should be found for all the challenges that regional inhabitants judge as important (weather from the cognitive or emotional viewpoint)? We should not neglect the fact that the convergence (in macro-economic terms, [4]) is not seen between the states as well as not between the regions (in case of Slovenia the regional divergence is constantly increasing despite the regional policy proclaiming to act in favour of less developed regions, [5]).

*The law of entropy* (it reflects the reality in which there is a permanent tendency toward destruction, which demands requisite holism and innovations permanently; the latter ones have conditioned survival since the times humankind has given up human's adaptation to nature).

In the context of the law of entropy we have to consider, think and rethink: shall we induce the changes; shall the changes be hindered; shall we try to attain the equilibrium. The mentioned possibilities are showing the possible re-action to the changes: in the first case we strengthen them, in the second we try to suppress them, and in the third we try to minimise their impact. Why do holism and innovativeness as human attributes matters? With both of them we can act against the entropy. Although the innovation should not be linked to small technically and technologically novelties elaborated without the formal duty, the innovations are still described and interpreted in those terms (although the EU definition [6] prescribes, that innovation is every novelty proven as beneficial in praxis (and only such) [1]).

In the context of development the innovativeness could be defined as constant intention of spirit/thoughts/intention that is striving for newness (usefulness is the measure set by the European innovation policy as criteria for justification of the public funds spent). If the intention for people to look out for newness is the smallest denominator of the being and human doing, then in the regional development we have to take into account all three components:

- Organisational (with the question: is the organisation that should be liable for regional development, innovative enough to play the role of regional impulse maker)?
- Processes (if anything, and what, is changing with the introduction of single measures aimed at enhancement of regional development programmes and even more important):
- How the different components of the society/individuals are included in the development or products/services (of which the RDP is part)?

Speaking in DTS terminology the innovation is described not as a sum but as synergy. Which of the mentioned factors below may be zero? *Innovation = (invention X entrepreneurship and entrepreneurial spirit X requisite holism X management X co-workers X innovation-friendly culture X customers X competitors X suppliers X natural environment X socio-economic environment and other outer, i.e. objective conditions X random factors, such as luck)*. Thus, we see a long and complex way from idea via invention to innovation/new benefit.

## **1.1 Differences between invention, potential innovation and innovation**

Invention is every new idea that might lead to the benefits of the customers and authors/owners. Technologically-technical invention used in the production could be monopolised by the patent. The number of patents in official statistics is a frequent measure of inventiveness and unfortunately also of innovativeness of particular state or the region. Potential innovation describes the level of invention development when it has all attributes needed for practical usability but still does not provide benefits for the users and authors/owners. The technological-technical as well as marketing, investment, financial, production and other viewpoints should be taken into account.

Innovation has already its customers and proven – more than usefulness: proven benefit in practice. Not to be forgotten: only one of 3.000 ideas, one percent of the patented inventions and four out of one hundred official company innovation projects become radical innovation and seven percentages incremental innovation. Percentages concerning non-technological innovations are not available, but they are obviously even more complex, because they attack the given habits.

What novelty is useful and beneficial, the customers decide; in case of the development funds these are the contracting authorities or the private capitalist (in case of regional funds the authorised civil servants). Therefore their judgments about the novelty and their benefit from it are matter of subjective viewpoints (norms, culture, ethics, values etc.) as well as the knowing about the regional state of affairs. Still there is no distinction between the promising idea-suggestion-invention and innovation in public calls and the scores that are usually given to the applications are solely arbitrary (what is assessed as the more then potential cannot be assessed; more, it is neglected that the target group has to decide whether or not the novelty is (and not will be!) useful and beneficial to them. Therefore innovation is invention plus commercialisation [8].

How do these findings apply to regions in need of more innovation as processes and its outcome?

## **2. Agency for Regional Innovation**

The first step the regions can make to reorient development (at least in Slovenia) is to change the nature and tasks of regional development agencies (12 development regions in total, but without legislative power). Therefore we propose the model that could be applied to all regions called ARI (Agency for Regional Innovation).

The national innovation systems were popular at the end of 20th century. Slovenia is very centralized (in political as well as in policy terms) and »feudalized«: the regional development (and cohesion policy) is under the Governmental Office for Local Self-Government and regional policy that is also in charge of accreditation of the 12 development agencies; for encouragement of entrepreneurship and competitiveness the Ministry of Economy has its own agency JAPTI (with the VEM points on the local level), Ministry of Higher Education, Science and Technology has its own agency TIA, while the spatial planning is under Ministry of Environment that is not active on the regional level (on the lower level of municipality there are special spatial departments and offices in charge of municipal preparation of spatial plans).

From the description it is obvious that Slovenia has a heavily centralised organisation (all important functions and funds) and on other hand it is explicitly dispersed without holism. Regional development policy must become trans-disciplinary; it cannot be in charge only of the economic development, but also of spatial, environmental as well as societal dimensions not neglecting the institutional set up (of its working). Regional development agencies, in the coming years, have to be transformed into agencies for regional innovation (ARI).

The tasks of ARI shall become:

- Mediator and mutual connectors of innovation potentials in regional community. It shall become nexus of the network that includes inventors, innovators and others that are encouraging new and useful that may become beneficial for the region at stake and its partners. ARI shall act on local, regional, and international levels by networking domestic and foreign knowledge by searching for new answers to the local needs (and not only global or national problems).
- ARI shall introduce new and useful ideas for local/regional society that are going beyond technical and scientific inventions into non-technological ones.
- ARI shall use the innovative technologies, including the e-Science, virtual reality, simulation techniques so that it will not only inform but also introduce innovative changes into its e-regional community.
- ARI shall shape the innovation policy on local, regional as well as on other levels by unleashing the potentials of public sector and public services and sponsoring their cooperation with business

and future to-be businesses. The innovation metrics shall be aligned to the needs as well as the innovativeness of public services shall be shown, documented and validated etc.

- ARI shall promote social responsibility of local and regional companies to become the echo of customers, their requirements as well as expert's discussion about what the customers expect from the producers. ARI can contribute to the social responsibility by revealing the cognitive preconditions needed for innovation: from interdisciplinary creative cooperation, basic creativity, problems detecting and solving, interpersonal skills to management, on one hand, and the risk taking, provocation, initiative taking and facing with problems as typical innovators attributes on the other hand. ARI shall contribute to socially responsible public procurement by requesting the green and innovation policy from the suppliers or the service providers: only the most socially responsible, total quality developed to systemic quality supplier-networks shall be eligible.
- ARI shall become research and development institutions for its region. ARI shall prepare pilot projects that have impacts on regional level of economy and quality of life.
- ARI shall not be only a propaganda machine for the mayors but shall serve broader societal interests reaching beyond for local policy people to meet, prescribe and decide but for companies, NGOs, research and educational institutions to meet. Therefore it shall become the engine of innovative and socially responsible changes in regional community.

Thus, the core of ARI shall consist of regional innovation and its diffusion.

## **2.1 Regional innovation and diffusion – the core responsibility of ARI**

Due to the emphasis given to the economic development within the regional development, the question is how the ARI can contribute to the regional innovation and diffusion processes (IIDP).

The following question should be answered beforehand: 1. How to encourage the regional creativity; 2. Which is the invention-innovation-diffusion process management's role: from the idea generation to the innovation diffusion; 3. How to design the regional market for invention, potential innovation and innovation and how to impact the speed and volume of diffusion; 4. How to place ARI on the innovation market. The possible answers to the questions are there in the Table 1 below.

**Table 1** Regional organisation of IIDP support

<b>Level of novelty</b>	<b>Institutional support on regional level – ARI</b>	<b>The elements of support</b>
Invention/suggestions (promising and written new idea)	Establishment of regional business angels clubs (to be included in EBAN and national business angles networks) with prepared services. Establishment of regional innovation fund for promising inventions with the web-portal for the mutual cooperation	Search for business angels; preparation of contractual agreements; act on behalf of the inventors; preparation of contracts (financial arrangements); services for business angles (clubs meetings, trainings, evaluations etc.). Establishment of teams (connection with research and marketing institutions), legal, marketing, business, financial, tax counselling.
Potential innovation (=useful novelty)	Set up of regional seed capital fund	Networking of potential innovation owners with the entrepreneurs and fund raising for the start of the production.
Innovation (=proven benefit for users of the novelty)	Regional marketing platform	Marketing research, connection of results from previous phases with potential producers; Marketing actions; function of opinion leaders.

Source: own contribution of authors

## **3. The model of innovativeness and strategic management of development region (NUTS III)**

### **3.1 Preparation of institutional framework for regional strategic and innovation management**

1. Regional Council (at the very moment the group of all mayors in one development region) nominates the Council for regional innovation and strategic management (CRIS) that shapes,

steers, monitors and oversees the economic, environmental, societal as well as institutional development of regional society grounded in the IIDP. CRIS is composed of 12 experts (multidisciplinary team with references), established for a 5 years term. It prepares yearly report to be approved by the Regional Council (that decides about the awards for the members according to their effectiveness and efficiency – the measures to be elaborated in advance and to cover all five years to prevent short-term criteria).

2. For the implementation of strategic innovation and management of development regions the ARI shall be established in each of them. The composition could follow the principles of public-private partnership.

### **3.2 The roles and tasks of ARI shall be**

1. ARI is responsible for IIDP in the region;
2. ARI shapes the innovation policy on the regional level;
3. ARI is multidisciplinary organisation, above any local/global »think-tank«;
4. ARI acts on all 4 pillars of sustainable development (societal, economic, environmental and institutional) as well overcoming the division to four pillars (inter-connection and mutual interdependency of the researchers as well as research topics and their interactions);
5. ARI is directed toward the development phase of new and benefit promising (and the implementation of novelty in the case of social innovation and commercialisation in the case of business innovation): ideas, suggestions, inventions and well as innovation promotion;
6. ARI acts as the quite holistic interdependent platform for public and private organisations to induce novelty (also with challenging or highlighting the norms, ethics, codes, modes of doing and being) and is so the basis for rethinking so called tasks of strategic development in researching what is the content and what the ways of possible development.

### **3.2 Basic regional development documents**

1. ARI is responsible for the preparation of single strategic documents as basis for innovation of development regions (long-term, mid-term as well as short term strategic plans as well as for the organisation of ex-ante, mid-term and ex-post evaluation). The strategic documents are approved by the Council for regional innovation and strategic management. The funds are guaranteed by the ARI founders.
2. ARI acts with the established professional management of IIDP and strategic regional development team that has sufficient capacity of inventive, motivated and entrepreneurial managers, responsible for the implementation of the strategic documents including the establishment and financing of regional development instruments. Financing is assured through the offered services. For the elaboration and preparation of services the organisation shall apply in the eligible calls for proposals or by use of PPP.
3. Regional innovation instruments are (inter alia):
  - Preparation of regional development platform (active participation of regional inhabitants and use of modern ICT for open innovation);
  - Preparation of regional development indicators and their monitoring as well as evaluation of impacts of single programmes/projects that are implemented on the regional level (by taking into account subjective as well objective criteria of wellbeing and social responsibility, including sustainable development);
  - Preparation of regional platform for IIDP (for cooperation of: intermediaries whose success can be measured with the success of their target groups; specialised organisation – funds, clubs etc., inventors and innovators and broader public including public media);
  - Preparation of regional club of business angels (that is able to act closely with the national and international networks of business angels) with developed services;
  - Preparation of regional fund for promising inventions with the portal (for open innovation);
  - Preparation of regional seed capital fund;
  - Preparation of regional marketing platform (including the elements of regional internationalisation).

The proposed model for innovation and strategic management in development region has in its core its tendency to solve the problem of entropy and quest for permanent development of innovative

changes in the community worked on. On the institutional level it makes sense to innovatively change the existing model, reduce the competences of the current institutes (such as Regional Council), avoid conflicts of interest, foremost shape the regional instruments for IIDP that will enable development and break-through on the global level. The starting point is preparation of long-term, middle-term and short term development strategies which are not bound only to the cohesion funds. More, for the efficiency of regional strategic management there is a need to increase the professionalization - of ARI as institutions as well as their members. Therefore we propose to shape new organisation, ARI and the Council for its supervision. ARI must, especially in the phase of generating new ideas and suggestions and inventions, become local/regional »think-tank« that will have knowledge and competences to be actively involved in societal innovative changes that will see and take part in challenges and searching for answers that will be implemented with new development instruments.

## **4. Model for preparation cohesion implementation on regional level 2014+**

The law of hierarchy of succession and interdependence (later events depend on earlier events of the same process crucially; processes and events interact, when and because they are interdependent; interaction is a precondition of survival, too: without it processes stop) is applied here.

Applied to regional development, the law of hierarchy of succession and interdependence shows that the final outcomes are not bound only to the implementation part (work programmes as the fundamental proves) nor to the management or information process but foremost (although not exclusively) it depends on its starting points. So: which starts points shall be chosen to be in line with the contemporary circumstances? Because one cannot neglect the subjective starting points of the observers/researchers/experts who are preparing the RDP, the broader societal consensus shall be reached not only about objectives, priorities and tasks in the defined time space but also about the ethics, norms, values and culture shaping the society. Therefore the new model (in accord with the regional development) shall be set up.

Model for the preparation of implementation documents for the new cohesion period on the regional level 2014 – 2020 is proposed due to the deficiency of centralized model of cohesion funds and unclear and especially conflicting roles of regional (local) development institutions. Therefore the innovative changes should be made on national, regional, and local levels.

### **4.1 National level**

1. Development forum shall be set up consisting of e.g. all 12 Slovenian development regions to discuss allocation policy based on regional proposals (starting points are the strengths and regional challenges seen in long-, mid-term and short term strategic plans).
2. Allocation of funds on regional level with the establishment of special development fund by the ARI.
3. Yearly development forum with the task to monitor regional development and the impacts of the cohesion policy.

### **4.2 Regional Level**

#### **4.2.1 Phase: project identification**

This phase should enable the broadest collection of potential projects that are justified as needed as well as holistic and considering interdependence of local and other units. In this phase the criteria for project ideas selection should be prepared and define the minimum criteria (elements for the purposes, partnerships, project types – services/supply/works as well as set up the financial volume of projects) and based upon the criteria select the project ideas.

1. ARI prepares the web-based platform for idea generation (and e.g. market the 10 best and 10 flops); their senders have to be identified (either as the representatives of organizations or physical persons).
2. ARI announces the criteria for project idea selection by taking into account the answers to the following questions:
  - Does the project contribute to the well-being of inhabitants (material vs. subjective well-being)?

- Is the project innovative (from the management viewpoint, processes or services/products) and, if so, is it found such by the target group (challenges for stakeholders/target groups or problems faced by the target group)?
  - Are there solutions that have already been developed with the public funds and must be only transferred, adopted, and adapted (and would therefore for the target group still represent a beneficial novelty)?
  - Does the project at stake contribute to the social capital of the region (partnership, quantitative and qualitative criteria)?
  - Is the project socially responsible, e.g. sustainable in the nature (viewpoints of sustainable development: environmental, economic, social, and institutional)?
  - Are the equal opportunities and other horizontal policies of the EU/nation/region taken into account?
  - Does it, and if so how, the project contribute to the social responsibility as the ethics and strategy in the region?
3. Part of the allocated funds shall be reserved for so called strategic projects and part for those for which the societies in broadest terms can participate.
  4. ARI prepares the list of proposed project ideas and submits it to the Council for information only.
  5. ARI gets into contact with the project idea holders so that the next phase could begin.

#### **4.2.2 Phase of project structuring**

In this phase the feasibility studies have to be prepared according to the joint methodology; the different policy should be taken into account by project screening, the private interest shall be estimated, cost-benefit analysis should be prepared, and the preliminary appraisal of financial construction as well the implementation structure should be done. Only so called structured projects should become part of Regional Implementation Plan.

1. Projects structuring is done in interdependence and interaction of the project holders and the ARI.
2. ARI reports monthly about the status of the projects to the Council.

#### **4.2.3 Phase of Project financing**

Project financing: cost-benefit is only one element of this phase which shall answer the question, which projects shall be co-financed and in which sequences; at this point it should be decided: whether the project is feasible (with/without modifications) or not and if it is acceptable from the cost-benefit viewpoint; if it is so, the implementation structure should be defined by taking into account potential risks in order to enable feasibility, transparency, efficiency and effectiveness of the implementation. The legislation linked to public procurement should be respected.

1. ARI is responsible for financial transparency of the project and for the closing of financial project's construction.
2. ARI is in charge to inspect the appropriateness of the documents (legal documents).

#### **4.2.4 Project implementation phase**

1. For the project implementation the project partnership is responsible.
2. ARI shall offer technical assistance to the project holders if needed.

#### **4.2.5 Phase of projects monitoring**

The phase includes the monitoring of financial issues as well as attainment of objectives/results/verifiable indicators as well as other aspects needed for the project implementation (spatial plans processes etc.). The on-site monitoring should become a crucial monitoring tool.

1. ARI shall prepare the on-going monitoring system for project implementation.
2. Council approves the monthly reports on the programme level.

#### **4.2.6 Evaluation phase**

The evaluation of RDP implementation (as well as of single projects) should take place as ex-ante, mid-term, and ex-post phase.

## 5. Conclusions

In order to avoid entropy and status-quo of the current regional development policy we proposed two models: the first model presents the new role of the regional organisations that has to manage strategic regional processes as IIDP (labelled as Agency for Regional Innovation in contrast to the current Regional Development Agencies); and the second outlines the participation model for the regions in allocation policy from 2014 on. The latter is feasible, if the preconditions are met: the regions seen as the networking of their members (inhabitants and organisations in which they are actively involved).

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## List of Abbreviations

ARI	Agency for Regional Innovation
CRIS	Council for Regional Innovation and Strategic Management
DTS	Dialectical Systems Theory
GOSP	Governmental Office for Local Self-Government and regional policy
ICT	Information Communication Technology
IIDP	Invention-Innovation-Diffusion Processes
JAPTI	Public Agency of Republic Slovenia for Entrepreneurship and Foreign Investments
NGO	Non-governmental Institutions
NUTS	Nomenclature Des Unites Territoriales Statistiques (Nomenclature of Territorial Units for Statistics)
PPP	Public Private Partnership
RDP	Regional Development Plan
TIA	Slovenian Technology Agency
VEM	One Stop Shop

# Methodological challenges of measuring intangible capital in developing countries: the case of innovation activity

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Economic growth was long considered to be largely dependent on capital accumulation, but recent research confirms that intangible capital has a strong impact on productivity and growth. The investigation of the role of intangible capital is still in early stages of development in emerging economies, primarily due to difficulties in obtaining suitable and reliable data on intangible capital in the official statistics. Consequently, the survey methodology is used to overcome the data problem.

The paper analyzes the methodologies used to measure intangible capital, focusing on innovation activity. We focus on existing survey methodologies, conducted by national statistical offices or some supranational organization and analyze their appropriateness for this stream of research. Often, intangible assets are insufficiently captured in questionnaires; therefore extensions are proposed, following existing literature and own experience. We propose a method, combining a cascade constructed questionnaire and official company data (financial statements). A study on a sample of Slovenian manufacturing companies was also conducted, revealing many methodological challenges, which are presented in the paper.

## Keywords

Developing countries, Innovation, Measurement problems, R&D activity

## 1. Introduction

Intangible capital represents a crucial factor of growth in developed countries and, as such, it certainly needs to be among their main interest, especially to those countries that find themselves on the brink of developmental breakthrough to the developed group. But the research has so far only scarcely covered those, for example Prašnikar (2010), Fukao et al. (2007), and VanArk et al. (2009). One of the major problems is collection and quality of data.

Innovation property, a part of intangible capital, depends largely on R&D. We attempt to first define R&D in accordance with the characteristics of R&D in developing countries, which differs from R&D in developed countries. Also, the data show that the size and characteristics of R&D are different in technology-followers in comparison to leaders. Therefore it is necessary to capture the R&D and innovation activity in the developing countries in a different manner. As sources of data normally official statistical sources are used, which describe the phenomenon by either capturing the expenditure on R&D, employment in R&D, number of patents of the company etc., or by using standardized (internationally comparable) questionnaires. But, these questionnaires, given their attempt to be simplistic, standardized, and comparative, are less able to capture the problems arising in technology-followers. We propose a methodology for capturing R&D and the innovation activity in developing countries. Last, we present preliminary results obtained with the application of this

methodology in the Slovenian manufacturing sector, focusing primarily on methodological challenges. The development and testing of the questionnaire used in this survey was a year long process. The preliminary results that are based on a sample of manufacturing companies in Slovenia are interesting and in many cases confirm the aforementioned characteristics of R&D in the technology-followers.

## **2. Measuring innovation activity**

### **2.1 What is being measured?**

According to the Frascati Manual (OECD, 2002) research and experimental development (R&D) comprise the creative work undertaken on a systematic basis in order to increase the stock of knowledge to devise new applications and can be classified into basic research (experimental and theoretical research with the purpose of gaining new knowledge), applied research (obtaining new knowledge focused on certain practical goals and purposes) and experimental development (systematic application of existing knowledge to new products and services).

Determining which intangibles should be considered as capital is not straightforward. According to the System of National Accounts (1993), the value of research and development (R&D) should be determined in terms of the economic benefits it is expected to provide in the future. In principle, R&D that does not provide an economic benefit to its owner does not constitute a fixed asset and should be treated as an intermediate consumption (Daniels, 2007). One firm's activities can only truly be called innovative when they have the effect of increasing productivity.

One outcome of innovation and R&D is the creation of new products, which when protected by copyrights i.e. patents allow the holder to exploit them and set prices above equilibrium. The other possible outcome is the increase in productivity, when research activity focuses on the production process. A recent study on the top 1000 Global Innovators (in Jaruzelski et al, 2005) also indicates that no statistical relationship exists between the number of patents and company business results: it is more important to develop a robust business model and solid cross-functional capabilities than to increase their R&D budget. Patents matter only if the underlying invention will result in profits for the patent owner, and only then can we equate a patent with innovation.

### **2.2 Measuring innovation in developing countries: challenges and data sources**

Innovation can either be a new product, a process or their significant technological change. It is not necessary that the innovation is new for the market as long as it is new for the company that launches it (Prasnikar & Kotnik, 2005). That is the rationale behind our expectations to observe different types i.e. different stages of innovativeness in technology-leader countries as compared to the technology-followers. Forbes and Wield (2000) suggest that, the innovation process in the technology-follower countries leads to new practises in R&D. Followers rely more on incremental innovation, rather than radical innovation. Also process innovation is equally or more important than product innovation, especially if the follower is developing cost advantages (Prasnikar & Kotnik, 2005). Shop-floor innovation is perceived as a major source of cost-saving, while organisational, cultural, and managerial innovations can help build the environment in which incremental innovation can continuously spread. Given the industrial development stage of the technology-follower country, the process innovation will often be more important than product innovation (Kline, 1991).

Forbes and Wield (2000) also claim that with exceptions, research has a rather limited role in technology-follower countries, because the firms conduct research to increase their absorptive capacity for research done outside the firm. They add that it is beneficial that these firms involve in formal R&D for number of reasons: complementing shop-floor innovation; intangible spin-off benefits for the whole organization; learning capability of R&D teams and the notion that moving up the value-chain to more attractive markets depends on a firm's ability to develop proprietary product-designs.

The problem of capturing the characteristics of R&D and innovation activity have been dealt with in different ways in empirical work, but a large number of articles (e.g. Wakelin, 2001, Griffith et al., 2000) uses the official data, such as statistical sources, either in terms of hard data (expenditure on R&D, employment, number of patents, new products, etc) or standardized survey (questionnaire) data, like Community Innovation Survey, OECD Innovation Survey and national innovation surveys.

Several problems can be encountered when using this data. Firstly, much of the data is being collected with company-based surveys. Second, although the number of indicators is rather large and able to provide a good description of the current state of R&D and innovation, the data is often

problematical when attempted to be used in an empirical research. For example, studies have shown either a positive or a non-existing relationship between innovation, R&D, productivity and growth on an aggregate level (e.g. Damijan & Kostevc, 2006). The discrepancy between what is being logically expected and the estimates can be attributed to the following factors: (1) aggregated data does not fully reveal and, in the same time, simplifies the actual process of transferring R&D into higher value added, productivity and growth; (2) given that the data often originates from questionnaire data aggregation, there are many missing elements (especially the more detailed ones), while in addition, that data often tends to be out-of-date; (3) for the purposes of policy decision making, the data also tends to be misleading, since it does not reveal the heterogeneity by size and sectors.

The Oslo manual (3<sup>rd</sup> edition, 2005) specifies the methodological guidelines for collecting and interpretation of firm level data on innovation. It (2005, p. 18-20) provides a detailed description on how to provide data on key four elements: the definition of innovation activities and expenditures, the factors influencing innovation, the types and the impact of innovation in the firm, and innovation linkages. The Oslo manual is also used for the Community Innovation Survey (CIS) which analyzes firm level innovation in the EU. We next briefly describe the 2004 questionnaire, used also in the 2006 survey. The questionnaire begins with the definition of the firm location and its target markets, then continues with a careful examination of the product innovation (type, how they were developed, revenue from new products), deals with process innovation (type, how developed), briefly deals with the problem of whether or not the company had any abandoned innovation. Section 5 of the questionnaire deals with the R&D characteristics, R&D expenditure and structure, and the outside financial assistance. Section 6 deals with the sources of input information for innovation (internal, market, institutional), and the cooperation in R&D activities. Section 7 analyzes the impact of different types of innovation (product- and process oriented effects, etc). Further the questionnaire deals with the factors hampering innovation and intellectual property rights, and finally addresses the marketing and the organizational innovation (CIS questionnaire, 2004). The questionnaire is highly detailed and analyzes many aspects of innovation and R&D, and being implemented in 30 countries, it provides a vast coverage of the innovation activity. As such it is an important and a valuable database for the study of innovation in Europe. Nevertheless, the questionnaire does not deal enough with the capabilities and the competences, which might be one of the key aspects of why the innovation in developing countries is less successful. Also, there is still room for improvement of some of its other aspects for the specific needs of the research in the developing countries.

### **3. The case of innovation in Slovenia**

#### ***3.1 Description of the methodology***

Since the combination of quantitative data and qualitative data is of key importance for measuring the innovative properties of firms, we upgraded the CIS questionnaire by adding aspects relevant for developing countries and by developing different techniques of collecting data due to both lack of public data and lack of reliable quantitative data in enterprises. The data collection is mainly based on a simple set of three 'yes/no' questions, which were carefully designed so that each additional 'yes' indicates that the company is at a higher level of development in a certain aspect. Such cascading technique allows us to create a measurement scale from 1 to 4 in empirical testing. The cascading questions are supplemented by standard questions that require a specific information (R&D expenditure, number of employees in R&D, etc.) and by a few Likert scale questions which are used to measure the competences and the capabilities of the company as well as its perception of itself in that aspect in comparison with the competitors. All these questions can be easily transformed to a cascade type of questions which will give researchers a possibility to use different multivariate methods, like factor analysis, when constructing composite measures of innovative activities of firms.

The questionnaire is divided into 9 sections: 1) target markets and characteristics of the industry (q. 1 and 10); 2) types of new products (q. 2-6, 16), 3) types of new processes (q. 6-8), 4) technology development as a source of innovative products (q. 9), 5) sources of information and innovation ideas (q. 10-12), 6) organization of R&D activity and expenditure on R&D (q. 13-15), 7) examination of competences (q. 17-19), 8) examination of capabilities (q. 20-22) and 9) a question on external aid funds for R&D. We describe each section of the questionnaire and explain the methodology of dealing with variables. Where the Likert scale is used, we emphasise it and explain the transformation.

First we briefly comment on the most general type of question used: a question composed of three sub-questions, all three being of a type 'answer with yes or no'. The yes/no approach mainly attempts to simplify the answering process, which also contributes to greater trust in the data obtained.

Questions are formulated as statements, carefully designed so that each subsequent sub-question represents a higher level of development in a certain area. Methodologically, our goal has been to create numerical variables from a series of sub-questions. The transformation is already initiated by assigning a value 1 for the answer 'no' in the first sub-question and a value 2 for the 'yes'-answer. If the answer in the next sub-question is 'no', then the value remains the same, for example it has a value of 2 if the first sub-question is answered 'yes'. If the answer is 'yes' also in the second sub-question, the value increases to 3. Similarly if the answer is 'yes' also to the third sub-question, the final value of the variable for a certain question, composed of three sub-questions, has an end value of 4. Building such cascades is a novelty approach in the analysis of innovation, suggested by a recent study on intangible capital (Miyagawa et al. 2010). In our opinion this approach is more suitable for the analysis of innovation in developing countries for several reasons. First, in many cases it is difficult to obtain hard data (numerical data), such as expenditure, employment in R&D etc., because there is a lot of uncertainty what the companies actually report as R&D costs and what data is missing. Also, in many cases, especially in smaller and medium companies, R&D is not organized as a special unit, which complicates the analysis further if trying to obtain hard data. Next, by putting a lot of effort into the design of the questionnaire, we can capture the nature of a certain aspect of R&D and innovation, and in the same time, by posing simple and clear questions (statements), we avoid any possible misunderstanding. Given that many companies in developing countries do not place a lot of attention to R&D, they might not be familiar with the terminology such as, for example competences and capabilities. But by actually describing of those concepts through statements, leaves little room for misunderstanding. Therefore, the reliability of data is higher. And finally, as an end result we obtain a numerical variable, which can be further on used in empirical research. Such cascading approach was used for the majority of the questions (2., 4., 6., 8., 9., 12.-15., 20.-22., 23).

Where companies are asked to compare themselves to competition, the questions are based on a Likert scale. Since most of the questions are measured on a scale of 1 to 4, we have also transformed the answers of the 1 to 5 Likert scale to a ladder of 1 to 4 by using the following transformation method: each part of the question 16. could be, for example, transformed to a cascade type by assigning values 1 and 2 (1 = substantially worse than main competitors and 2 = worse than main competitors), values 1 and 3 (3 = equally than main competitors) values 2 and 4 (4 = better than main competitors) value 3 and 5 (5 = we outperform our competitors) value 4. Examples of such questions are questions 16-19. Also, the questionnaire includes a few questions where companies need to state whether a specific type of innovation (q. 3), source of information (q. 10) is being either highly important, medium, or less important for them (or not used). Here we also used a transformation method to obtain a scale from 1 to – we assign 'not used' a value 1 and 'high' a number 4.

In continuation we briefly describe the questions. The main idea is that companies differ significantly both in terms of their origin (developed, developing country) and their target market (home based, exporter). Those that operate more abroad and seek to penetrate the more developed markets have been shown to be more productive and innovative (Damijan et al., 2006). The issue is especially relevant for developing countries. If the company operates in more demanding developed markets then this reflects its past successful development on one hand, and it also implies further motivation to be innovative in order to keep up with the competition in those markets which is fiercer and where the consumers are more demanding (Zheng Zhou et al., 2007). We thus examine the division of sales across different markets (national, export and location of exports). Following the idea that the firm's behaviour is conditioned chiefly by the competition in their primary market, when asking companies about their competition, we always relate the specific question to their most relevant market.

The next two sections deal with the characteristics of product and process innovation. Regarding product innovation, we examine the importance of product innovation for the company and its performance in terms of its competition (q2, q4 and q7). We examine the types of product innovation (q3) of the companies (repositioning, marginal product improvements, adding to existing product lines, globally new products, etc.) and how the companies developed these products (q6) (by copying, by own development, by cooperation). We also ask what percentage of the company's sales is generated by the new products. Similarly, we investigate the characteristics of the companies' process innovation: whether the company improved their business processes (q7, e.g. production, logistics, distribution, IT, etc.), how the process innovation was developed (q8) etc. Given that growth theory often stresses the idea of catch-up and technology transfer, we were careful to include these aspects as well. Also, the types of process- and product innovation can significantly differ in the developing as compared to the developed countries (Forbes, 2000), hence we have carefully designed the questions to capture the types of both those aspects, expecting less focus in companies on basic research and fundamentally new products and processes, and expecting more marginal improvements. One of the

key aspects is whether the industry the company operates in is characterized by rapid technological change (q9). This can significantly impact the general product and process innovation in the company. Companies can get information and ideas for innovation from many different sources. These can be divided into internal sources (suggestions from employees, own research activities etc.) and external (market, institutional etc). This is the focus of our next section (q10). We believe that the location of the partners in innovation activity and other business partners can also impact the firm innovation characteristics (q11). The theoretical link for developing country model is the potential for learning effect caused by cooperating or operating in developed markets (e.g. Forbes, 2000).

The organization of the R&D department is another element of innovation success. Questions (with sub-questions) 13-15 analyze how the R&D department in firms is organized, whether companies have one, what are its tasks (q13) and what percentage of revenue is spent on R&D (q14). From a strategic perspective, it is important to analyze the company's attitude towards R&D: does the company believe that R&D is an important source of competitive advantage or is R&D perceived just as an unnecessary cost (q15)? Especially the last question can give an insight into the innovativeness logic in developing countries – often, they innovate because they are forced to by the competition on the market and the drive for building a competitive edge is not primarily their own. Also, the organization of their R&D departments is less straightforward, depending on the size of the company, the target markets and the country's level of development (for organizational design of R&D see for example Ambec and Poitevin, 2001). Since the expenditure on R&D is generally lower in developing countries than in developed (Forbes, 2000), based on observation, a series of sub-questions led to the highest answer "we spend more than 3% of revenues on R&D".

The questions 16–22 analyze the company's self-perception and its competences and capabilities. The competences (q.17–19) refer to the possession of knowledge for problem solving. The term capabilities (q.20–22) describes the company's ability to apply the knowledge in order to solve a specific problem (see Rajkovič and Prašnikar, 2009). Both are extremely important to understand the nature, size and success of innovation in developing countries. Apart from not being necessarily strategically oriented into R&D, not possessing the skills to develop and market (use) new products (process improvements) can significantly hinder the innovation in developing countries. Therefore, we feel that this section provides some of the most important information for understanding the characteristics of innovation in developing countries. The section is based on a mixture of Likert scale questions and cascading questions. We are foremost interested in how the company performs relative to its competitors on the market, in terms of new products, time needed to develop them, and the level of innovativeness in these new products (q16). The next set of questions refers to competences (q17-19): technological, marketing, and complementary. While technological competencies refer to the technological characteristics of the company, the marketing competencies to the company's marketing capabilities and competencies, the complementary competences refer to the company's system of sharing and spreading the information and the knowledge in the company, team-work, and cooperation among the different departments etc. Last, we examine the company's capabilities (q20-22), which are the only questions in this section that use the cascading method of yes/no answers.

The questionnaire we briefly presented differs from existing standardized questionnaires in at least three major aspects. Since our focus are the developing countries, we first extend the questionnaire with the questions that allow us to analyze the differences between better and less well performing firms in relation to their competences, their capabilities, and their strategic orientation towards R&D. It is a crucial element for understanding the innovation gap within and between countries.

Second, the use of the cascading technique in the questionnaire we believe is an important improvement which was shown as necessary in the testing phase of the questionnaire, in 2010, since companies tend to have insufficient data, especially when it comes to hard data. The smaller, the more diversified or less advanced the company was in terms of innovation (or any other specific field of intangibles for that matter), the harder it was to obtain a reliable answer. The personal interviews in the testing phase using the questionnaire revealed how important it is not to pose questions that are too specific, long, complicated or detailed, because the answers might be completely different from what was asked. Therefore, through a series of improvements, we developed a questionnaire that captures the entire innovation and R&D story, but is based on statements that are for majority of companies easy to understand and easy to answer. We supplemented the descriptive data with some hard data (expenditure, etc.), but we have already learned from the experience with the Slovenian companies that hard data is much more complicated to obtain given the size, industry, development of the company. It is often the case that that data is unreliable (e.g. companies may classify their R&D expenditure differently) or simply companies do not bother with finding these data. We also believe that as the study is extended to other countries in the region, which are in some aspects less developed than Slovenia, the problems with obtaining data will be even more severe.

Third, the questionnaire allows us to distinguish between expenditure on R&D, innovation, employment in R&D, which further distinguishes the flow of funds into R&D and actual innovation capital. On one hand, we have the company's R&D data, on the other hand, we obtain a significant amount of information on how R&D is conducted, what are the results of R&D (new products, processes), that is, whether and how R&D is being capitalized. This opens a question of efficiency of the R&D, which again is an exceptionally interesting issue, primarily in the comparative analysis.

Fourth, by running a multivariate analysis, like factor analysis, we are able to construct composite measures for each property of innovative activity of firms. This will provide an indication of the factors and the components in each factor are of key importance in developing countries. This could be a very significant finding since the simple quantitative indicators in the developing countries are less likely to be available due to lack of data.

### **3.2 Preliminary results**

Thus far, we have produced the descriptive statistics, which already provides some interesting results. In 2010 we conducted an analysis in a sample of 61 companies operating in 23 industries. On average the companies were active in 4 markets: domestic markets, European markets, Western Balkan markets, and others. The domestic markets came as the second most important markets with 39.7 % operating in it, just after the European markets (48.3 % of companies).

The focus of the analysis was identifying the main characteristics of the activities that drive innovation in these companies. The results showed that 88 % of the companies have introduced a significant number of new products in the past five years in their relevant market. Out of these, 59 % have introduced novel products in their domestic markets and 27.9 % introduced globally novel products. The most important types of innovation, as companies report, are the improved existing products, introduction of new product lines, the expansion of the existing product lines, and the repositioned products. About half of the companies (50.8 %) stated that, in their view, they are among the leading companies with regard to product innovation (or product imitation) in their industries and relevant markets. Almost 97 % stated that they rely on own innovation which in 33 % has been a result of in-house development and/or 56.7 % of the innovation activities were a result of joint efforts with other companies. The companies were also asked to provide data on the share of new products included in sales figures. The results indicate that out of the 50 companies that responded, that the sale of products that were both new to the companies and their relevant markets makes up a 7.2 % share of their total sales on average, and 12.4 % of their sales were obtained offering products that were new to the company, but were already existent on the market they operate in.

In regards to process innovation activities, three quarters of the surveyed companies reported that they have also improved their processes over the past five years. 74 % of them said that they have made improvements in their production processes, 55.7 % have improved their logistics and distribution, and 68.9 % have improved the supporting services such as IT, sales, accounting, etc. Similarly to product innovation, the majority of companies (89.5 %) relied on either in-house process improvements or improvements from joint cooperation.

Another focal point of the 2010 survey was to identify the source of ideas and information on the companies' innovative activities. The majority (61 %) reported that suppliers, clients, and external sources of knowledge contribute to their innovation. Out of the respondents, close to 90 % have their own R&D departments, although the roles of the R&D departments in those companies differ (mostly being systematic support and problem solving (82.2 %) and in only 38.6 % of the cases having the ability to design in-house processes).

Furthermore, the research also examined the idea that the comparative performance of the companies depends on their comparative capabilities and the competences of the companies in their innovative activities. The questions are based on a Likert 1-5 scale and were for descriptive statistics not yet transformed. The results show that regarding the number of new and updated products, the majority of companies (46.7 %) rank themselves on par with competitors, whilst 38.4 % of them believe that they are better than the competition. Also large a portion of companies (84.4 %) believes to be either on par or better than their competitors when it comes to the time needed to adjust new products to market conditions. Interestingly so, when asked about the time needed to develop completely new products, the majority of companies (58.3 %) believes to be worse or, at most, on par with their competition and almost half of the companies are convinced that they contribute little to setting new trends in the market. The companies admit that their technological competences are at most on par with competitors or lower (72.4 %) and are slightly more confident when it comes to marketing competencies (70 %) The companies were asked to rank their capabilities and the results show that they have a rather high confidence in that aspect. When it comes to technological capabilities, 60 % of

the companies believe to have better technological capabilities than the average and have stated that dynamically renew their capabilities. Similar results hold for marketing capabilities, but with a slightly lower percentage (50 %).

R&D activity is one of the aspects often mentioned in government and EU strategies as a key element of growth (e.g. Lisbon Strategy). The results show that only 3.1 % of companies received assistance for R&D activities from local municipalities, 43.1 % received assistance from the state, and 27.6 % received assistance from the EU. Additional assistance from the authorities would help stimulate R&D activities.

The results that we briefly presented are for now preliminary results based on a relatively small sample of companies. Nonetheless, the results are very important already as they reveal the main characteristics of innovation, their importance for companies and competences and capabilities of companies in a comparative way, where comparison is made with companies in their relevant (biggest) market. Therefore, these results are also an important indication of their future potential.

#### **4. Conclusions and challenges for future research**

Investigating the link between aspects such as: R&D, innovation, growth, productivity, value added, and the like is extremely important for the developing countries. It is merely the growth based on company's own resources itself that can push the economy over the brink and into the company if the developed group. But there are many challenges when investigating R&D and innovation in developing countries. Firstly, the aggregated data on the different aspects of innovation activity in developing countries is not available. Second, the survey is often an unsuitable method for an in-depth analysis due to many aspects that are not covered by the (typically implemented) standardized questionnaires. Also, the quality of data is questionable due to the problems mentioned above.

We use an innovative cascading questionnaire that is straightforward and based on simple yes/no statements, adjusted for developing countries in order to avoid as many problems as possible. The research was initiated a year ago and the sample is still being extended. The first results are, despite the relatively small sample size, satisfactory as they indicate that the relationships between R&D and productivity are as expected. We expect that once the sample size is increased, the problems with the statistical significance will disappear.

The way in which we intend to extend the research is that we will firstly extend the sample of companies from the manufacturing sector in order to obtain more reliable results. We will also examine the link between innovation and company performance in the manufacturing sector, mainly expressed in productivity, by merging the database on innovation with the database of financial statements, which is prepared by the authorities (AJPES database). The test estimates indicate that the more innovative companies are more productive, but due to small sample size and many needed controls, statistical significance is only around 0.2. The methodology applied will allow us to easily create new composite variables capturing the characteristics of the innovative activity. Quantitative research methods will be used in order to extract as much information as possible from the dataset. That reduces the need to include various aspects of innovation into the productivity analysis, which could lead to the loss of degrees of freedom. Secondly, we wish to also extend the research to other sectors. We follow the idea of five sector economy (primary, secondary, tertiary, quaternary and quinary, where quaternary and quinary refer to the intellectual services and highest governmental decision-making powers, respectively). Our intention is that we include, besides the manufacturing, also the service sector. Some research for the financial services has already been done, but that always requires adapting the questionnaire to the needs of specific sector that is being researched and testing it. Lastly, our goal is to extend this research to the countries in the region. Again, the questionnaire needs to be adapted to the development and structural characteristics of these countries, as it was done for Slovenia. Interesting comparative results are expected.

Overall, the research of the role of the intangible capital, not just its innovation part, is extremely important for future development in this scientific area. Although the extensive model of growth that is based on export-led production can be a source of short and medium term success, it does not succeed in providing a solid foundation on its own for further growth, thus making the countries' economic position especially fragile to external demand conditions.

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# Entrepreneurship Challenges in Kosovo: Innovation, Research and Education

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**Innovation has a potential role in strengthening social development and social cohesion. Innovative approaches to entrepreneurship can contribute to the sustainability of social systems and the development of economy.**

**According to the Lisbon Strategy of the European Union the interlinkage between education, research and innovation could increase the global and knowledge based economy. In this paper will be analyzed the role of education and innovation on entrepreneurship development in Kosovo.**

**The research question in this paper is: does in Kosovo exist this interlinkage between education, research innovation and entrepreneurship. Do Kosovo entrepreneurs have an adequate level of education?**

**There will be applied different statistical estimates based on questionnaires in order to provide empirical data about the role of education, and innovation on entrepreneurship activities in Kosovo.**

## **Keywords:**

Education, entrepreneurship, innovation, research

## **1. Introduction**

Managing the transition towards a knowledge-based economy is the key challenge for the EU (European Union) as well as for the transition countries. The success of this transition will ensure a competitive and dynamic economy with more and better jobs and a higher level of social cohesion.

According to EU Commission [6], more than 60% of companies responding to the consultation consider that schools do not provide the competences needed by entrepreneurs and their staff. This result highlights the societal need to always provide young people with essential skills, such as reading, writing, natural sciences, management, technical, ICT (information and communications technology) and language skills and enable them to be creative. SMEs (small and medium enterprise) suffer in particular from the lack of skilled labour in the field of new technologies.

### **1.1 What about transition countries such as Kosovo?**

Kosovo entrepreneurs have been pushed to undertake self-employment activities even though they had limited managerial experience and a limited educational background as required for entrepreneurship activities. In comparison, according to Bartlett and Prašnikar [2] most entrepreneurs in Slovenia were not pushed into setting up a business under the pressure of unemployment. They held experience in management positions and the most important objective of most entrepreneurs was to achieve personal independence. Compared to Kosovo, entrepreneurs in Slovenia appear to be growth-oriented.

Regarding Kosovo, two issues should be taken into consideration. First, new generations wanting to move from school to the labour market find the transition very difficult because of the lack of practical skills offered by school programmes. Second, a gap in human development was created in the 1989-1999 period.

During these years most of the work force was fired and as a result a layer and experience enterprise

managers are missing. Due to this gap, they do not have enough experience to adapt to the new market requirements. Given the above factors, there is currently shortage of people with adequate relevant experience or human capital who could embark on and intensify entrepreneurship activities in Kosovo. This is despite the very large number of new firms established in the post – 1999 period, but there is also very large number of failures.

## 2. Methodology

The empirical analysis of entrepreneurship and self-employment behavior is based on a questionnaire survey. On 2007 it was surveyed a random sample of about 300 entrepreneurs within Kosovo in seven regions. The sample is taken from the list of available official business registers in Kosovo in order to have proper statistical estimates.

Furthermore on 2010 in order to investigate the interlinkage between education, research and innovation, for increasing the global knowledge based economy, 100 entrepreneurs are interviewed.

In this paper are represented a descriptive statistics, that explore the entrepreneurs approach towards universities and other scientific institutions.

## 3. Education, research and innovation

There is evidence that education improves individuals' future earning and overall success [1]. On one hand, more educated people are better informed about business opportunities and might select occupations in which entrepreneurship is more common. On the other hand, the skills needed for entrepreneurship different from those provided by formal education. They are generally regarded as relatively original persons who may have learned their business skills without too much formal education.

There is some evidence suggesting that for highly educated people wage-based work tends to be a more attractive choice compared to self-employment. According to Lucas [11], highly educated people earn more as employees than they would if self-employed.

Also, if education is seen as a screening device then entrepreneurs have fewer incentives to acquire formal education. However, empirically most studies have found positive effects of education on self-employment. In general, the higher education of self-employed people should improve the growth opportunities of their firms because higher education improves the ability to comprehend market prospects, better exploit market demand, enhances the awareness of risk and improves adaptability in changing circumstances.

Pekkalas and Kangasharju [13] analysed the success of the self-employed and their firms in a period of economic downturn (1990-1992) in Finland and reported that in an economic downturn a higher level of education raises the probability of survival.

The impact of education on self-employment depends on the industry in which someone is self-employed. Bates [3] found significant and positive effects of education on the probability of commencing self-employment in skilled services, significant negative effects on the probability of commencing self-employment in construction and insignificant effects on the probability of commencing self-employment in wholesale and manufacturing activities.

In 2002, Lazear [10] proposed a jack-of-all-trades model of entrepreneurship, suggesting that individuals with a wide variety of skills are more likely to become entrepreneurs, while those who specialize are likely to pursue wage-based work.

A UNDP (The United Nations Development Programme) survey for Kosovo in 2005 [15] reported that the education system in Kosovo does not offer proper knowledge and skills to young generations in order to prepare them in line with market economy requirements. They proposed that vocational education and training could help young generations adapt to the labour market. Based on this UNDP report, currently there are low expectations that education will be a significant factor in supporting entrepreneurship.

## 4. What about innovation

For the innovation, many authors have provided different definitions and each of them has its own nuance. During the last 40 years, according to Cumming [7], the definition of the term innovation

changed. During the 1960s and 1970s, innovation was defined as the development of a new idea or a process to change.

According to Yukl [16] when the changes appear is necessary to adjust the ways in which employees will find it easier to cope with the changes. First, there is a need to explain that adjustment is necessary, this way people are asked about their previous experience and how they were adopted, another way is to organize some sort of trainings in order to make easier for them to adopt changes.

According to March [12] there are many ways that develop performance of companies such as analysis, learning, imitation, those are elements that reinforce any attempt to develop further organizational performance. When there is a chaos managers should structure the organization into the much-loved condition (change) and go back to status quo. It is about to remove the previous state of mind and implement a new one [8].

For organization environmental and learning, the leads of big companies have to know as much as possible about the benefit of core knowledge. Very often the way of leading the companies are connection the companies, not creating the new ones. By using this strategy of connecting the small companies it is good chance to raise their opportunity of standard. The connections of companies are more chases for incising the effect of quality in supplies and workforce is well, therefore from those are coming the culture and learning in organization [9]. For organization environmental and learning, the leads of big companies have to know as much as possible about the benefit of core knowledge. Very often the way of leading the companies are connection the companies, not creating the new ones.

By using this strategy of connecting the small companies it is good chance to raise their opportunity of standard. The connections of companies are more chases for incising the effect of quality in supplies and workforce is well, therefore from those are coming the culture and learning in organization [9]. At the time of selecting the strategic choice as model, decision - making is first evaluated to the organizational possibly position in their atmosphere.

A main part of this involve selection outside factors, and trends of time, marketplace indicators and opportunity such as imposed on the society by the suppliers, indicated to organization. In this perspective, an amount of objectives are achieved of which the association can be winning. Moreover, is not likely to ignore the external indicators as the situation itself, in the organization developed, constitutes the structure of the choices of vary can be performed [5]. Organization regulations and changes can be initiated in the order for better managing situations, therefore, those changes are used as a tool to improve the system of governance and regulations in the created situation [5].

Therefore, governmental regulations as external attitudes for companies are not evolution issue, as Child [5] argues all the regulations and laws are as revolution in the organization, and then the adapting and changes can happen in all levels of human resources.

However, community considers that the modernization or changes can have some advantages; they will be able to try and learn more on it in order to decrease their hesitation. At what time they cover sufficient information, they will create their choice on whether to adopt or reject the innovation and changes [14]. Lots of companies' reward incentives to possible clients to enlarge the apparent relation benefit, in categorize to change their behavior and make them adapt to the innovation. Then people can without difficulty try out the innovation and changes, what makes them adopt it more easily soon after on [14].

Knowledge is ordering of information, we gain knowledge of the world through our experience of it, so potentially everyone's knowledge of it differs. The attempt to make sense of the environment in the world is not an attempt to discover reality and truth, but an attempt of maintaining the stability so that we can continue to function and believe that we understand the situation as it is or as it can be after the situation is changed [8].

Many aspects of a change can feel threatening to people and thereby increase the ambiguity to accept the wished future state. However many changes lead to something better and the same people that made the resistance can be happy that the change occurred.

## 5. Results

The results of the empirical analysis respectively descriptive statistics are represented as follow:

When we asked our respondents: what is your level of education, 68.7 % of them answered that they have only low level of education, respectively secondary school while 31.3% of them superior education respectively bachelor degree.

The second important issue was to understand if Kosovo entrepreneurs cooperate with Universities (public or private) in order to use the scientific or professional aspects with regard to human resources.

Around 32.8% of respondents answered positively while 67.2% answered negatively meaning that they do not cooperate with universities.

Third important point of this analysis was the question: if the Kosovo entrepreneurs are satisfied with professional level of their young employees coming from universities. Most of the entrepreneurs around 86.6% answered that they are not satisfied with the professional level of young graduates while only 13.4% answered positively.

The last important issue was to investigate if university graduates could develop new strategies and accelerate growth oriented approach for the companies in Kosovo. Around 40.3% concluded that there is a possibility to interlink new knowledge's with entrepreneurial ventures while 59.7% of the respondents answered that there is no any value added coming from young graduates of Universities.

## 6. Conclusions

Kosovo suffer from very high unemployment, particularly where the official rate of unemployment is around 40% of the work force, with the rate of economic growth too slow to reduce unemployment, especially youth. The evidence in Kosovo shows that graduate students are not prepared to fulfill professional criteria's asked by employers therefore due to low level of education there is not an interlink between education, research, innovation and entrepreneurship activities.

The main recommendations of this paper are:

- By learning practical issues young graduates will be prepared and attracted to undertake actions towards self employment or being able to meet requirements from the employers.
- Promoting entrepreneurship and self-employment by improving the quality of human capital (education and training) are regarded as key elements.
- There is a need to fulfill the gap created by the lack of upgrading of university study programmes and curricula, especially in entrepreneurship and self employment.
- Developing relevant programmes based on the needs of the labor improving the quality of human capital by training.
- Connecting education, research and entrepreneurship activities by inducing research activities with universities which could be explored also by general public, institutions, policy makers and private sector.

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# Entrepreneurial University – case of Montenegro

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**Promotion of the entrepreneurial culture is one of the very important goals of Lisbon Strategy and is crucial for generations of new jobs and economic growth in Europe. European Commission proposed whole list of recommendations to promote the entrepreneurship in high education, with special emphasis to transversal approach meaning that entrepreneurship should be accessible to all students, at all faculties and not only to those of economics or business studies. “Entrepreneurial University” is the one with employees at all levels committed, and students of all faculties encouraged to think and act as entrepreneurs. That is the only way to create society driven by knowledge, with small companies dominating and being highly competitive.**

**The paper reviews the process of creating the Entrepreneurial University having in mind the following presumptions: (i) The entrepreneurship is predominant factor for growth and competitiveness; (ii) Education, and in particular high education, could impact student’s intention to become an entrepreneur; (iii) Various policies and programmes could be developed to increase someone’s affection towards entrepreneurial activity, and towards the results of that activity.**

**A case study of the University Arkansas will be presented in developing entrepreneurial culture at the university, as well as attempts of creating entrepreneurial university in Montenegro with recommendations including both policies and practical level of action for Montenegrin case, also applicable to other countries in the region.**

## **Keywords**

Competitiveness, Entrepreneurial University, Entrepreneurship Education, Higher Education

## **1. Introduction**

Promotion of the entrepreneurial culture is one of the very important goals of the European Union’s Lisbon Strategy. Also, entrepreneurial culture is crucial for generations of new jobs and economic growth in Europe. Having regarded to above mentioned, the European Commission pays special attention to the development of life-long learning at all levels of education [1]. Furthermore, entrepreneurship has been recognized as one of eight key competences for a life-long learning. The European Commission proposed a whole list of recommendations to promote the entrepreneurship in high education, with special emphasis to transversal approach meaning that entrepreneurship should be accessible to all students, at all faculties and not only to those of economics or business studies. Innovated Lisbon Strategy has particularly pointed to the need of the European Union member states to better anticipate skills that need to be developed in order to education process could follow development of the economy. Thus, the Education Council in 2007 adopted the Resolution “New Skills for New Jobs”, [2]. Particularity of the Resolution lies in highlighting the lacking skills, weaknesses and new skills demands. The revised strategic framework for the European cooperation in education and training, yielded four strategic challenges that should be tackled in the period until 2020 and one of them is related to strengthening innovations and creativity, including entrepreneurship at all levels of education. These challenges are a contribution of education and training to Lisbon Strategy implementation and innovated social agenda and need to be included in common policies and

measures within entire system, including primary and secondary schools, higher education, vocational education and adult education.

Following the example of the European Union member states, as well as the countries applying for the membership that strive after, or at least they should strive, to accept the paradigm of entrepreneurial learning at all levels of education system. Following the logics of the European Charter for Small Enterprises, a few countries from South East Europe region has started small but strategic actions. However, the indicators referring to human resource development and entrepreneurial learning (dimension 1 and dimension 4 of the European Charter for Small Enterprises) show that the achieved progress was negligible. By accepting the European Charter for Small Enterprises, South East Europe countries have committed themselves to promote entrepreneurial learning in all sectors and to develop the connection between universities and enterprises and the economy. Certainly, one of the solutions is to universities become more entrepreneurship-oriented, in the first line, in its management, and in creation of their own strategy and education providing, in order to adjust to new market trends with more distinctive approach to entrepreneurial learning.

In the period 2006-2009, the European Training Foundation has developed a whole set of indicators related to entrepreneurial learning, including the promotion of entrepreneurship at the tertiary level of education. In short, these indicators show that the Europe lacks entrepreneurial studies primarily in the non-business institutions and disciplines: entrepreneurship is still not sufficiently integrated into different subjects of the curriculum. With increasing expectations in terms of university contribution to the competitiveness of local and regional economy, the European Commission recommends penetration of entrepreneurship education with other disciplines in order to make students able to develop a higher potential after graduation.

In this light, higher education institutions in South East Europe countries, including Montenegro, should have a strategy or action plan for teaching and research of entrepreneurship and the creation of new businesses and spin-offs. In other words, this implies forming of so-called "Entrepreneurial University" which also represents the major change in the culture of higher education institutions, through: study programs that must be more multidisciplinary oriented; teaching and learning methods (through team work and encouraging student's initiative); research strategies; employment policies (teachers employment practice, incentives and rewarding, training); and cooperation with the economy. Several universities in Southeastern Europe has already introduced activities in the field of entrepreneurship development, however, it is still not clear which institutional model and the approach will actually lead to the creation and sustainability of "Entrepreneurial University". The question is what should be done to position the university in a way to adapt to the challenges of the XXI century and how to create an entrepreneurial university, which will best meet the demands of time to come? It is relevant to mention the initiative of the South East European Centre for Entrepreneurial Learning (SEECCEL) which aims at developing the curriculum for entrepreneurial university in the region. It turned out that the main problem (both in the European Union and South East Europe countries) is the lack of personal commitment, interest and the lack of support of decision makers in these institutions. In this sense, the "Entrepreneurial University" is the one in which employees at all levels are committed, and students of all disciplines are encouraged to think and act in an entrepreneurial manner. Only in this way we can develop a society driven by knowledge, which is dominated by small companies, and that is highly competitive.

## 2. Entrepreneurship as key competence

As a key competence for lifelong learning, entrepreneurship refers to individual's ability to turn idea into action [3], which includes creativity, innovation and taking of the risk, as well as the ability to plan and manage projects in order to meet set goals. The essence of this competence is ability to recognize the context in which an individual acts and proactively respond to given opportunities. A small number of individuals are born entrepreneurs, but studies show that education and training can significantly contribute to the development of entrepreneurial views, knowledge and skills. Competence entrepreneurship implies [3]:

- Knowledge of available opportunities in order to identify those that match personal, professional and /or business activities of a person.
- Skills, including: ability for cooperative and flexible work as a part of the team; be able to identify personal strengths and weaknesses; ability of proactive reacting and positive reaction to changes; ability to assess and take the risk when necessary and justified.

- Views, including disposition to take the initiative; positive attitude towards changes and innovations; the willingness to identify areas where a person can demonstrate the full range of entrepreneurial skills - for example at home, at work and in the community.

### 3. Entrepreneurship education

Recognizing the importance of lifelong learning for entrepreneurial development of a knowledge society based on human capital, education, research and innovation, Montenegro has a lifelong entrepreneurial learning strategy for 2008-2013. By this, the need for constant development and improvement in order to monitor the daily technological changes, growing competition and globalization has been recognized. The question is how to adjust educational system to fit the needs of modern society and more distinctive influence of globalization in XXI century. As it has been recognized in this strategic document, the solution is to build key competences - multi-functional, portable packages of knowledge, skills, and attitudes that are necessary for every individual to personal fulfillment and development, inclusion and employment. In narrower sense, entrepreneurship education refers to acquiring knowledge on how to start a one's own business and economic literacy; in broader sense, it focuses on development of personal characteristics and skills considered to be a prerequisite for successful acting of individual as an entrepreneur. Entrepreneurial competence takes into account both definitions of entrepreneurial learning, but the focus of learning is different depending on the level and types of education. Education system should enable children in early stage of education process to develop their creativity and curiosity, while university students can learn practical and theoretical matters necessary for establishing a new business.

Strategy for lifelong entrepreneurial learning 2008-2013 contains an analysis of the current situation of entrepreneurial learning in Montenegro, from the regulatory framework through the practice of entrepreneurial learning at all levels of education, from primary to tertiary, including the breakdown of informal education that focuses on strengthening the entrepreneurial skills. We can conclude that all three universities that currently exist in Montenegro have programs aimed at developing entrepreneurial skills, and entrepreneurship is often a compulsory subject. All of the above and thousands of students who passed the training, largely contributed to the creation of entrepreneurial culture and entrepreneurial thinking in Montenegro. However, the analysis showed that there are many challenges to overcome, among which stand out (for details see [4], page 17) the following: lack of understanding of the concept of entrepreneurial learning, prejudice about entrepreneurial learning, low awareness and promotion of entrepreneurial learning, insufficient cooperation economy (enterprises) with facilities for education and training, etc.

### 4. Creation of Entrepreneurial University

Attention and importance given to entrepreneurship is growing. Data on the importance of small and medium-sized enterprises for creation of gross domestic product and creation of new jobs, put entrepreneur in the centre of interest of policy makers, and by that higher education as well. The higher education is expected to take a leading role in creating institutions and entrepreneurial culture that will, finally, contribute to strengthening the competitiveness of national economy. Initial assumptions are the following:

- Entrepreneurship is a major factor of growth and competitiveness,
- Education, especially higher education can influence on development of student's desire to become an entrepreneur,
- Policies and programs that will increase the affinity towards entrepreneurial activity and the results these activities will have can be developed.

Hence, the pressure on higher education institutions to become more entrepreneurship oriented, in the first line, through commercialization of researches in order to contribute to competitiveness of the economy at international market, and local economic and social development is growing worldwide. A special role of higher education has been recognized in preparation of students for the world of insecurity and complexity which is reflected in: frequent change of profession and job, global mobility, adapting to different cultures, greater opportunities for self-employment, and higher level of responsibility in family and social life. In other words, a university degree no longer offers the security of lifelong employment, but is only a ticket to the labor market. The question is how to train students for lifelong market competition? In general, entrepreneurship development policies at the level of

higher education can be divided into two groups: those that connect the higher education sector with other stakeholders, and those that are more focused on the education of students in the context of entrepreneurship.

Experience of United States and Europe show that at first policy group, the use of technologies is the most important. To this regard, it is necessary to stimulate multidisciplinary research and enhance cooperation of researchers with outside stakeholders (outside the university) which further contributes to the development of patents and spin-off companies. This will enable the commercialization of ideas developed at the university through the scientific and technology parks, research centers and incubators. In the second group of policies, the emphasis is put on educating students in order to prepare for self-employment and to start their own business. Studies show that such educated future "entrepreneurs" rarely decide to start their own businesses immediately after graduation, but they usually do that between 26 and 34 [5]. Also, while this study significantly influence the intention to engage in entrepreneurial waters, students can later gave up from turning their intention into action, which often happens.

There are numerous examples of creation of the Entrepreneurial University, but is still not clear which is the best model for it. Maybe it is the best to first determine the commitment to really create an entrepreneurial university, and then start the activities based on best practices in the world (especially in the United States where, it seems, this concept took hold more in relation to Europe). We are already aware that universities play important role in many economies, by having economic impact through their basic activity - education then through research and development and through many other effects they have. However, universities have the ability to create the culture and program to make entrepreneurship a common value. The best example is the Massachusetts Institute of Technology, which confirms that the universities that are intensively engaged in research and technology, especially through the creation of spin-off companies, significantly affect the economy of their country. Recently published research results [6]. indicate that if active companies founded by Massachusetts Institute of Technology alumni, students formed an independent nation, their revenues would make that nation be at least the seventeenth largest economy in the world. Less conservative extrapolation show that 25,800 active companies founded by former Massachusetts Institute of Technology students employ around 3.3 million people, achieve annual sales of 2 trillion dollars, and generate the same total production of the eleventh largest economy in the world!

## 5. What needs to be done?

The existing experience shows that the creation of Entrepreneurial University requires the following:

- Internal university organization based on entrepreneurship principles, headed by leaders entrepreneurs, then staff and teaching personnel who understand and act in favor of entrepreneurship,
- External funding, in the first line through connecting with external stakeholders (economy, local community, government),
- Interdisciplinary approach, which means that traditional entrepreneurship paradigm is shifted from narrow focus on business and
- lectures dedicated to development of entrepreneurial values, not only business models.

In terms of organization, entrepreneurial universities are themselves a reflection of entrepreneurial initiative and entrepreneurial ways of management meaning that they are flexible, strategically placed in relation to the local community and they monitor the opportunities that arise. In other words, entrepreneurship is becoming a cornerstone of university strategy. The ultimate goal is to create a "culture of enterprise"; that is open to change and explore opportunities for innovation and development [7].

Creating Entrepreneurial University primarily takes time. This is simply because traditionalists and traditional programs are highly likely to put up resistance. That is why it is important that university leaders are entrepreneurs or leaders with entrepreneurial skills and views. Besides leaders, the process of creating Entrepreneurial University requires attracting teaching and other staff with similar entrepreneurial thinking and who recognize a wider university role in society. Experience of other countries (especially United States) shows that leaders and teaching staff gathered in this way with entrepreneurial culture have the need for additional support, which primarily refers to external funding, outside regular university revenues. This does not only and primarily refer to philanthropic activities, but to connecting university with key stakeholders that will be actively involved in creation of Entrepreneurial University. Creation of Entrepreneurial University requires broader, multidisciplinary

approach that will not observe entrepreneurship through narrow focus on business, but on something we call intellectual entrepreneurship [8].

Instead of traditional lectures characteristic for business studies mostly related to creation of new companies, business growth, business planning and traditional management functions, Entrepreneurial University is aimed to something different. Namely, the focus is put on development of entrepreneurial characteristics and values at students, development of emotional intelligence, insight into real life of entrepreneur and etc. The accent is on recognizing opportunities for development and innovation, especially in linking different disciplines in solving social problems. In order to introduce Entrepreneurial University, first of all, it is necessary to have a clear concept, and then “champions” or “change agents” within university that will accept to develop the ideas of Entrepreneurial University. A clear concept implies that, instead of traditional, pure business model, the focus is put on approach that highlights the ability to recognize an opportunity, contribution to society, development of interdisciplinarity and involvement of local community. Regarding the human resource development of Entrepreneurial University it is particularly interesting to emphasize the importance and impact of foundations (such as Kauffman Foundation and Coleman Foundation) which provided financial support to teaching staff who decide to develop programs and materials for their department, and for the purpose of entrepreneurship promotion.

## 6. Case Study: University Arkansas – creation of entrepreneurial culture at university

University of Arkansas, founded in 1871, was the type of university whose focus was on teaching and educating students with research in the field of agriculture. Research function of the University has evolved throughout the century, however, only in the last twenty years more attention has been devoted to creating new companies and technology transfer in the economic base of the economy. As resources are always limited, the decision to use the same model or to create new companies or to create an infrastructure that will enable the creation and establishment of many new companies was crucial. Decision was made to create infrastructure that will enable creation of new companies, in cooperation with both Government and private sector, which made University Arkansas to become the centre of entrepreneurial activity of the state (for more information look at [9]).

In the change and creation of entrepreneurial culture the key items were: the establishment of technological business incubators; establishment of centers for coordinating research activities; inclusion of entrepreneurship into the curriculum; establishment of connections with business. Establishment of technological business incubator *Genesis* within University, only three miles away from the main campus, in abandoned factory, enabled small companies, which were created based on research work done at the University, to endure the first period of “incubation” until they are ready enough for market competition. Entrepreneurs who based their ideas on new technologies, *Genezis* provided shared premises and office services. Above all, *Genezis* provided the opportunity of using professional network of managers, marketing and financial advisors, as well as technical expertise provided by the University.

The next step was establishment of independent research coordination centers, who gathered multidisciplinary teams. Named High Density Electronics Center, this group of mutually linked but independent research coordination centers has become the only laboratory in the United States that brought about several patents, who already found their use value at the market, while others are in the process of registration and commercialization. In parallel with advancement in research, the University hired professionals whose task was to develop education programs in specific areas (emp. nanotechnology). A new program must contain elements of entrepreneurship in part to encourage students to commercialize the research results at the market. Already in 1999, the post-graduate studies in the field of Microelectronics Photonics – microEP came to life. The successes achieved by the program were always awarded by additional state grants and aimed at further investment into development and research. Master studies in this area were soon supplemented with PhD studies. Despite significant technical and scientific achievements, the key for success were:

- Dedicated leaders among main lecturers in campus,
- Campus administration guided efforts to link the available funds at the local, national and federal level towards achieving common goal,
- The fact that the University’s business incubator and research capacities were sharing space,
- Coordinated strategy to start the research outside the existing research infrastructure,

- Harmonization among research, education and entrepreneurship in project proposals in preparation,
- New, interesting, educational programs that attracted students throughout the country and worldwide who were ready to take the risk,
- Employment of new experts who brought the perspective of industry into the curriculum,
- Cooperation with partners outside campus.

The analysis of the curriculum, which took place at the University of Arkansas, revealed what was common to many studies. It was identified the need for interdisciplinary studies, the need for business trainings for technologists, identified mostly negative impact of bad business decisions made by technologists, need to respond to rapid changes in technology-based businesses, lack of team work in college and the lack of educational partnerships between technology and business studies. This was the reason for forming a new educational program called *Technology Entrepreneurship*, which is just one of the programs developed in order to meet the needs arising, and to overcome the problems in development. The aim was to: increase understanding of creation and evolution of entrepreneurial companies based on high technologies, identify basic decisions faced by an entrepreneur concerning the choice of technology, market analysis, finance and general management operations; identify mature research efforts of University to commercialize them in partnership with the Technology Transfer Office and the professor who runs the research. The final step was to create the links between the University and business community, which is still in progress. This was done through establishment of new incubator, so-called Innovative Incubator, whose task was to:

- Receives and evaluates proposals for needed research for Arkansas business,
- Matches these needs with University Arkansas system capacities,
- Providing students in campus who will work on required researches and pay them for it,
- Provides vouchers for business clients, who want to use the campus research capacities.

The successful idea from innovative Incubator goes to Genезis where it gets the basic support necessary for start-up companies until they are ready to operate on their own at the market.

## 8. Entrepreneurial University in Montenegro – from a dream to reality?

Montenegro does not have an Entrepreneurial University yet. Based on the analysis of economic policies on contribution of small and medium-sized enterprises in creation of gross domestic product and employment, it is clear that entrepreneurship gains increasing attention. The importance of entrepreneurship both at local and national level is seen in on-going efforts to eliminate business barriers. While these efforts achieve limited results, the strategic commitment to support entrepreneurship is clear, as well as recognizing entrepreneurship as key competence for lifelong learning.

All three universities to lesser or greater extent turn their attention to entrepreneurship as a subject, and by that, to the development of entrepreneurial skills in students. At University of Donja Gorica, Entrepreneurship is optional subject at the first year of studies, but the entire studies and the work with students in all subjects are organized in a way to develop entrepreneurial skills. The focus is put on “awakening of entrepreneurial nerve” at students, developing ability to see opportunity in problems, ability to take the initiative, analyze the data, to think creatively, have the optimistic approach towards life and world, develop independency and individuality, creation and maintaining social networks, developing ideas, orientation towards success, team work, etc. Among optional subjects are those offering multidisciplinary knowledge (Economy of Media, Architecture and Business, Wine and Economics etc.). Within the subject Entrepreneurship, an entrepreneurial platform €€\$ is organized when students have the opportunity to listen to our guests from the practice, most successful entrepreneurs from Montenegro and abroad. Also, during the studies, students have paid internships in private companies and system institutions, in order to acquire practical in addition to theoretical knowledge. In order to strengthen team work skill the students work in groups of 10, with mandatory communication with the group mentor who is associate from the practice. Except faculties for economics and management studies, the students at faculties of other orientations have no opportunity to develop characteristics and values of entrepreneur.

Regardless of individual efforts, in general, we can say that the concept of entrepreneurship and entrepreneurial universities in Montenegro was not recognized. This is largely a consequence of

society attitude towards entrepreneurs whose success is often contentious, although it is not an excuse for higher education institutions that should create and determine the development of society. There is very limited link between universities and the business community. Current cooperation often comes down to visiting lecturers from economy, and organizing practice for students, while the connection of research universities and business activities is negligible. In Montenegro there are two incubators, while the third is in process of establishment. Although there is some communication and cooperation with universities, none of the incubators is primarily related to any of the three universities, or any university unit.

## 9. Conclusion and Recommendations

Creating entrepreneurial culture within the university is a complex task that requires considerable effort of dedicated individuals. These individuals are located in the industrial sector, in academia circles, in relevant ministries, and they are very loosely coordinated with each other in their activities. However, all have the same passion to create new and greater opportunities for the country's economy and its citizens.

If we agree that the Entrepreneurial University is a core that can significantly contribute to strengthening the competitiveness of the economy on the international level, that it contributes to community development and helps students to be more prepared to participate in the labor market or to develop their ability of self-employment, then it is necessary to take measures that will contribute to creation and development of Entrepreneurial university as follows:

### In the period until 2015:

- promote entrepreneurship in a broader sense as a way of living and thinking, rather than through standard business skills,
- education of university leader on the importance of entrepreneurship,
- including entrepreneurship into the curriculum of non-economic disciplines in higher education,
- the development of programs that will complement the students technical knowledge with business and entrepreneurial skills, and vice versa, supplementing economy students knowledge with basics of technological process,
- create research centers in accordance with the priorities of the Montenegrin economy, which will monitor the development of these sectors and connection with world research centers in this area for the sake of cooperation on joint projects,
- providing support for financing student's research papers, either from the State Budget or from the European Union funds.

### in the period until 2025:

- Establish strong connection and communication mechanisms between universities and economy in such way that universities conduct researches upon business request and with their financial support.
- Montenegro has at least one technology incubator that will allow the commercialization of the results of university professors and students at the market.

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# Assessment of Ozone Injury

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The essential basis for choosing ozone (O<sub>3</sub>) induced visible injury is that many plant species respond to ambient levels of ozone pollution with distinct visible foliar symptoms that can be diagnosed in the field. The results attributed to LEVEL II Serbia – Kopaonik sites will be documented in maps covering Europe, characterizing areas of increased ozone risk for European forest ecosystems. The evidence we have today strongly suggests that ozone occurs at concentrations that cause visible foliar injury to a wide range of sensitive plants. The assessment of ozone visible injury serves therefore as a means to estimate the potential risk for European ecosystems that are exposed to elevated ambient ozone concentrations and has to be considered in the context of ICP Forests aiming among others to document the presence of environmental drivers that may affect forest condition across Europe. Many plant species respond to elevated ambient levels of tropospheric ozone (O<sub>3</sub>) with distinct specific foliar symptoms. These symptoms can be diagnosed only after adequate training. Harmonization of procedures is essential to ensure spatial and temporal data comparability. For the injury data being accepted for the international database and evaluations, National Focal Centers and their scientific partners that are participating in the UN/ECE ICP Forests program must follow the methods and apply the manual described herein. The assessment for visible ozone injury on main tree species is conducted on the leaves from the same branches where foliar analysis is carried out. The samples for foliar injury are collected every second year from the upper sun exposed crown. Ozone visible injury on conifer species is expressed at the upper parts of the crown, in the upper side of branches and needles.

## Keywords

Assessment, experiment, injury, ozon.

## 1. Introduction

Vegetation is a major component of forest ecosystems. The composition, diversity, and structure of vegetation are important factors for assessing biological diversity of forest ecosystems. Vegetation is the source of primary production, plays a direct role in water and nutrient cycling, and interacts strongly with other biotic components (insects, game, etc.) being a determinant habitat for many species. Vegetation has also been identified as a specific target for the calculation of critical loads/levels.

The development of ozone-induced injury is inter- and intra-species specific, and depends apart from local ambient ozone concentrations on other environmental such as biotic and climatic factors. Due to the complex nature of the diagnosis and the given restrictions of the investment, results from the tree and vegetation assessment should be considered as semi quantitative. Ozone pollution leaves no elemental residue that can be detected by analytical techniques, as do fluorides [1] and sulfur dioxide [2]. Therefore, ozone-induced visible injury on needles and leaves is the only easily detectable evidence in the field as a result of oxidative stress, leading to a cascade of adverse physiological and morphological effects. These “ozone response variables,” made at the needle, whorl, branch, tree, or stand level, and aggregated in analysis, can be an effective way to quantify ozone effects on pines [3]. Ozone response variables include microscopic and macroscopic injury to the foliage (primary effect), and injury to branches and roots (secondary effects) that can be quantified within defined levels of

accuracy and precision. These “ozone response variables,” made at the needle, whorl, branch, tree, or stand level, and aggregated in analysis, can be an effective way to quantify ozone effects on pines [3]. Ozone response variables include microscopic and macroscopic injury to the foliage (primary effect), and injury to branches and roots (secondary effects) that can be quantified within defined levels of accuracy and precision.

Until now, experiments have concentrated on explaining the mechanisms leading to injury observed in experimental studies, rather than to identify and characterize the symptoms observed in the field on a regional scale.

The evidence we have today strongly suggests that ozone occurs at concentrations - cumulative exposures greater than 60 ppb; [4] that cause visible foliar injury to a wide range of sensitive plants. Gaseous pollutants pass through the stomata of conifer foliage and cause direct damage to the photosynthetically active mesophyll cells, often producing a diagnostic visible injury pattern [5]. Next, degeneration of essential biological processes in the needles occur that may eventually lead to reduced crown vigor, increased susceptibility to other pathogens, and tree death [6].

Controlled exposures and field observations of ozone effects on western conifer species have confirmed that a distinct visible symptom known as chlorotic mottle typically occurs on needle surfaces [7,8]. Chlorotic mottle begins as the walls of mesophyll cells below the epidermis degrade, causing the loss of cellular contents and the subsequent degradation of chlorophyll within the cell [5,9,10]. Microscopically this condition appears as amorphous staining of cellular contents, plasmolysis of cell contents, and cell death. The degradation of chlorophyll beneath the epidermis appears on the needle surface as amorphous chlorotic blotches with diffuse borders that occur in irregular patterns, giving a yellow “mottled” appearance; hence the terminology “chlorotic mottle”. This foliar injury symptom is visibly distinct from foliar symptoms induced by other air pollutants.

Chlorotic mottle frequently appears in the one-third of the needle surface nearest the tip on 1-year-old or older needles, and progresses basipetally until the entire needle is affected [7,8].

This pattern is observed mainly in southern California. In the Sierra Nevada the mottle tends to occur randomly along the entire needle length [11,12]. The current-year’s needles will show small amounts of chlorotic mottle only when summer ozone exposure levels are higher than usual and/or adequate soil moisture contributes to higher stomatal conductance and more ozone flux to needles, or both. This condition is usually the exception and not the rule for the response of current year needles to ozone exposures in the Sierra Nevada. Tip necrosis or necrotic bands can result from acute ozone exposures in fumigation experiments, but chronic field exposures typically induce only chlorotic mottling.

The assessment of ozone visible injury serves therefore as a means to estimate the potential risk for European ecosystems that are exposed to elevated ambient ozone concentrations and has to be considered in the context of ICP Forests aiming among others to document the presence of environmental drivers that may affect forest condition across Europe.

The main objective of assessing ozone visible injury on a selected number of Level II plots is to assess the effect of tropospheric ozone at the sites where ozone monitoring is performed, and to contribute to an ozone risk assessment for European forest ecosystems.

Specific aims are set as follows: Quantification of ozone injury occurrence on a selected number of Level II plots in Serbia – Kopaonik. Detection of temporal trends on a selected number of Level II plots in Europe (significant changes within 10 years with a 95% significance level for individual plots).

## **2. Measurements**

Symptoms of ozone injury on red fir, ranging from effects on needles to effects on portions of ecosystems, were differentiated from symptoms induced by other natural biotic and abiotic stressors occurring in the same area. Identified in laboratory and field studies, quantification and monitoring of these symptoms were used to provide reliable information on the effects of air pollution on forest trees and ecosystems. Monitoring symptoms of ozone injury were used to determine status, changes, and trends in effects ranging from needle injury to tree growth.

### **2.1. Variables measured and reporting units**

For the in-plot assessment, the following variables are measured:

- Symptomatic leaves or needles, reported as frequency classes (% score of symptomatic leaves for each sampled branch per IM plot)

For the off-plot (LESS and LESS-plus) the following variables are measured:

- Lists of symptomatic and asymptomatic species per quadrat (LESS). 'Empty' quadrats such as a gap, skidder trail, rock, etc., where no woody species are growing are also recorded.
- A list of symptomatic species within a radius of 500 m from the ozone sampling device (LESSplus).

## 2.2. Symptom identification

Towards the end of the growing season, foliar symptoms may progress to leaf yellowing or premature senescence, followed by earlier leaf loss. Severely injured leaves may develop necrosis that can also be seen on.

## 2.3. Symptom identification for conifer species

Ozone visible injury can be identified and distinguished from symptoms caused by other biotic/abiotic factors by the following criteria:

1. Visible symptoms are typically expressed as tiny purple-red, yellow or black spots (described as stipple) or sometimes as a general even discoloration, reddening or bronzing.
2. Look for ozone visible injury on fully developed, light-exposed leaves.
3. Symptoms are more severe on mid-aged and older leaves than on younger leaves. Older leaves are the first ones that develop symptoms followed by an accelerated senescence (age effect).
4. Shaded portions of two overlapping leaves do not show any visible injury (shade effect).
5. Ozone visible injury normally does not go through the leaf-tissue (exception, see point 6). Both, stippling and even discoloration, occur only between the veins (interveinal) and do not affect the veins the lower leaf surface towards the end of the growing season.
7. Plants growing on more humid sites are more likely to develop ozone visible ozone injury compared to plants grown on drier sites (higher O<sub>3</sub> uptake).

### 2.3.1 Conifer trees (main tree species and others) within the Intensive Monitoring Plots

Once the branches are collected, the different needle age classes are identified. Only current year needles (C) and current + 1 year needles (C+1) are assessed. Needles have to be placed close to each other (making a "plane", at least 30 needles if available) and examined in full sunlight. The chlorotic mottling will be scored for each needle age class in percentage of total surface affected. The resulting percentages per branch and needle age are then transformed to the corresponding score (classes), according to Table 1.

Score	Frequency class (%)	Definition
0	No injury	None of the leaves are injured
1	1 – 5 %	1 – 5% of the leaves per branch show ozone symptoms
2	6 - 50 %	6 – 50% of the leaves per branch show ozone symptoms
3	51 - 100 %	51 – 100% of the leaves per branch show ozone symptoms

**Table 1.** Scoring and scoring definition for visible ozone injury as it is expressed on the respective needle years for the collected branches of conifer species

## 3. Results and Discussion

Estimates of ozone damage was done in the manner provided for the Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of results of impact of air pollution on forests adopted by the International cooperative program for assessing and monitoring the impact of air pollution on forests [14]. Visible damage to the assimilation organs of conifer expressed ozone in the upper parts of the crown, the top of the twigs and needles.

Minimum of 3 branches per tree and five trees per plot are assessed. The evaluation is very different for deciduous trees and coniferous trees and trees from which they reap the samples in Kopaonik are dominant spruce trees. The trees are on the ground marked the permanent markings on the bark,

numbered 1-195, at 3 under plot. The numbers of trees to assess damage caused by ozone are 9, 20, 54, 76, 108.

Needles in the laboratory for evaluation prepared by placing the flasks with 2.5% solution of glutaraldehyde ON (SN2) 3SNO. Microscopic changes were found chlorotic-most common symptom induced by ozone damage.

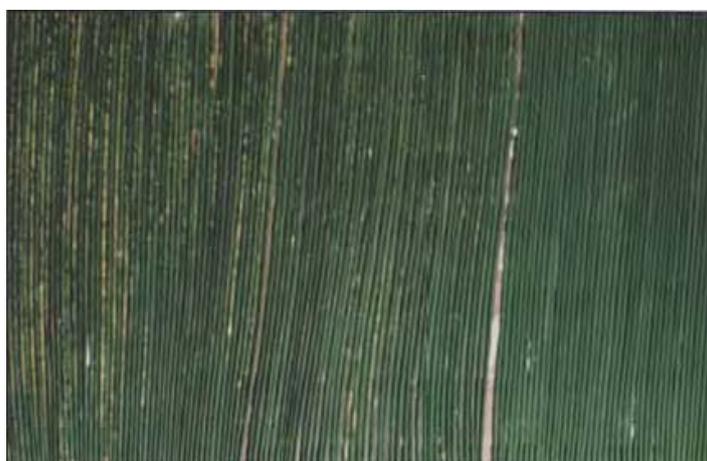
The samples were assigned to these five trees with three branches - the three clusters (1-3, 3-5 ... 15) in the form LTF2004. The number of needles per sample is 30.

Other required parameters are listed in table-form LTF2004. (Type number, dates of sampling, analysis, method of detection and other observations). Needles are grouped by category (percentage share - a result with symptoms from each branch were taken to five trees on the experimental plot).

**Table 2** LTF2004- Determination of ozone injury on conifer

Point No	Tree No	Cod of species	Latin name	Material of cluster	Date of taking samples	Date of analyses	Injury of conifer	Status of examples
2	9	118	<i>P.abies</i>	1-3	131010	191110	0,0,1	NR
2	20	118	<i>P.abies</i>	4-6	131010	191110	0,1,0	NR
2	54	118	<i>P.abies</i>	7-9	131010	191110	1,0,0	NR
2	76	118	<i>P.abies</i>	10-12	131010	191110	0,0,0	NR
2	108	118P	<i>P.abies</i>	13-15	131010	191110	1,0,0	NR

Foliar injuries resulting from biotic agents may appear on needle surfaces, confounding diagnosis of ozone injury. Chlorotic and necrotic spots or blotches caused by sucking insects, such as aphids and pine needle scale, may sometimes closely resemble ozone chlorotic mottle (Figure 1). The most common confounding pests are fungi [15], and chewing (needle weevil) or sucking (scale or aphids) insects [6,11]. Chlorotic mottle can be differentiated from injuries brought about by these diseases and insects by in-hand observation of the color and pattern of the symptoms on the needles. Careful observation may reveal the presence of fungus fruiting bodies. Close inspection of chlorotic islands of tissue (aided by a hand lens) often reveals a distinct necrotic point at the center of the discolored area, where the insect penetrated the epidermis with its piercing mouth parts.



**Figure 1** Healthy ponderosa pine needles are shown on the right one– third of the photo compared to chlorotic mottle caused by ozone injury that gradually increases in intensity on the left [16].

In many conifer species, foliage longevity can be measured by counting nodes on branches back from the branch tip to the oldest whorl, with each node separating a annual whorl of needles or needle fascicles corresponding to one year of growth. Reduction in needle longevity is recognized as an indicator of air pollution stress for these species when other factors leading to accelerated abscission of needles are taken into account. Foliage longevity is related to other factors, most particularly the elevation at which a tree grows [17], which is an indication of the length of the growing season at a particular site. Interpretation of data on foliage longevity must consider other confounding factors, for example, persistent infections of needle cast fungi can lead to tree crowns that are extensively defoliated. The bole and other crown variables that are associated with growth and overall tree vigor

can respond to elevated ozone exposures. Branch mortality in the lowest portion of the crown has been observed in southern California [18], leading to a decrease in vertical crown length, as measured by percent live crown [19]. Before lower branch mortality occurs, a decline in vigor in the lower crown may be observed as a reduction in needle length [20], and the production of fewer numbers of needle fascicles [21,22]. A reduction in the vertical and radial growth of stems has been documented for ozone-stressed trees in southern California and southern Sierras [23,24,25]. Cone and seed production can also be reduced by ozone stress in ponderosa pines [6]. Oleoresin exudation pressure, yield, and rate of flow were all substantially reduced in oxidant-injured ponderosa pines in southern California, while the crystallization rate was observed to increase [26]. The moisture content of phloem and sapwood were found to be reduced, as well as a reduction in phloem thickness. These phenomena have been associated with susceptibility to cambium damage from the heat of fire and successful attack by bark beetles (Cobb and others 1968, Graban and Duriscoe 1992). [26, 27].

## 4. Conclusion

- In Europe, ambient ozone levels are high enough to cause visible injury in native species. Assessment of visible injury is a feasible way to detect the impacts of this pollutant in forest plants and to identify potential risk areas. Ozone-induced visible injury has been incorporated in monitoring programmes, and it is surveyed at a pan-European scale under the protocols of ICP-Forests and FutMon (Life+) project.
- Conifers are presented on categories in percentage. Results with symptoms are shown from each branches from 5 trees from experimental plate. The peaces of conifers were estimated for 5 trees from 3 clasters ( 1-3, 3-5...15).
- Chlorotic mottle caused by ozone injury were on the toop of the tree, in first part of the conifer.
- Minimum 3 brances by tree and 5 trees by parcelles are controled. Evaluation is different to leaves and conifers, and the experiment were made on red fir. In locality Kopaonik- Rtanj.

## 5. Acknowledgements

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# Knowledge Networks of Universities and other Research Institutions in South and East Bulgaria

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The paper analyses the networks of knowledge supply institutions in South and East Bulgaria using data gathered through a range of interactions with 20 universities and other research institutions in South and East Bulgaria and as well as through a focus group. The paper is structured as follows: The first section focuses on knowledge assets and the analysis of their importance and effectiveness. The second section summarizes the results concerned with knowledge transfer. The third section highlights the main barriers, faced in the processes of knowledge transfer and the future support that is needed to improve the knowledge supply and transfer. Based on the data obtained, the following conclusions could be outlined:

- Knowledge supply and transfer is dominated by training activities and training programs, and training is the most important knowledge type and intellectual asset. The universities are focusing mainly on education in almost all fields of the science, and they do not pay sufficient attention to research activities;
- The traditional research institutions carry out significant research in the area of fundamental sciences, whereas the applied research is of a secondary importance. In the area of external relations, reputation is considered to be of a high importance for knowledge suppliers, whereas the responsiveness to beneficiary demands, and relationships with beneficiaries and other providers are considered to be less significant;
- The main knowledge recipients are universities and other higher education institutes, whereas the private sector firms are rated to be of less importance. The research institutions closely interact with major business and professional institutions, however the interaction is happening mainly on the institutional level;
- A lack of public support is the main barrier to knowledge transfer for knowledge suppliers, whereas the main barriers for the firms are a lack of financing and access to skilled labour.

## Keywords

Innovations, R&D, Knowledge

## 1. Introduction

Knowledge is well recognized as a key ingredient underlying the competitiveness of regions, states, sectors and individual firms. The knowledge-base of the economy can be defined as the capacity and capability to create and innovate new ideas, thoughts, processes and products, and to translate these into economic value and wealth [1].

The paper presented the results of benchmarking regional knowledge supply and transfer in the region of South and East Bulgaria. This region includes four out of the six planning regions (NUTS 2 level) in Bulgaria – South-West region, South-Central region, South-East region, and North-East region. It covers an area of about 74.2 % of the country's territory, homes 79% of the total Bulgarian population, and provides 83.8% of the country's GDP level.

Regarding the R&D investments, the region manifests its main characteristics - the high centralisation and concentration of resources in the capital of the country. In relation to knowledge supply and

creation, the region covers 93% of the staff involved in such activities in Bulgaria. Within the region the South-West planning region concentrates more than 80% of the R&D personnel and researchers, and hosts approximately half (21 out of 43) of the universities.

The analysis of knowledge networks of universities and other research institutions summarizes the results from structured interviews with representatives of 20 key knowledge supply institutions in the region and from a focus group, which was organized as a networking event [2].

The interaction with knowledge supply actors was aimed at: a) exploring types of knowledge that is generated by these institutions; understanding how knowledge is currently transferred from the research to the SME community; identifying and understanding how knowledge creating institutions and intermediaries can be involved and in the future enhance knowledge transfer and infusion activities; gaining an understanding of the issues that the research community is facing when they are trying to engage with the SME community in regard to knowledge transfer and supply.

The main goal of the paper is to analyze the kinds of knowledge that universities and other research institutions create, the R&D that they currently undertake, and the existing modes of transfer and barriers hindering such transfer. The interviewed firms were expected to access the role of different innovation related factors, using a 1 – 9 scale, where 1 is the minimum, and 9 is the maximum grade. They were also expected to rate the importance and effectiveness of the various factors, where the importance is related to the necessity of a particular factor, while the effectiveness is connected with its efficient usage for the competitiveness of the knowledge supply institution.

The paper is structured as follows: The first section focuses on knowledge assets and the analysis of their importance and effectiveness. The second section summarizes the results concerned with knowledge transfer. The third section highlights the main barriers, faced in the knowledge transfer and the future support that is needed to improve the knowledge supply and transfer [3].

## 2. Knowledge assets

This section contains a description of knowledge assets that interviewed institutions possess and an analysis of their importance and effectiveness. Knowledge assets are classified in 13 groups: employment law; health and safety advices; finance, accounting and auditing; development of new markets, new products, new processes, and new services; new technologies; recruitment or skilled labour; training; procurement of inputs; IT development; general business support.

**Table 1** Types of knowledge supplied to external sources (%)

Types of knowledge	Very often supplied	Quite often supplied	Not often supplied	Never supplied
Employment law	5	15	35	45
Health and safety advice	0	20	25	55
Finance, accounting & auditing	25	25	25	25
New Market development	10	20	30	40
New Product development	10	20	30	40
New Process development	10	10	35	45
New Service development	10	20	30	40
New Technology	5	10	45	40
Recruitment or Skilled Labour	40	5	10	45
Training	75	25	0	0
Procurement of inputs	0	10	45	45
IT development/support	30	30	20	20
General business support	30	45	25	0

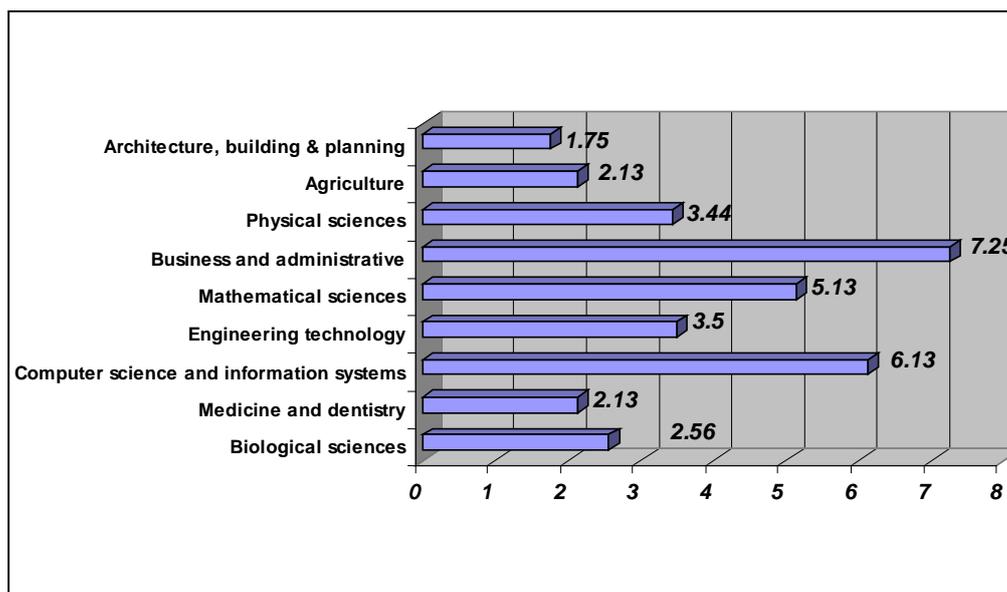
The results presented in Table 2 shows that the most important intellectual assets supplied are training programmes, websites and market knowledge with average scores of 8.07, 7.56 and 6.75 respectively. At the same time, the importance of typical intellectual assets as patents and copyrights is ranked as the lowest (2.63 and 3.44). Processes manuals and IT facilities appear to be of an equal importance for the knowledge supply organizations with an average score of 5.38. Six of seven intellectual assets are rated more important than effective. The only exception is IT facilities where the percentage difference between the importance and effectiveness is only -4.65%. The biggest percentage differences between importance and effectiveness are related to copyrights held and

patents. The percentage difference for training programs is only 3.35%, which means that their significance for the organization is almost the same as the efficiency of their use.

**Table 2** Intellectual assets

Types of intellectual assets	Importance	Effectiveness	Percentage Difference
Patents filed	2.63	2.37	9.89
Copyrights held	3.44	3.06	11.05
Market knowledge	6.75	6.25	7.41
Process manuals	5.38	5.00	7.06
Training programmes	8.07	7.8	3.35
Website	7.56	7.0	7.41
IT facilities	5.38	5.63	-4.65

Figure 1 suggests that business and administration (e.g. logistics), and computer science and information systems are considered to be the most significant disciplines for knowledge creation with average scores of 7.25 and 6.13 respectively. The rest of disciplines are not rated highly, and the lowest score 1.75 is given to architecture, building & planning. Almost all of the respondents under the section 'other disciplines' added different fields of social sciences, with an average score of 4.43, which is higher than in other disciplines, such as engineering technology and other fields of natural sciences. This can be explained by the fact that the majority of the interviewed universities and most of the Bulgarian universities as a whole supply knowledge in the field of social sciences.



**Figure 1** Importance of academic disciplines

In terms of sources of knowledge, the highest rated source within and outside the region are "universities or other higher education institutes" with an average score of 7.4 (see Figure 2). These knowledge sources are distributed almost equally within and outside the region. All other sources of knowledge, except the "other", have a medium frequency of usage with average scores of 4.7 and 4.3 within and outside the region. Firms and organizations from private sector and professional networks are definitely more important sources of knowledge within the region rather than outside the region. Not surprisingly international organizations are the only high important source of knowledge outside the region with an average score of 5.00. The basic locations of the outside sources are grouped into two main groups. The first group consists of the district centers located outside the MIRIAD region such as Veliko Tarnovo, Rousse, Plevna, Swishtov, Vratza, Vidin, and Montana. The second group includes locations outside the country and especially the EU countries.

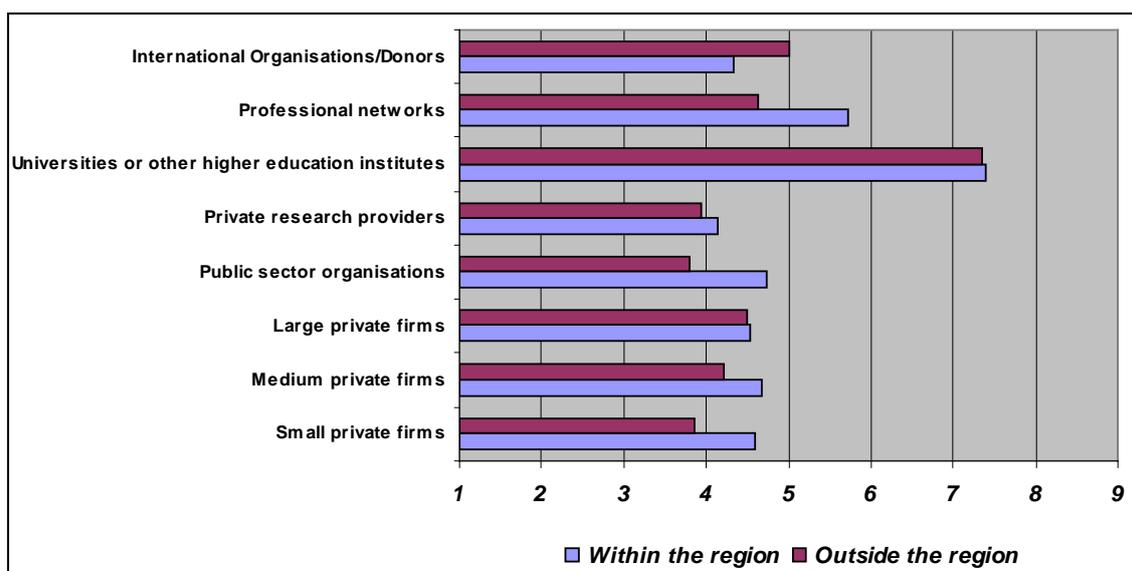


Figure 2 Sources of knowledge

### 3. Knowledge transfer

This section contains empirical analysis of the practices and routines, and the main kinds of external relations of the knowledge transfer organizations. The focus is on their importance and effectiveness for the competitiveness of the respondents.

Table 3 Practices and routines

Types of practices and routines	Importance	Effectiveness	Percentage difference
Process manuals	5.64	5.07	10.11
Training materials	8.07	7.64	5.33
Customer project materials	4.36	4.07	6.65
Library	7.57	7.14	5.68
e-library subscription	5.00	4.71	5.80
Forums for solving problems	6.57	6.5	1.07
Communication with beneficiaries	6.64	6.00	9.64
Communication with other service providers	5.14	5.07	1.36

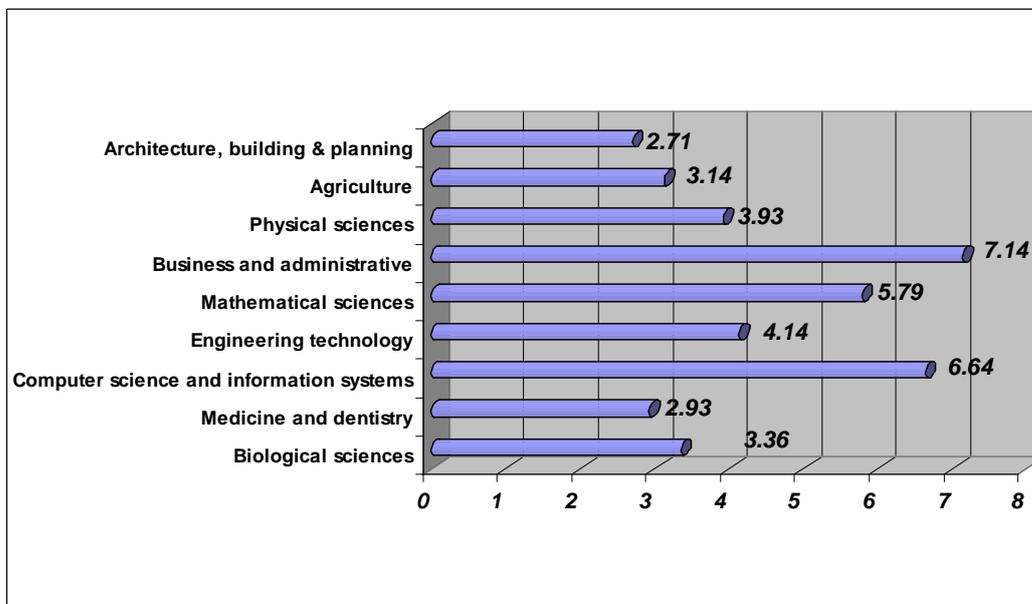
Table 3 suggests that training materials are the most important and the most effective practices and routines, affecting the organizations' capabilities to transfer knowledge to business. The average values of 8.07 and 7.64 are high which documents that this significance occurs both in relative and in absolute terms. The second ranked item is library, whereas the lowest score is given to the customer project materials. The importance of all "practices and routines" is higher than their effectiveness, i.e. knowledge transfer organizations are not able to use them as efficiently as it is necessary in order to be competitive. The difference between importance and effectiveness of 10.11% for the process manuals is the highest, whereas the difference for solving problems forums is only 1%.

When considering the external relations of the knowledge transfer organizations, the following major characteristics could be outlined: In comparison to other external relations, the reputation of knowledge transfer organizations appears to be the decisive factor in terms of importance and effectiveness with average scores of 8.43 and 7.57. The next three positions were obtained by information on an organization's roles, presentation of their services, and the level of client satisfaction. Interestingly the relatively low scores were obtained in the area of relationships and collaborations with business and other providers, which suggest that they are less significant in the knowledge transfer process.

Similarly to the previous table, all forms of external relations are rated as more important than being effective, and again these forms are more important for the knowledge creation organisation than they are being efficient in regard to the knowledge transfer (See Table 4). The percentage difference between the levels of importance and effectiveness varies from 3.96% (satisfaction of clients) to 10.2% (reputation of the organization).

**Table 4** External relations

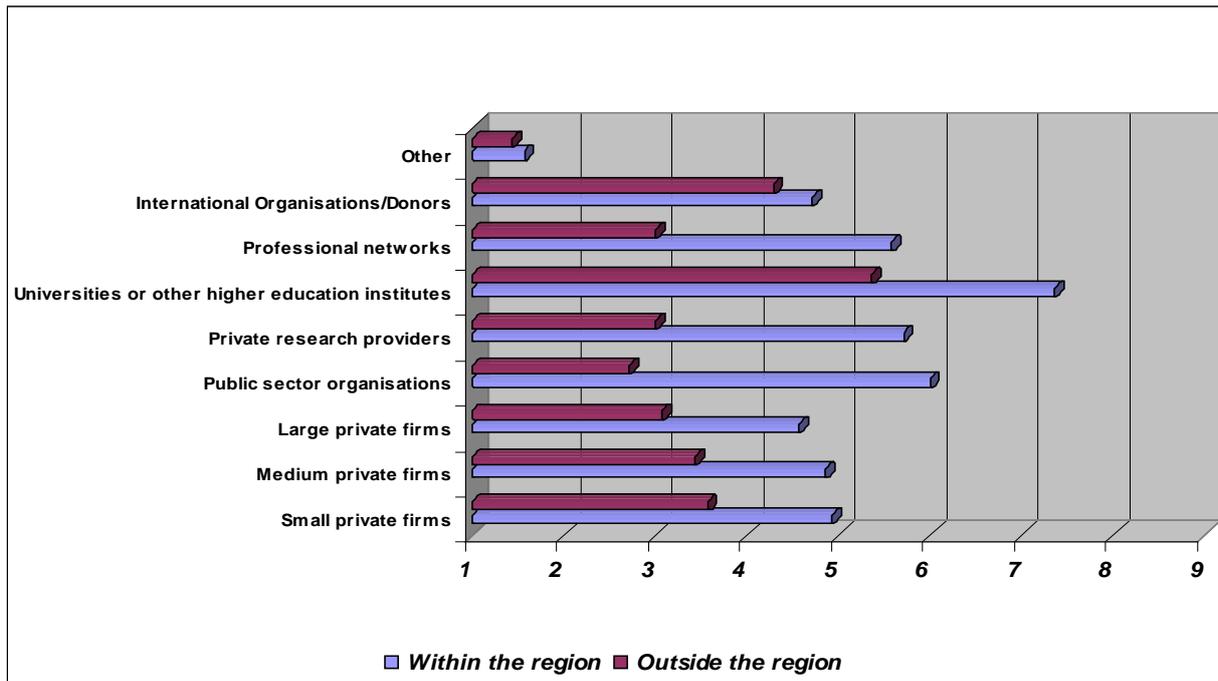
	Importance	Effectiveness	Percentage difference
Reputation of your organisation	8.43	7.57	10.2
Presentation of your services	7.36	6.93	5.84
Knowledge of your organisation's role(s)	7.79	7.14	8.34
Satisfaction of client/customer/partner	7.07	6.79	3.96
Responsiveness to beneficiary demands	6.71	6.36	5.22
Relationships with your beneficiaries	5.71	5.36	6.13
Relationships with other providers	5.86	5.29	9.73
Collaboration with business to innovate	6.00	5.50	8.33
Collaboration with other providers to innovate	4.86	4.57	5.97



**Figure 3** Importance of academic disciplines for knowledge transfer

Regarding the importance of scientific disciplines in relation to knowledge transfer, Figure 3 shows that they are ranked in very similar way as the results on Figure 1. The obtained scores for a majority of disciplines are in this case higher, which denotes that they are of higher significance and contribute to knowledge transfer. The data on Figure 3 confirms the inference, drawing from knowledge supply analysis, that the scientific disciplines are not rated highly, except business and administration, and computer sciences.

Figure 4 presents the results concerning knowledge transfer to the different stakeholders. It highlights the fact that the recipients of primary importance are universities and other higher education institutes, public sector organisations, private sector organisations, and professional networks. The scores for all types of private firms are much lower, and this fact can be interpreted as an unfavourable in respect to the innovation capabilities and competitiveness of the firms.



**Figure 4** Main knowledge recipients

The knowledge transfer recipients are located mostly inside the region. Thus, the average scores for the agents outside are very low in absolute and in relative terms, due to the broad definition of the Bulgarian region for the project purposes, which has more than ¾ of all Bulgarian universities and other research centres. Similarly to the previous results, the main outside knowledge transfer destinations are the district centres of the excluded planning regions, as well as the EU countries.

**Table 5** Interactions with other stakeholders (%)

Partners to knowledge transfer organizations	Yes	No
Chamber of Commerce	57.1	42.9
Trade or Business Association	78.6	21.4
Business Club	64.3	35.7
International research organisations	100.0	0.0
Professional organisations	92.9	7.1
Subject focused organisations	85.7	14.3
Funding organisations	85.7	14.3

Table 5 provides information for various partners to knowledge transfer organizations. All the listed partner organizations appear to be of a high importance. 100% of the respondents interact with international research institutions, 92.9% with professional organizations, and 85.7% with the subject focused and funding organizations. These data can be perceived as evidence that a relatively big part of interactions relates to fundamental research, having little to do with the applications to SMEs.

The most important interaction for the knowledge transfer seems to be an improving of the university-business relations, whereas the effect on developing a trust between research providers and companies is rated relatively low. The obtained results suggest that interaction at institutional level is rather high but the real collaboration with the firms is actually not happening.

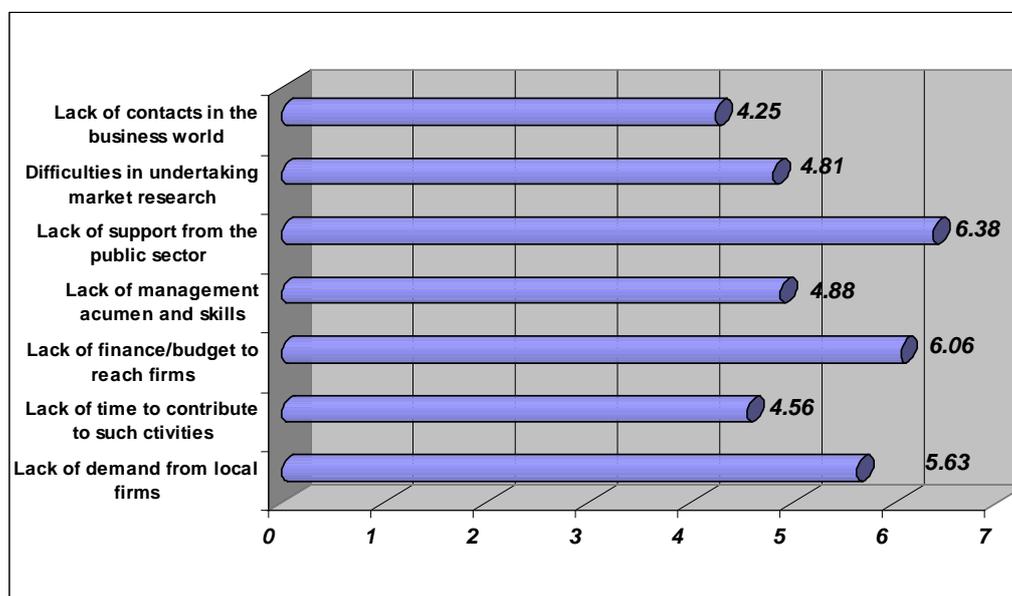
## 4. Barriers and future support

There are two types of barriers to knowledge transfer: barriers concerning knowledge transfer to firms, and barriers to acquiring or creating knowledge in the organisations which need to maintain or improve

their competitiveness. This fact raises the problem concerning the areas of policy interventions that could help companies to acquire and develop knowledge needed for improving their performance.

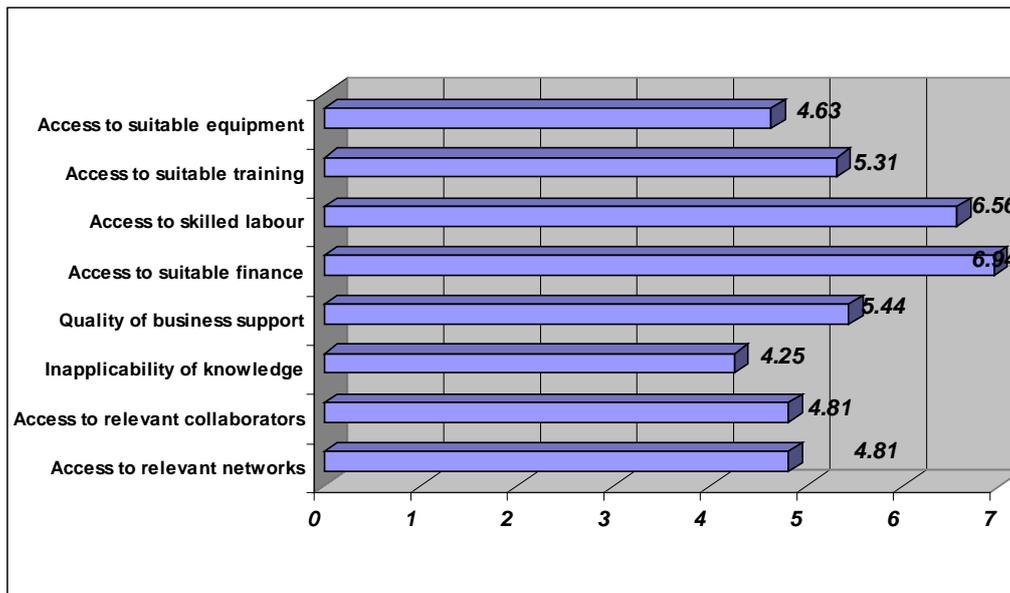
Figure 5 suggests that over 50% of barriers to knowledge transfer are rated below 5 and consequently they are not classified as significant. The most important barrier faced by knowledge transfer organizations is a lack of support from the public sector, followed closely by a lack of finance/budget to reach many firms and a lack of demand from local firms with scores of 6.06 and 5.63 respectively. It should be pointed out that none of the barriers (except the item "other") is ranked below 4, which means that these barriers are not significant. These data are indicative and suggests that the public sector interventions are necessary in regards to the knowledge supply process. In this case it is necessary to take into consideration the fact that a majority of the research institutions are still state-owned and subsidised, and therefore rely on the public support more than on knowledge transfer activities initiating by themselves.

In terms of barriers faced by firms, Figure 6 shows that the two most important barriers are the access to suitable finance and the access to skilled labour with average scores of 6.94 and 6.56 respectively. The relatively high scores of the access to suitable finance and the access to skilled labour highlight the financial problems of most of Bulgarian firms, which suffer from the adverse demographic trends and the "brain drain" processes.



**Figure 5** Barriers to knowledge transfer

The priority for future policy should be a focus on creating better networks that link companies with universities and other R&D performing organisations. The high percentage (70%) suggests that it should form the core policy. The other areas that seem to be of a high importance are the improvements to the physical infrastructure (55%), and creating more access to training and workforce development opportunities (50%). From the obtained data it becomes apparent that the universities and other research centres do not think that making finances available to firms or providing more support to companies to improve their supply-chains should form the core future policy.



**Figure 6** Barriers to knowledge creation faced by firms

## 5. Conclusions

Based on the conducted analysis of the knowledge supply and transfer in the region of South and East Bulgaria, the following conclusions could be outlined:

- Knowledge supply and transfer is dominated by training activities and training programs, and training is the most important knowledge type and intellectual asset. The universities are focusing mainly on education in almost all fields of the science, and they do not pay sufficient attention to research activities;
- The traditional research institutions carry out significant research in the area of fundamental sciences, whereas the applied research is of a secondary importance. In the area of external relations, reputation is considered to be of a high importance for knowledge suppliers, whereas the responsiveness to beneficiary demands, and relationships with beneficiaries and other providers are considered to be less significant;
- The main knowledge recipients are universities and other higher education institutes, whereas the private sector firms are rated to be of less importance. The research institutions closely interact with major business and professional institutions, however the interaction is happening mainly on the institutional level;
- A lack of public support is the main barrier to knowledge transfer for knowledge suppliers, whereas the main barriers for the firms are a lack of financing and access to skilled labour.

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# Venture Capital in Macedonia - Does it really exist?

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**Due to inexperienced management, lack of specialization, lack of undifferentiated production program, lack of reference of successful story, unwillingness of entrepreneur to share the ownership etc., many researches confirm that financing represents a serious difficulty for small and medium sizes enterprises. Financing is a very critical issue for the survival and development of small and medium sized enterprises. Venture capital represents a very interesting solution for the new and existing small and medium sized enterprises which have interesting and attractive ideas and projects, but are short of finances. The specific importance that lies on venture capital and its impact on small and medium sized enterprises is the fact that they provide much more than money for them.**

**This paper offers analyses the current situation in Republic of Macedonia related to the development of venture capital - what is done and what should be done? It also gives data on the features of investments made by venture capital funds, established by Small Enterprise Assistance Funds - SEAF from USA (SEAF Macedonia, Small Investment Fund and SEAF Fund for Southern Balkans) as the only funds which provide venture capital in Macedonia. The data are related to the number of investments made in Macedonia, preferred sectors for investments, amounts of invested capital, factors that affected these investments, received benefits of businesses from invested venture capital, level of success achieved from investments etc. Up until now these funds have invested in 17 small and medium sized enterprises in our country.**

## **Keywords**

Business angel, exit strategies, investment criteria, venture capital, venture capital fund.

## **1. Introduction**

The idea of investing capital in risky businesses and seeking sources of capital is not new. In the XV century explorers - adventurers to sail around the world looking for a big wealth in exotic locations was needed to find financial resources from someone. Using their connections with the king or queen they came to the appropriate financial means for realization of their goals. It can be stated that the first venture capitalist was the Spanish Queen Isabella, who invested in its well-known entrepreneur Christopher Colombo for various researches and searching for new places. [1, p2-5] In the nineteenth century a large number of wealthy individuals and families financially helped researchers of new technologies. Immediately after The World War II, in 1946 was formed the first venture capital fund, American Research Development Corporation, which initially invested in new companies with great growth potential, mainly composed by soldiers returning from the war, and later it invested in other businesses types as well. [2, p32] It is assumed that the term "venture capital", for the first time is mentioned by Jean Carter Witter in 1939 in an open forum at Convention of Associations of Investment banks of United States of America, and since then venture capital began to be considered as a particular source of financing small and medium enterprises. [3, p2] The term "venture capital" derives from the nature and characteristics of investment projects in which the capital is invested. Because the bulk of investment projects are characterized by a high degree of risk and the capital invested in them is qualified as "risky."

Venture capital is often invested in small enterprises which deal with scientific studies and application of modern technology, in which investments are characterized with a high risk. If they realize a successful penetration in the market, then they will achieve a high level of profitability, in compared with other enterprises. In the seventies as risk investments were considered companies that were engaged in production and development of computers.

As features of small and medium enterprises, which are distinguished by a high degree of investment risk, are: the availability of a strong potential of growth and development, orientation to the rapid growth and great development of the product for a short time period; appearance on the market with completely new products or products that have been modified.

But it should be noted that not all businesses are attractive for investment by venture capitalists. According to many studies in different countries of the world, venture capitalists analyze 100 to 200 projects before they invest their financial means, which have been planned.

## 2. Definition and types of venture capital

Venture capital represents the financial funds, usually in the form of equity capital and know-how management, which are invested by individuals and institutions in small and medium enterprises, which are not listed on the stock exchange and have high growth potential. Venture capital represents long-term investment in the form of equity capital, or similar to it, in small and medium enterprises - new and existing, which includes not only financial resources but also managerial advices. [4, p166] Venture capital can be presented in two basic forms, business angels, as informal venture capital funds and formal venture capital funds, which will be addressed in the following pages.

Business angels are private investors, wealthy (often millionaires) who invest in small and medium enterprises, which are not listed on the stock exchange, mainly in the early stages of their development in order to help young entrepreneurs in the achievement of their objectives, and in the realization of profits for themselves. Business angels as an informal source of capital, they represent important force in the financing and the management support to newly created enterprises.

In literature and practice we can see certain types of business angels. Main division is as follows: active, latent and virgin angels. [5, 6] Active angels are people who have experience in investment and continue to seek investment. Latent angels are passive investors who have invested in the past, but have not invested in the past three years. Virgin angels are people who want and seek to invest, but have not yet made their first investment

The origins of modern formal venture capital is related with the formation of the American Research and Development Corporation (ARDC) in 1946, which was mentioned beforehand, at the initiative of General Georges F. Doriot, who is also known as "the father of the formal venture capital", together with Ralph Flanders and Karl Compton, in order to support investments in the weapon industry, and soldiers returning from World War II to form and lead their own businesses.[2, p32] ARDC, as the first formal venture capital fund, the most successful investment marked in 1957 when it invested \$ 61,400 in Digital Equipment Corporation (DEC), which in its first appearance on the stock exchange in 1968, was valued at \$ 355 million. DEC began with "a table and two people", while in 1971 numbered 7000 employees. ARDC Fund continued to invest up until 1971, when the founder George F. Doriot was retired. In 1972, Doriot merged ARDC with another fund - Textron. ARDC had so far invested in more than 150 enterprises. According to the ARDC system, other venture capital funds were formed.[7, p13-4] The formal venture capital represents the capital mobilized by pension funds, insurance companies, corporations, financial institutions, academic institutions, individuals and others from the venture capital firm, which manages the same and invest in small and medium enterprises that are not listed on the stock exchange within a limited period in order to realize a profit for themselves, investors and entrepreneurs.

There are several types of formal venture capital. On the basis of who provides the capital, we can distinguish state venture capital (government, is usually the sole investor), financial venture capital (investors are banks and other financial institutions), corporate venture capital (non-financial corporations are investors) and venture capital partnership (partnership between so called institutional investors and venture capital firms).

Formal venture capitalists invest large sums of capital in the enterprise, which are already developed, respectively, have exceeded the risky stages of their life cycle. In this way, formal venture capitalists support only when entrepreneurs are convinced that the business to some extent has proven to be successful, this mostly can be seen through the positive sales figures and profits. They simply are "part" of a particular investment in a period of 3-5 years.

There are several types of companies that work with venture capital. They are divided in Independent captive, and semi-captive. [8-11] Independent companies are those which raise capital for investments from other sources (pension funds, insurance companies, corporations, wealthy individuals and families, etc.) and invest in small and medium enterprises. Captive companies are those that raise capital for investment by the parent company, which is the dominant financier of the investment fund, which is created by the company for venture capital. The captive company is a subsidiary or department of a bank, financial institution, insurance company or industrial company. These firms are formed to seek new ideas and projects for investment, which are related to the sector in which the parent company operates. Banks create these firms/sectors to distinguish their commercial activity from the investment one. Semi-captive companies are almost the same with the previous, with the difference here that aside the parent company, largely as financiers a third party appears. Venture capital companies, in most cases are structured as partnerships or limited liability company, as in Figure 1. [12, p.500]

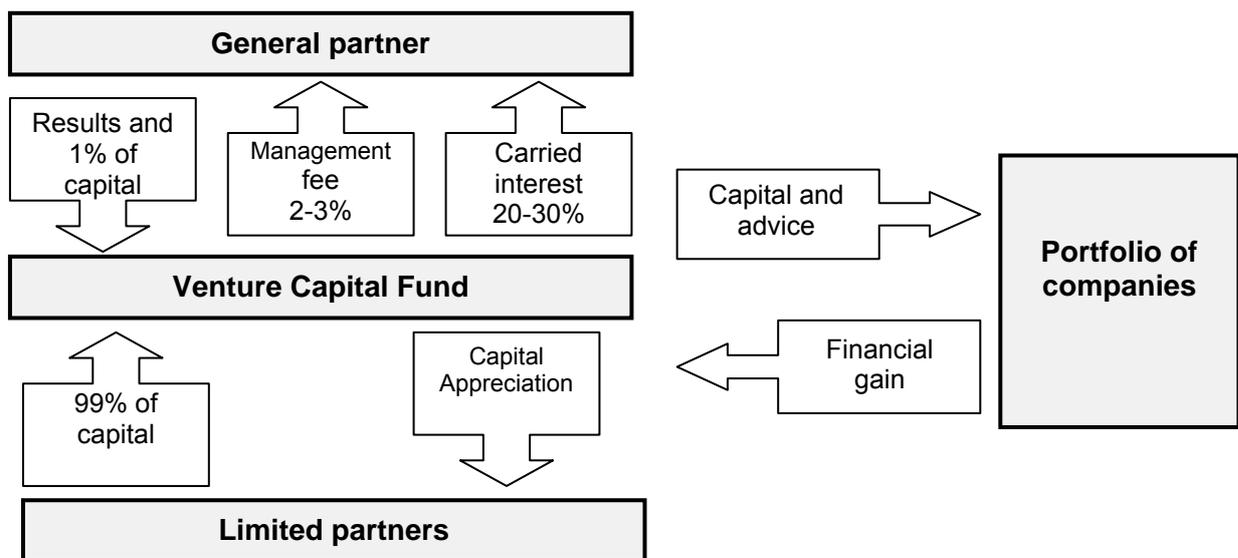


Figure 1 Venture Capital Partnership

Venture capital companies for their efforts and investments made are compensated in two ways, through a management fee and carried interest. Venture capital companies receive annual compensation, which amounts to about 2-3% of the gathered and dedicated capital for investment. This management compensation usually serves for payment of workers engaged in the investment process, office rent, phone, electricity, travel expenses and marketing costs. Carried interest is around 20% of profits from investments made. It is distributed to venture capital companies, after the investors (limited partners) have returned their invested means.

At the new era, venture capital marks developments even in some countries in transition. Causes for this capital development are different, for example, 1) necessity that investment project with a high degree of risk to be financed in a more flexible way rather than financing through bank loans, which are characterized by fixed costs and fixed date credit returns and 2) development of small and medium enterprises as a source of innovation, new jobs creators and their role in the holistic development of the state.

### 3. Macedonia and venture capital - conditions, problems and perspectives

The financial system in Macedonia is shallow and unbranched system and is characterized by limited access of SMEs to financing sources needed for their growth and development.

Venture capital as an important source of financing is almost completely absent in the Republic of Macedonia. Consequently, our small and medium enterprises are deprived from "one of the most favorable and most quality financing sources for their development" [13, p215] In our country, recently the interest for formal venture capital started to take place, while business angels still remained "unknown term".

In 2007 the Government launched an initiative to open three venture capital funds (with the participation of state capital) in order to determine is there a willingness of the private sector to invest together with the government in promising, risky investment projects. Some activities around this initiative took place during 2007, but ended unsuccessfully. [14] In Macedonia there is a legal framework for the establishment of venture capital funds. The establishment and operation of these funds is regulated under the Law on Investment Funds (from 2000, which suffered amendments in 2007 and 2009), which enables the formation of private funds, whose operation is similar with the operation of venture capital funds. Private funds are established to raising funds through a private offering, which are then invested according to the aims of the fund. According to Article 41 b of the Law on Investment Funds: [15, p2] 1) A private fund is established in temporary basis that can not be shorter than eight years 2) The size of the fund is at least 500.000 € converted in denars. Under the fund's size means a committed capital from all investors during the entire time of existence of the fund, 3) Minimum taken concerted commitment of investment of each investor in the private fund can not be less than 50.000 € converted in denars which the investor is obliged to pay on a call of the company for managing private funds in accordance with the provisions of the prospectus, 4) The maximum number of private investors in the fund is 20 investors; 5) Private fund is established and it is managed by a company for managing private funds; 6) To establish a private fund, the company for managing private funds adopt a statute and prospectus of the fund; 7)The private fund can borrow without any limit.

The only funds which invest in the form of venture capital and operate in our country are funds established by the U.S. Fund for Small Businesses - SEAF (Small Enterprise Assistance Funds - SEAF). SEAF is a global investment company based in Washington, where its work focuses on providing capital for business development in fast growing markets as well as those who lack traditional sources of capital. These funds are: SEAF Macedonia Small Investment Fund (SIF) and SEAF Fund for South Balkans. [16]

SEAF Macedonia was established in 1998. SEAF Macedonia is a small venture capital fund with total capital of \$ 13 million. The founders and investors of SEAF Macedonia are: The European Bank for Reconstruction and Development (EBRD) - which has invested \$ 4 million, the International Finance Corporation (IFC) - 2,5 million \$, the German Investment Company (DEG) - 2,5 million \$ and The U.S. government's Agency for International Development (USAID) - \$ 4 million.

The mission of SEAF Macedonia is making wise investments in small and medium businesses. Investments in these companies are carried out in combination with management training and technical support in order to improve their business performance and achieve their development goals. The Fund actively supports its portfolio companies in implementing appropriate improvements in the techniques and practices of management, particularly those related to financial control, cost accounting, quality control and marketing (see Table 1).

**Table 1** Types of support offered by SEAF Macedonia

<b>Type of support</b>	<b>No. of firms</b>
Regular management support	14
Financial consalting	14
Marketing consalting	14
Recruitment and personnel development	5
Assistance in legal matters	11
Access to other sources of funding	11
Organization development	6
Product development	8
Entrance to the international market	5
Other	1

Information obtained from our research related to SEAF funds investments say that they mostly are focused in the sector of production (42.86%), followed by trade sector (28.57%), media (21.43%) and internet traffic (7.14%). In terms of invested amounts, for the most part, respectively 35.71%, they moved within 100,001 to 500,000 \$. The most part of the investments were made in the early stage of development of enterprises, in 78.57% of total investments. Only one investment is made in seed phase, while none in the start-up phase of development. In late stage are made 14.29% of the

investments. In enterprises where SEAF invested his funds, the percentage of the share of ownership that was taken from SEAF, in 42.86% of cases are moving from 20-40% (the share of ownership does not exceed 49%, with the exception of On.Net, where SEAF had taken 64% of ownership). SEAF used these strategy to exit from its investments: management by out (42,86%), exit through strategic partner (14,29%), selling to third party (14,29%) and others (28,56%). Until now, only from three investments SEAF has not exited yet. According to SEAF, from previous investments made, in terms of success, they are categorized as follows: 42.86% moderately successful, 28.56% very successful, 14.29% slightly successful and 14.29% finished with failure (realized loss).

SEAF Macedonia has invested in 14 enterprises in Macedonia: Login Systems (authorized distributor of the largest IT companies in the world, such us Microsoft, Cisco Systems, Hewlett-Packard, Navision Solution Center and provider of solutions and services from business-information sphere in Macedonia and the region), Fonko (dealing with air conditioning, but produce and wine and men's shirts), Mako Market (one of the leading suppliers of consumer goods in Macedonia to the most wholesalers and retail enterprises in Macedonia as Vero, Tinex, Skopje Pazar, Tediko and others), Gica (production of animal feed), Tinex (one of the leading supermarket chains), Krug (publisher of one of the most sold daily newspaper "Dnevnik"), On.net (one of the most popular ISP in Macedonia), Pilko (the largest Macedonian producer of fresh chicken) Datapons (one of the leading printing houses in the country), Medium Export (one of the largest exporters of red pepper and lamb meat), Nasto (producer of dairy products, the most famous cheese like "Gauda" and "Ajdamer"), Magnolia (children's apparel manufacturer) Ivoprom (production of spices) and Planet Press (publisher of the journal "Tea Moderna", "Tin shema" and "Tea krstozbor"). SEAF no longer invest in Macedonia.

Key factors which attracted SEAF to invest in these companies are shown in table 2.

**Table 2** Factors for attracting venture capital from SEAF

<b>factor</b>	<b>Percentage</b>	<b>No. of firms</b>
Entrepreneur / management team of the company	100,00	14
Solid history of the operation of the company	78,57	11
The development phase of the company	42,86	6
Product Innovation	42,86	6
Technical Innovation	35,71	5

Small Investment Fund - SIF was established in July 2007 and until now has made three investment in Macedonia, such as: Oktober (company for producing toilet paper), INet (system integrator and distributor of various products of information and communication technology) and Urban Invest (the largest producer of concrete paving elements and mosaic products).

SEAF Fund for South Balkans was established in 2006. The headquarters of the fund is in Belgrade, Serbia. This is a regional fund and operates in Serbia, Montenegro and Macedonia. SEAF Fund for South Balkans has not invested in any company in Macedonia. Currently is preparing three investments in our small and medium enterprises, but because the principle of "business secret" the names of companies and amounts of investments were not disclosed.

Considering the presented information we can conclude that SEAF funds did not have a significant impact on the financing of small and medium enterprises. In fact, very few companies in Macedonia were able to use venture capital as a source of funding, respectively only 17 companies of about 70,000 active companies. However, the role of SEAF funds is immense because they laid the foundation of the functioning of venture capital in our country.

#### **4. Measures to encourage the development of venture capital in Republic of Macedonia**

Measures which were taken in developed countries and those in transition countries were different. As a measure that was most exploited in the analyzed countries was the establishment of state funds of venture capital – from which after a certain period, the state retreated and were transformed into a private commercial venture capital funds. Significant role in the development of venture capital have played and the European Bank for Reconstruction and Development (EBRD) and International

Finance Corporation (IFC), which initiated the formation of many venture capital funds and networks of business angels. In certain states to encourage investment by venture capital have been introduced and numerous tax incentives by the state, particularly in income tax.

Considering the experiences of countries in which venture capital is present and developed as a source of financing for small and medium enterprises, we suggest the following measures which should be taken to promote the role and importance of venture capital in the Republic of Macedonia:

- Raising awareness about the benefits of venture capital for small and medium enterprises. Considering that in our country venture capital is not enough known concept, it is needed to organize seminars, workshops, conferences, etc., introducing the curricular content in the programs of faculties of economics and business administration, publication of professional and scientific papers, where in the explicit way will be explained all the good and bad sides arising from this method of financing.
- Increasing the number of investment opportunities. This can be achieved with the development of entrepreneurship and small business in the country, i.e. by creating more business incubators, business centers, science parks and so on, where we could develop and present interesting business ideas. We should consider that venture capitalists prefer to invest in interesting entrepreneurial businesses with high growth potential.
- Establishment of state funds for venture capital. Starting from the experiences of countries in transition in which has been developed this way of financing, the first venture capital funds/companies should be established by the government itself, which may appear as a single investor (which is not very desirable), or in cooperation with international institutions and agencies such as the European Bank for Reconstruction and Development (EBRD), International financial corporation (IFC), the American Aid Agency (USAID) and others, which confirmed that they are willing to invest risk capital (for example, they supported the establishment of SEAF funds).
- Formation of a hybrid venture capital funds. Besides the formation of pure state funds, good practice is the formation of so-called hybrid funds, where despite the government, as investors may appear institutional and private investors, such as corporations, banks, pension funds and wealthy individuals. This measure was successfully implemented in Hungary [17].
- Establish networks of business angels. Networks of business angels can be formed with government (central or local) and private initiative. These networks will provide connectivity to prospective investors with entrepreneurs, which can have a good business idea but have lack of funds.
- Providing a supportive fiscal policy. Almost all countries in which venture capital operates and is quite developed, as an incentive to include institutions and wealthy people in this type of investment is tax relief or full exemption from the government. Our country applies a flat tax, which is 10%. As a good measure to encourage venture capital investment could be if the potential investors in the year in which they investment to be completely exempt from income and profit tax, while the profit tax be reduced to 50% in first 3 years from the moment when the investment is made.
- Further development of the Macedonian Stock Exchange. Venture capitalists invest in companies that are not listed on the stock exchange. In the meantime, these companies are growing, becoming known to the market, and to the additional funds coming through the stock market. Venture capitalists are willing to sell their shares of ownership, in these companies. If there is no effective stock market and they can not sell their shares to gain profits from investing, they would not be willing to invest in new businesses. In this context, is very important the establishment and development of the OTC market (over the counter market), which is characterized by much more liberal entry conditions for enterprises, which would enable the listing of successful small and medium enterprises. These are practices of developed countries such as USA, Great Britain, France, Sweden and others. It should also be offered a special service that would pick up buying and selling share prices from various dealers that would be presented to potential investors. Then, investors will complete the transaction through special computer software, without the help of a broker. For example, NASDAQ, Reuters, Telerate and Bloomberg work on these principles[18].
- Reduction or elimination of investment restrictions of pension funds in risky deals. According to the Law on Mandatory Fully Funded Pension Insurance, pension funds are not allowed to make investments that are typical for venture capital. Under Article 108 of this law, the assets of pension funds can not be invested in stocks, bonds and other securities which are not listed on official stock market or are publicly traded, instruments that can not legally be available, material goods which are rarely traded on organized markets and whose assessment is uncertain except in securities which are issued based on mortgage and indirect investment through investment funds.

Under the same law, Article 106 and 107, pension funds can invest: maximum 30% of the assets of pension funds in securities issued by foreign governments and central banks of EU countries and OECD countries; maximum 80% of the assets of pension funds in securities guaranteed by the Government or the National Bank of the Republic of Macedonia; maximum 60% of the assets of pension funds in bank deposits, certificates of deposit, commercial bills, bonds and securities based on mortgage of domestic banks; maximum 40% of the assets of pension funds in bonds and commercial bills of domestic corporations other than banks; maximum of 30% of the assets of pension funds in shares of domestic corporations (shareholding companies) and maximum 5% of the assets of pension funds in share documents and stocks of Macedonian investment funds.[19] But pension funds in our country are not quite developed and have no practical experience in investing in the stock market or small businesses. They also lack managerial staff to do these kind of investments. Hence, the implementation of this measure is too risky. It could be implemented in the future, in a further phase of development of venture capital.

- Training of talented students from different fields about the functioning modes of venture capital. The students who have shown excellent results during their studies, from various fields, government and other institutions and organizations may provide scholarships for training and further formation outside the country, specifically in those countries that are characterized by a developed venture capital, such as United States., Great Britain, Ireland, Sweden, France and others. Once they complete their training, they will return to the country with the obtained experiences and knowledge related to the functioning of venture capital.
- Support and promotion of venture capital from other sources of funding. Commercial banks, savings and other various funds should promote and support the venture capital, as a specific and particularly important source of capital because they give great help in the creation of new enterprises. These enterprises, once they stand on "healthy legs" in the subsequent phases of development will require funding from these sources in the form of loans, allowing the realization of income in the form of interest payments, commissions, etc. Also, commercial banks and other financial institutions can establish a separate department/sector for venture capital, where interesting businesses will be financed, and where they will gain additional profits and other benefits.

## 5. Conclusions

Venture capital in the Republic of Macedonia is not yet developed. The only funds that invest and operate in the form of venture capital in our country are funds established by the U.S. Fund for Small Businesses - SEAF (Small Enterprise Assistance Funds-SEAF). SEAF is a global investment company based in Washington, where his work focuses on providing capital for business development in fast growing markets as well as those who lack traditional sources of capital. These funds are: SEAF Macedonia, Small Investment Fund (SIF) and SEAF Fund for South Balkans. Barriers for the development of venture capital in our country, and in countries in transition in general, mainly are related to: underdeveloped capital markets (stock markets), a small number of domestic and foreign investors, higher risk for investment, untrained and inexperienced management, corruption, bad regulation, unfavorable tax treatment for this type of investment, bureaucratic and administrative obstacles and so on. Measures of initiation and development of venture capital that were undertaken in developed countries and those in countries in transition were different. As a measure that was most exploited, particularly in countries in transition was the establishment of state funds of venture capital, from which after a certain period, the state retreated and they were transformed into a private commercial venture capital funds. So the first venture capital funds/companies should be established by the Government of the Republic of Macedonia, which may appear as a single investor or in cooperation with international institutions and agencies such as the European Bank for Reconstruction and Development (EBRD), International financial Corporation (IFC), the American Aid Agency (USAID) and others. Besides the formation of pure state funds, good practice is the formation of so-called hybrid funds, where despite the government, as investors may appear institutional and private investors, such as corporations, banks, pension funds and wealthy individuals. This measure was successfully implemented in Hungary as a country in transition. Almost in all countries where venture capital operates and is quite developed as an incentive to include institutions and wealthy people in this type of investment is tax relief or full exempt from the government. Besides these, other measures that should be taken to promote the role and importance of venture capital in the Republic of Macedonia and the development of it, we suggest the following: to continue improving the general business climate, raising awareness about the benefits of venture capital for small and medium

enterprises, increasing a number of investment opportunities by creating a greater number of business incubators, business centers and so on, forming networks of business angels, further development of the Macedonian Stock Securities and establishing and development of the OTC market (over the counter market), allowing pension funds to invest in risky deals, training of talented students from various areas about the operation of venture capital, promotion and support of venture capital from other sources of funding.

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# Management training and knowledge management and innovation

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**Trainings have their importance and their managing today is a need without which could never be imagined the development of the human society. They are divided according to criteria which are oriented to the development of society.**

**General management training which will be implemented in practice has its importance for the implementation in daily life in order to increase professional and general development of the overall society.**

## **Keywords:**

Management, training, project, idea, purpose, innovation,

## **1. Introduction**

Training Management and management of knowledge and innovation are very important because they all should be available for projects to go well for different companies in all fields and human activities. The goal of training is to provide coaches with experience, modern environment, including interactive and modern methods. Trainings are different and their focus is oriented as per their filed. Training for managers in education has focused on the distribution of experience previously created with the development of training programs for management education in different countries with experience. The program aims to build national capacity and development of materials related to running the schools. The main goal has to do with the training of trainers program for school principals, development of programs and development of teaching materials. The aim of this training is the distribution of experiences among participants, capacity building training and creating training modules. Training of human resources management, include concepts of human resource management, development and evaluation performances based on a combination of international best practices, and recognizing local circumstances. Training for project management, financial management, customer service, training in leadership and training in information technology. All training should be managed in order to be successful and achieve the desired results.

## **2. Management training in various activities**

Trainings is different from their management following results that affect the quality of life in raising activities and events. As we introduce the knowledge and “know how” to apply each time the function will be put on innovations that are new to the development of human society and overall development of socio-economic development. Profile management of education should be noted that the training itself, with a range of features, including leadership and manager duties to the institution in order to succeed in the development of performance and results. In this case are involved the basic skills and facilities. During the training should take into account the organization of cooperation. Also giving and receiving feedback, including an understanding of the management situation, together with the evaluation meetings, analyzing all the circumstances and assessment of behavior in a large scale

term. All you can take to complete and deciding where to put their implementation plan. In these cases, management training has several goals:

- To communicate in collaboration with staff and effectively to ensure understanding and commitment at work.
- To clearly describe the differences between leadership and manager.
- To demonstrate the ability to describe and assigned staff duties effectively in a way that invites participation.
- Develop a variety of schemes for decision making.
- To conduct staff meetings productive
- Describe the mentality to deal with conflicts of interest in the workplace.

### **3. Human Resource Management Training**

Has its role and importance, as it helps in improving the learning outcomes of the concept of human resource management, including planning, recruitment, selection and remuneration of labor and training, including development and evaluation of performance. During the training has to rely on a combination of best practices in various countries, without ignoring the local circumstances in the country and the region. Human resources must always be under development in order to prepare the staff motivated.

Training for this department is offered for you to have a staff of motivated, happy and valued. Training in human resource management should include: employee benefits, relationship with employees, employee motivation, compensation, selection and recruitment, performance management and career planning assessment.

### **4. Project Management Training**

Project management is an important area where the person responsible for implementing the project due to be prepared and organized to complete the due date and the projected results for time management and work overload. In order to effectively manage projects should consist of the activities of project management, project scope, time and cost management, human resources and communications.

### **5. Training in sales management**

It begins with what the customer is always right there. Sale of goods is important and that can not survive without any of the companies and firms if they do not sell products or services. Customer needs and requirements change every day and more and even sales techniques should be parallel to meet those needs and requirements. The combination of what information needs of clients and wants the good presentation of products or services to ensure successful sales and profits for the company.

Training to better manage customer needs to provide answers to questions provided such as:

- What are the needs and demands of customers?
- How will they react to a particular product or service?
- How long does the process of buying a product or service?
- How should the sales person to react in a situation of denial?
- How can I understand the sales person when it comes time to close deals?
- When should I ask the sales person to close?
- How to close the deal?

## 6. Management training in customer service

We have case management training has to do with the "customer is always right." For many years dominated by the philosophy of good customer service more customers. Today is a philosophy that has changed little in terms of quality and quantity. Well-known international companies and more successful than requiring customers loyal customers who come once and never return. That is why many companies are focused on consumers, and that is training to be successful. Staff training in this area will result in more satisfied and loyal customers in these cases t training program will include: How to deal with customers:

- Communication Skills;
- Listening skills and problem solving;
- Resolving disputes and conflicts;
- Overcoming barriers in difficult situations;
- Cultural diversity;
- All these will give their influence in management training.

## 7. Management training in leadership

Construction is due and tough. He was expecting a tough challenge. Being a leader is not easy, because not everyone can be, the reason is that you should know and follow techniques that will ensure successful management and operation of your staff. With a dog that leadership has to do with various companies and institutions then has its own specifics. We must be clear what the Leader is? And what someone should have to be a leader? In order for training to succeed, it should be clear:

- Types of leadership;
- Leadership in change and transition;
- Leadership competencies;
- Dealing with difficult situations;
- Developing individual and group performance;
- Presentation of productivity and profitability;
- Time management and office.

## 8. Management training in financial management

Training and development are important for continued success. Financial management has its role and importance in accordance with the development and performance of each company. To be a successful management must have the following basic parameters:

- Evaluation of financial performance;
- Planning and forecasting;
- Monitoring and reporting;
- Financial Management;
- Human capital;
- Strategic planning;
- Investments;

## 9. Conclusions

Training Management and knowledge management and innovation are important in performance on the basis of development. The development of today's society requires innovation and new conditions for the development of all human activities in order to follow modern trends in the economic sectors, manufacturing and services. All activities as the best managed better training to achieve results that will be effective for society. Training is seen as a necessity of time. We are working on some do not include all of these roles and their importance for the development of society. Development prospects will be good with training, which means that knowledge management and innovation, where developed. Training and development are the success and continued progress in development. Success in this depends on the specifications and performance and use of standards.

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# The estimation of competentions for veterans included in civile life-second carier

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The new time of transition imposed changes in the army. In our army there is a need for transformation, modernization and reorganization of the units. In this transformation appears more personal, who should be prequalified for civilian occupations. The organizational setup of the program includes the prequalification assessment of whether the accuracy for the selection of the second occupation is. The aim of the research is to access the factor which most affects the accuracy of selection of the second occupation and assessment of the first term results from aplicativity of the program. The results of the prequalification estimation of person for its second occupation, have the largest meaning in the personal values that can be accomplished with the prequalification like economical and social safety. General conclusion is that in our country as a candidate for the NATO Alliance, the reforms have been made for the care of military personnel by the termination of military service, but there are general social and organizational differences between R. of Macedonia and the USA. Individual personal conclusion is: the excess of personnel in our army has the possibility of a second career choice through a free program, which is demonstrated practical applicative, but it is not solving the employment.

## Key words

Management of human resource, comeback of veterans in civil life

## 1. Introduction

*Human management in the defense.* The human management today represents very significant factor for the efficient and effective accomplishment of the defensive tasks. The human management in the defense became an important factor in the realization of the national defensive interests<sup>1,2,3,4</sup>. Today, it has to successfully solve the issues in the reduction, that is reduction of the number of the members of the army, privates, civilians, to protect the qualitative staff, to maintain the readiness for execution of the tasks in the defense and to care for each private with great attention and with feeling of commonness<sup>5,6,7</sup>,.

The system for obtaining staff for the necessities of the army has been built in order to secure staff that will be corresponding both by quality and quantity of the active and the reserve army<sup>8</sup>. The obtaining of people for service in the army will be made due to the confirmed quality standards which must be fulfilled by each individual. For the privates and the officers there is secured logical path in their career, which covers long-term professional training and practice and achievable oriented development<sup>9</sup>. To the military people ( officers, non commissioned officers, and professional privates), according to the Law for service in ARM ( The Army of the Republic of Macedonia )<sup>10</sup> can stop the working contract in the army on many bases and that is: the end of the working relation, due to age limit, certain level of disability or extinction of the working post, then in many armies in the world and in our as well there has been developed a program for adjustment and redirection of the military officers for civil life in order to achieve employment again and to have economic benefit.

The process of returning of the military officers to civil life has always been actual, since there had always been wars, officers and privates. After the end of the wars, after the end of the military period

as a paid private he had to return to the civil life where there were different rules and behavior attitudes. It is in our interest to get knowledge for the following issues:

1. What is the condition and the way of the returning of the military officers in the civil life?
2. How is that solved in many countries in the world and in our country?

We have searched for many countries. The knowledge shows that the former people who served in the army by any status are named veterans. A veteran is a person who at any time served to the army as a professional or a reservist. Their number is not small in the world.

### ***1.1 Existing model of management in the process for returning of the military officers in the second career in the Republic of Serbia***

In the Republic of Serbia there is an organized program for returning of the military officers in civil life named "PRISMA" which has been introduced by law in 2010. The activity and the program have been organized and managed by the department for tradition, standards and veteran at MO. In the program beside the Ministry<sup>11</sup> of Defense are included the Ministries of Education, Economy, Finances, Ministry of Foreign Economy, nongovernmental organizations and the Chamber of Economy. The activities are regulated by law which includes regulations for election of end of work in the army, decision for the residential issues, as well as the help at the prequalification for other employment and mediation in the employment<sup>12</sup>. In this program military officers and civilians are included who on any base are found as a surplus of staff.

### ***1.2 Existing model of management in the process of returning of the military officers in second career in the Russian federation***

Knowledge says that the organizational setting as a special unit or a department for veterans does not exist at the Ministry of defense. Certain knowledge we gained from the part for the legal regulations when recruiting officers for service in the army. In this part the conditions are defined as well the obligations of the officers and the obligation of the army towards the military officers<sup>13</sup>. In 2005 The Ministry of Defense of the Russian Federation introduced changes in the management of the military officers because the requests of the modern fight could not satisfy the current organizational setting of the management with the military staff and as a result of that the law allowed 90% of young men to avoid the military service from one side and from the demographic structure of the population that is shortage of people at the age which is corresponding to the military service from the other side in 2005 appeared as a demographic trench. The demographic trench is a shortage of military officers in the service of the army which continued to grow until 2010. From those reasons, a need appeared for big changes in the recruiting of the military force and the program for the same. The program is developed and conducted by the Ministry of Defense, Economic Development and Commerce, The Ministry of Finance and the other ministries and agencies authorized by law for maintenance of the military force. The contract for service in the army is on 12 months with possibility the mobilization with the recruiting to be conducted according to the necessities. When the contract is ended the people who had a contract join the military reserve and by necessity they conclude a contract again. This allows fast mobilization by necessity and it is avoid continuous financing on longer period which has financial importance for the state.

### ***1.3 Existing model of management in the process of returning of the military officers in the second career in The Great Britain***

In the frames of the Defense of Great Britain is the Ministry of Defense. Veteran in Great Britain is each person who served to the military forces regardless to the length of service (private, officers, reservists). In the Ministry<sup>14</sup> of defense there are many services which give corresponding help to the veterans that is: the department for information, the department of military pensions, the department for medals, departments for veteran voluntary activities, department for health protection of the veterans and the departments for celebration of the veteran days. The work in this ministry has been regulated by law since 1947.

#### ***1.4 The existing model of management in the processing of returning of the military offices in second career in the Republic of Turkey***

In the Ministry of Defense there is no department for veterans issues and for the conduction of the legal regulation the national Association of Veterans takes care<sup>15</sup>. The Association obtains financial aid by the state agencies, the local administration, the state enterprises and they are economically connected to institutions according to the law 5253 and the article 10 of the Turkish constitution<sup>18</sup>. The Association counts 19000 members and takes care for the memories of the former military staff who participated in the wars home or abroad in wars for the independence from the occupational authorities<sup>16,17</sup>. The army, the Turkish Academy, the military aircraft, the rehabilitation centers and other medical institutions cooperate with the Ministry of Defense.

#### ***1.5 Existing model of management in the process of returning of the military officers in the second career in the Kingdom of Canada***

In the kingdom Canada there is a special ministry with a Ministry of veteran issues<sup>18</sup>. A status of veteran is obtained by each person who participated in the army of Canada, the privileges have the families for obtain payments and pensions. In the frames of this ministry several organizational departments exist: the department of mental health, the services by the veteran hospital St. Ana, the bureau of pension and disability, the department for information the department for rewards and medals.

#### ***1.6 Existing model of management in the process of returning of the military officers in the second career in the United States of America***

The most extended data for the management of the process of returning of the military officers in civil life we got for the United State of America<sup>19</sup>. The first organized forms of protection of the participants in war date from 1636. In 19th century an aid program benefiting and pensions for the veterans was reached. The Congress of USA in 1917 reached new system of benefiting for veterans directly after the including of USA in the military actions of the First World War. The benefiting included a program for payment in a case of disability by war, insurance for the veteran and professional rehabilitation for veterans. In 1920 for the first time it has been registered the existence of organized institutions for a veteran that is: Bureau for veteran, Bureau for pensions and internal affairs and the National home for disabled soldiers. The organized leading of the administration for veterans was founded in 1930.

The veterans' department in its frames has medical institutions clinic and program for administration of the benefiting for the veterans and their families, the administration for disability in work, pension education, residential credits, life insurance, professional rehabilitation, payments for survived, medical benefiting and funeral benefiting. The Department for Veteran Issues in USA constantly changes its work according to the legal regulation for the work and the actual happening or military activity. The last change of the law was in July 2010<sup>20</sup>.

At the Department<sup>19</sup> for veteran issues there are in function many programs for returning of the military people in the second career. The veteran centers secure free adjustment services for the veterans who served at any military activity. There existed individual and group counseling centers, a family counseling centers and etc.

#### ***1.7 Existing model of management of the process for returning of the military officers in the second career in the Republic of China***

The data primarily refer to the transitional changes in the army in the Republic of China. Institutionally the law is effective for service in the army from 2004-2008<sup>21</sup>. The organizational units for veterans at MO do not exist. The transitional changes in the army of the Republic of China are in the section of the information system, the planning of the economic development, reforms of the security system, development of modern logistic system, development of the international cooperation with the other armies in the world. The reforms in the defensive system of Republic of China are applied in the human resources management section and in the projection activity drawn by the Government of the Republic of China and in the following period until 2020 prequalification of the soldiers from the reserve forces in the workers in the industry that will work for the army has been planned. Part of the

reforms in the defensive forces have already been conducted at the police forces. The police forces have been reduced from 10 to 8 millions.

### ***1.8 Existing model of management of the process of returning of the military officers in the second career in Republic of Macedonia***

The basis for gaining knowledge for the way of conduction of the returning of the military officers in the civil life in R. Macedonia are the acts of the Ministry of Defense<sup>22</sup>, the legal regulation and the program for returning of the military officers in civil life "LEPEZA"<sup>23</sup>. The serving and the end of the working relation in the army are regulated by law<sup>24</sup>,. In MO there is a Section of the staff management that will conduct the program through the department of transition. The program will be in three educational centers that have for a purpose to make an evaluation of the qualifications of the military officers for inclusion in civil professions. There has been no cooperation with other institutions and the employment bureau until 2010. The employment was individual and in 2011 the program was developed with larger institutional care for return employment.

## **2. Definition of the Research**

In the current conditions of functioning of the defensive system in the Republic of Macedonia, faced with the process of transition and the tendency for admission at the North Atlantic Alliance defensive system, the offices and the professional soldiers take the largest burden by the necessities for reorganization of the defensive structures

The acceptance of an offered model of management in the process of returning of the veterans in civil life by the program "LEPEZA" in Republic of Macedonia should give the predicted results for integration of the military officers and the surplus of the staff without feeling of a refusal by the society. This program is doctrinally discussed by the higher structures in the country and abroad and should give its contribution in our country in the solution of this problem.

## **3. Qualitative Analyses in the Research**

### ***3.1 The organizational setting of the care for the veterans in the societies with different social system***

From the researched material regarding the tradition and the care for the society for the veterans, it could be confirmed the following: the oldest social care by the analyzed countries exists in USA (1636), then The Great Britain 1947.<sup>14</sup> In the Kingdom of Canada there is a special care for the veterans by the Ministry defined for veteran affairs and the ministry for veteran affairs.<sup>18</sup> In the Republic of Turkey modern care for the veterans with protection as a special category in the society has existed since 1965.,<sup>15,16</sup>. The veterans in the Turkish army have special treatment of respect towards the society. In modern Russian federation and at the Ministry of Defense there is no department for veteran issues and the serving of the military term is a national duty and it is not paid. In Republic of Serbia<sup>11</sup>, the Ministry of Defense has a national counsel which coordinates the work for care of the military officers that will appear as a surplus.

In the Law for serving in ARM the conditions have been correctly defined for contract for working relation in the army and its end<sup>22</sup> which after the end of validity of the contract for work on any of the listed bases, the ARM has no further obligation for the military officers. In the Ministry of Defense there is a Section for staff management and it has the department for transition which fulfils the program "LEPEZA"

### ***3.2 The legal regulation for the working obligations in the army and the end of the same***

In the USA there is the law which has been efficient for serving in the army since July 2010, but the legal regulations come since the time of the president Lincoln, who named the returned officers from war veterans and he gave special social status described in the previous text.

In Great Britain and the Kingdom of Canada the serving in the army and the rights of the veterans have been regulated by law since 1947.<sup>19,20</sup>

In the Republic of Turkey in the constitution there is a law number 5253 with article 10 and number 2847 by which the rights of the veterans and the treatment in the society have been regulated.<sup>14,15</sup>

In the Russian Federation there is a law which has been efficient since 2003 which in the period from 2004-2007 regulates the way of recruiting of paid privates, their payment and duration of the contract.<sup>11</sup> In the Russian Federation there is the shortest period for work contract in period of 12 months.

In the Republic of China there is the law which has been efficient since 2000 with many changes which has a purpose to supply China until 2020 with modern technically equipped and functional army. The legal regulations for serving in the army. In the Republic of China were not available at the web sites by the Ministry of defense<sup>21</sup>.

In the Republic of Serbia there is a law which is efficient for serving in the army and the article 107-242<sup>11,12</sup>. According to this law the program for returning of the military officers in civil life called "PRISMA" has been implemented.

In the Republic of Macedonia the law for serving in the army in the article 84 the relations for the end of the working relation with the army have been regulated <sup>24</sup>. The same law has no explanation of the status of veterans, because such category is not defined.

### ***3.3 Reasons for end of the military service***

The knowledge says that the end of serving in the army can be caused due to: regular retirement, premature retirement due to losing of the post or disability, end of the contract unfulfilling of the obligations from the contract by the military officers.

At the same time, there is no guaranteed working relation and in the society where there is health and pension insurance payment the person receives it until the working contract is forceful, but not after that. In USA as there is no obligatory health and pension insurance, the military officers after the end of the military service are treated on the burden of the state for any disease gained in the army. In all armies in the world there is constant employment and firing of the military staff.

### ***3.4 The organizational programs for returning of the military officers in civil life***

In the USA, the Great Britain, the Kingdom of Canada and the republic of Turkey, the returning of the military officers in civil life is imposed by the necessity of transformation of the military structures in modern number of small and efficient army. The programs have been organized and finances by the budget of the state. In the Russian Federation and in the republic of China on the web sites of the Ministry of Defense there are not available data for the organized programs for returning of the military officers in civil life.

### ***3.5 Achievement of the military protection and the pension insurance after the end of the working obligations towards the army***

If the military officer gained the right of age pension in the societies with regulated health and pension benefit the same receives pension personal or family. Such is the case with the Republic of Macedonia and Republic of Serbia. If it is a case of premature pension according to the working training and the age the person can or can not gain a pension.

If they were not insured after the end of the obligation the payment of salaries stops. For injuries, damages and incapability during Military mission, they gain health protection through the Section of health in the veteran service, by previously health evaluation. For special benefits and contributions they receive pension by the army.

### ***3.6 Possibilities that are offered by the society for returning into civil life and the second career***

In the USA, the Kingdom of Canada and the Great Britain there is a similar system of organizational and offering possibilities for the second career<sup>25,26,27,28,29</sup>. Through programs for introduction in civil life, the veteran can choose to achieve his personal small business, to open factory which will

work for the necessities of the army and will employ veterans, to be included in serving activities of the army with prequalification such as care of sick, transport of food, medicines for the necessities of the hospitals of the veteran association. They are included in different non military logistic organization which cooperate with the army.

In the Russian Federation after the end of the working relation of 12 months the person is treated as reserve soldier and he can by necessity be reemployed or he can have some other civil profession.

In Republic of China the reservists are pre-qualified to work in the industry with advanced technology which works for the necessities of the army

### **3.7 The process of transformation of the armies**

The process of transformation of the army is not appearance only in our country, it is not an appearance only in underdeveloped countries and countries that formerly belonged to the socialist state management or still belongs such as China but also the developed countries. 36 37

Many from the former activities which have been going on in the frames of the military forces, primarily the technical and the logistic support are in the function of civil institutions which work for the defensive forces.

For the standards and the legal regulation when performing service for the military forces by the civil institutions are also reached laws by which their activity is controlled.

In these conditions of transformation MCR should take its place, as care for the military staff after the end of using of the services of the individual veteran who was in military service by contract.

## **4. Conclusions**

By the observations of the situation in the Republic of Macedonia as well as with the comparison of the named state for return of the military officers in civil life we came to the following conclusions:

1. In the Republic of Macedonia at the Ministry of Defense a program has been started for return of the military officers in civil life named "LEPEZA".
2. The realization of the program "LEPEZA" is a result from the necessary need with the appearance of the new organization of the army, the appearance of surplus of staff, the professionalism of the army and the tendencies towards NATO standards.
3. The program for returning of the military officers in civil life in republic of Macedonia is in certain degree started earlier regarding republic of Serbia although the both states were former dafter the falling apart of Yugoslavia
4. The program for returning of the military officers in civil life helps the individuals in the evaluation when choosing second career but does not solve the employment as it is case in USA.
5. There are individual differences in the society in the Republic of Macedonia and USA which result from the differences in the health and the pension insurance and the accomplishment of the benefits.

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# The education for physical therapy, Where are we today, possibilities and perspectives

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The process of education is changing globally and locally. The earaches in education must be in way which educative model accepts and what is needed and is aktuel for society. We have impresion that our staff is well educated and can find place in job market all over the world. In this case education is economic. We try to solve deficite of physiotherapists in Republic of Macedonia with opening of Studies with 3 and 4 years at four public universities. Aim of our investigation was to determinate the level of education compared with other countries in the world. Material and method: We have made one interview with 12 university professors, from 15 different countries from the world ( Italy, Germany, USA, UK, India, China, Ghana, Romania, Indonesia, Canada, Belgium, Macedonia, Albania, Ethiopia, Haiti, Madagascar, Brazil ) on 9 questions, with maximum point of 9, and minimum 0. The level of education was graded as low (0-2) points, middle (3-5) points, high middle (6-7) and high (8-9) points. Results: Our investigation is showing a high middle level of education in Macedonia (7). Discussion and conclusion: Educational system is involved according Bologna standard, ECTS in Macedonia, We have not physiotherapist with doctoral level of education for practical education of students. The interuniversity collaboration for theoretical support is possible with internet techniques like Skype, in same land and from outside, but for better quality of practice is needed interuniversity exchange of students.

## Keywords

university education, physiotherapist, perspectives,

## 1. Introduction

The process of education is changing globally and locally. The earaches in education must be in way which educative model accepts and what is needed and is aktuel for society [1]. We have impresion that our staff is well educated and can find place in job market all over the world. In this case education is economic. We try to solve deficite of physiotherapists in Republic of Macedonia with opening of Studies with 3 and 4 years at four public universities. Ministry of Health and Ministry of Science and Education in our country are trying to make education on level of European standards. This was considered an important issue, in part because of the imminent accession of Macedonia to the EU, and they launched a reform process [2,3,4].

There is still great diversity in how the education of health professionals is organized, not only among EU member states, but also among non-members, develop and an develop countries. It is not easy to define standards of high develop countries for countries with low health standards and economy. The second problem are consequences of individual follow and adapt them in own society [5].

The need for defining rigorous standards and standardizing them across the EU is apparent, due to the dramatic changes in physical and rehabilitation medicine practice over the last decades, as well as the changing position and role of rehabilitation staff in the health care structures.

Traditionally, physical therapists have provided treatment on the basis of the medical diagnosis and supervision of physician's instructions. Thus physical therapists have served the physician, not the patient. While assisting the physician in this curative role is an important function of physiotherapist, it is not his or her primary role. For the physiotherapist today, the principal responsibility is to identify and address patients needs, disabilities, develop a plan for rehabilitation, provide rehabilitation, and assess the outcomes. Obviously, this is a complex intellectual process and requires a wide range of knowledge and skills.

During the past century, physiotherapist responsibilities have proliferated from one fairly limited set of skills that any physiotherapist was expected to have into every preventive and curative intervention. Today, physiotherapists are involving in primary care for patients in early stage of rehabilitation.

In this frame of reference, authorities responsible for the education of health professionals have had develop new operating principles in order to create a new paradigm. The task is a considerable one: all health professionals should be educated to deliver patient-centered treatment as members of an interdisciplinary team, with an emphasis on evidence-based practice, quality improvement, and intensive use of health-related information technology.

Recent development of a system of peer review to assess educational standards has provided an opportunity to build an international community of professionals and formulate Educational Standards for physical therapy and rehabilitation [6].

The key changes in educations for physiotherapist involve:

- identification of common elements that underpin all health practice,
- the development of clinical competency and practice-based learning paradigms, with increase emphasis on health-related subjects in educational curricula.
- a focus on essential practical skills, with emphasis on clinical practice.
- recognition of physiotherapist education with an academic degree as well as professional registration.

In most Western European countries programs for physiotherapist education are linked to higher education institutions, like in Macedonia. However, fewer than half of these programs award a baccalaureate degree and most physiotherapists still graduate without an academic degree. Such reality indicates deficit in implementation [7].

Over the last decade, the World Health Organization (WHO) has provided a number of tools to support and facilitate the design of new models of university-based nursing education. It is not same situation with physiotherapists. In addition, the WHO provide guidance on quality control and education evaluation; preparation of nursing teachers and mentors; and criteria for the schools of nursing. We must be informed and involve in all strategies of WHO not only for nurses but also for physiotherapist education [8].

Aim of our investigation was to determinate the level of education for physiotherapist compared with other countries in the world.

*Material and method.* We have made one interview with 12 university professors, from 15 different countries from the world (Italy, Germany, USA, UK, India, China, Ghana, Romania, Indonesia, Canada, Belgium, Macedonia, Albania, Ethiopia, Haiti, Madagascar, and Brazil). The interview was made on 06-09.06.2009 in Kayseri, Turkey, on the 1st World conference on Medical Rehabilitation in Rural and Developing Regions. Our presentation with theme. Education for physical therapy in Macedonia,, was the first step to represent us and to open discussion about it. The interview was made on the end of the conference with questionnaire. The questionnaire was consisting of 9 questions, with maximum point of 9, and minimum 0. The level of education was graded as low (0-2) points, middle (3-5) points, high middle (6-7) and high (8-9) points. The collection of data was analyzed according the country, level of education, name, science level of educator and country of educator.

The questionnaire is showing in table 1. The qualification of educators and country are showing in table 2.

**Table1** The questionnaire

No.	Question: Do you have	YES	NO
1	Middle school for physiotherapist		
2	High Professional School		
3	University degree (3years)		
3.1.	Theoretical education	Conference master	
3.2	Theoretical education	Doctoral degree	
3.3.	Practical education	Conference master	

No.	Question: Do you have	YES	NO
3.4	Practical education Doctoral degree		
4	Technical support (equipment, labor)		
5	University degree(4 years)		
6	Doctoral studies		
TOTAL			

The level of education was graded as low (0-2) points, middle (3-5) points, high middle (6-7) and high (8-9) points.

The results of our interview are showing on table 2.

**Table 2** Results from interview

No	Country	Name of educator	of Science degree	Level of education	of Total point
1.	R.Macedonia	E.Popova Ramova	Conference master	1./2/.1/3/3.1/3.2/4/5.	7
2.	Italy	G.Pestelli	PhD	1/2/3/3.1/3.2/4/	6
3.	Romania	A.Nika	PhD	1/2/3/3.1/3.2/4/5	7
4.	United Kindom	Chamberian MS	PhD	1/2/3/3.1/3.2/3.4/ 4/5/6.	9
5.	USA	Haig AJ	PhD	1/2/3/3.1/3.2/3.4/ 4/5/6.	9
6	Albania	G.Pestelli(Italy)	PhD	1/2/3/3.1/3.2/	5
7	Etiopia	G.Pestelli(Italy)	PhD	/	0
8	Madagaskar	Chamberian MS(UK)	PhD	/	0
9	Haiti	Canfield J(USA) Vice President, International Society of Educators in Physiotherapy	PhD	/	0
10	Ghana	GGNyante	PhD	1/2/3/3.1/	4
11	Brazil	DA Jorge	Physioterapist on doctoral study	1/2/3/3.1/3.2/4/5/	7
12	China	J Li	PhD	1/2/3/3.1/3.2/4/5	7
13.	Germany	Atabas E	doctor	1/2/3/3.1/3.2/3.4/ 4/5/6.	9
14	New Zeland	Sekerak R	doctor	1/2/3/3.1/3.2/3.4/ 4/5/6.	9
15	Belgium	Draulans N	PhD	1/2/3/3.1/3.2/3.4/	9

The five countries (33,3%) have high level of education and all are from develop regions, high middle are 5 (33.3%) from countries in transition 4, and 1 from EU, 1(7%) is middle from Africa, and 4 (27%), with low educational level are 3 (20%).

## 2. Discussion: Influence of Bologna Process

The principal aim of the Bologna process is to bring about the convergence of higher education across the European Union by 2010. Thus, it will lead to the unification of professional and higher physiotherapist education and facilitate mobility of graduate physiotherapist across the European Community. In addition, the process has provided the impetus to raise the educational status of physiotherapist from diploma to graduate level across Europe. Reciprocal recognition of EU

physiotherapist qualifications will increase mobility and employment opportunities, alleviate shortage in some countries by redistributing the surplus in others, and allow more efficient use of physiotherapist workforce. The Bologna process will also offer more opportunities for undergraduate and post graduate study and research across Europe and for international collaboration research, in order to advance rehabilitation knowledge and scholarship [5,9].

### **3. Physiotherapist education in Macedonia: an abbreviation history**

Education for physiotherapist in middle medical school was started in Macedonia 20 years ago. Education for physiotherapist with high medical school was possible in ex republics of Yugoslav federation, but not in Macedonia. Macedonian young students had studied in Belgrade, Zagreb and Rijeka. The university level with basic and post graduate level was starting four years ago.

We have deficit of physiotherapist with university level of education, and many people have studying in Bulgaria. In the market of job was deficit of physiotherapist too. The government of Macedonia together with Ministry of Sciences and Education decided to open departments for physiotherapist education at four government universities. The models of curriculum were made by models from European countries adapted by our possibilities.

Those educational models are based on Bologna process, and ECTS system, with more opportunities for undergraduate and post graduate study compatible with European standards and for international collaboration research. The curricula of those educations are consisting of basic subjects, clinical subjects, sociological subjects and professional subjects. All of those curricula are presenting on their university web sides and they shall development in the future. Every university educational institution has a foundation: the curriculum. It is the main frame on which the institution is built, which represent the expression of educational ideas in practice, and refers to the totality of the educational program for student who will enter a practice-based profession [10,11,12].

Macedonia has high middle level of education, according Bologna process and ECTS. It is very significant, for one country that is not still in European Union. Our biggest problem in education of physiotherapist with university degree is it that no exist a doctoral studies yet. We have a vision to dissolve it with sending the best students in forger countries from EU. It can be helpful for increase a quality of practical education [13,14,15].

### **4. Education of generalist, specialist, or advanced practitioners**

Traditional school of physiotherapist exist in France, Germany, Austria, and Luxemburg. High professional School University exists in Holland, Belgium, UK, Spain, and Norway. University at 2 levels is existing in UK, Ireland, Sweden and Germany [16].

We have University 2 level education for Physiotherapist (bachelor and master) in Macedonia.

As a prerequisite for design of a high-quality curriculum, an assessment must be made of the knowledge, skills, and attributes that country needs from health professionals [17].

The prerequisite of successful implementation of radical changes in structure, content, and context depends on capabilities in structure, content, and context depends on the capabilities of them changed with translating plans into practice [18,19].

We shall up the level of health care by our patients in field of rehabilitation with employed new generation of university educate physiotherapist in our health system. Medical workers with not adequate education are working in many physical therapy departments, employed in time of physiotherapist deficit. The new plane of management of human resource, must be planning and controlling from the Ministry of Health, if we liked to have a model of health system compatibility with EU standards, because not only equipment is important, but also the people who are educate to work with new methodology of practice and technology.

We like educational institution had made the first step. We are working on a unified platform of higher education system, it is assumed, will support a policy of licensure reciprocity, which is intended to facilitate the mobility of physiotherapist across Europe and World.

We think that the future collaboration between countries must be first in straight line to change experience in education and researches in EU, and second to help on rural countries in developing the management plans and actions for rehabilitation.

At the 1st World Conference on Medical Rehabilitation in rural and developing Regions was representing many experiences, for help of those poor and rural countries. Those activities were organized by government and not government organizations from UK, USA, Italy and other develop

countries. We were participants of this conference and we think that WHO, must manage all activities (planning, organizing and control finance) to educate people who shall help in their own countries, for their own people. Many of disability peoples are poor and vulnerable-no jobs, no education, and low incomes. The program of Italian Volunteers in Ethiopia is example of good management plane, because it gave jobs to unemployed Ethiopian people and it served to improve the rehabilitation of Ethiopians with disability [20]. The same was made in Madagascar from UK [21], Haiti from USA [22], and Sri Lanka from Canada [23].

## 5. Conclusions

We can say the next conclusion after explanation of physiotherapist education in Macedonia compared with EU and World:

1. Republic of Macedonia has university 2 level education, by Bologna, and ECTS standard.
2. The new generations of university degree educate physiotherapist must be involve in our medical system, if we lake to have European standard for treatment in rehabilitation.
3. Our Future Vision is to change students and researchers to up physical therapy on higher level for doctoral studies for physiotherapist.
4. Our physiotherapists are compatible to employ in market of job in EU, but we need them to help us for our population of sick people.
5. There are many disability people, who wait for help in rural countries. Macedonia during organizational process from WHO, can be involve in their help.

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# Why international R&D Cooperation performs better than national?

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The global perspective on world-class research performance with the challenge of rapid adaptation to technological & environmental changes leads to a higher demand for cross-border and inter-institutional research-cooperation. This means that opportunities & challenges within our dynamic world have never been greater than now. Therefore R&D (Research & Development) cooperation projects require an integrative system approach embracing several spheres, like market considerations, production processes, usage of raw materials & technologies, quality and risk analysis, implications on environment/health issues; etc.

Beside that cross-European R&D cooperation projects and associated multidisciplinary and inter-institutional working teams are necessary in order to deal with the inherent complexity of research topics, technologies and corresponding environments considering the underlying objective to boost organisational performance and efficiency.

Major success factors of such R&D cooperation projects (for example Integrated Projects within FP7) are that the best researchers and the most qualified institutions/companies cooperate in relation to a specific research topic on a cross-national level. In this connection cross-cultural knowledge sharing activities and a mutual learning process are taking place.

Other success factors of fruitful international R&D cooperation projects are: a project consortium consisting of experts from different research areas as well as adequate involvement of commercial and end-user partners to ensure the proper exploitation of the project results; the whole cooperation is based on mutual trust; all partners within the R&D project have a real benefit and incentive to contribute to the project work; and a balanced IPR approach.

The above mentioned R&D cooperation requirements will continue into the future, and those organisations which can best cope with it, will benefit the most.

## Keywords

Cross-border & inter-institutional research projects; interdisciplinary project teams; R&D cooperation projects.

## 1. Introduction

The global perspective on world-class research performance with the challenge of rapid adaptation to technological & environmental changes leads to a higher demand for cross-border and inter-institutional research-cooperation. This means that opportunities & challenges within our dynamic world have never been greater than now. Therefore R&D (Research & Development) cooperation projects require an integrative system approach embracing several spheres, like market considerations, production processes, usage of raw materials & technologies, quality and risk analysis, implications on environment/health issues; etc.

Beside that cross-European R&D cooperation projects and associated multidisciplinary and inter-institutional working teams are necessary in order to deal with the inherent complexity of research topics, technologies and corresponding environments considering the underlying objective to boost organisational performance and efficiency.

However, especially cross-border & inter-institutional research projects involve a dynamic complexity which result from a number of facts like different cultural backgrounds & philosophies (on an organisational and on a national level), different motivations (scientific publications versus achieving a market advantage through non-disclosure-policy), etc. Unfortunately, this kind of R&D projects can not be seen as a self-organising success story [1] but require an efficient, clear and well-structured project management approach which considers a variety of different aspects like scientific, technological, organisational, legal and commercial project goals.

This paper is based on practical examples/case studies and proven principles, which will act as instruction:

- to fulfil some general research cooperation requirements, and
- to plan balanced human interaction processes

in order to facilitate innovative breakthroughs and best practices in a cross-country and inter-institutional environment.

With regard to international R&D cooperation projects this paper concentrates on EC funded projects performed in the area of "Information and Communication Technology" under the European Research Framework programme. The paper is based on the experience of more than 40 projects (within 10 of them the Author acted as Project Manager and/or Project Coordinator) which were carried out within the 4th, 5th, 6th and 7th Framework Programme – whereas only 2 of them are described in detail in this paper.

## **2. Some basic assumptions for the comparison of international R&D cooperation projects with national ones**

Even we have already stated that in most cases international R&D cooperation projects are more complex than national ones and need more rigorous project management structures and procedures – we assume in the following sections that the working atmosphere in the international R&D cooperation project is fruitful and the cooperation between the different project partners is functioning well.

This means that successful R&D cooperation projects, independently if they are operating on a national or international level, require excellent teamwork. So for example within a project one or more inter-institutional team(s) has (have) to be set-up in order to pool knowledge and experience. In this connection each team has to learn to cooperate within itself and has to initiate positive learning and knowledge-sharing experiences [2].

Beside that an excellent and professional management of the R&D project plays a fundamental role for the success of the project and helps to set-up a trustful relationship within the project consortium. In this relation a clear distribution of responsibilities as well as an efficient communication policy is of special importance. Additionally a comprehensive project assessment system as well as an appropriate risk management system complete that approach and guarantee the achievement of project goals within the timeframe of the project.

Other success factors of fruitful international R&D cooperation projects are:

- a project consortium of high quality, consisting of experts from different research areas as well as adequate involvement of commercial and end-user partners to ensure the proper exploitation of the project results;
- encouraging enthusiasm in relation to the overall and joint project goal;
- all partners within the R&D project have a real benefit and incentive to contribute to the project work; and
- a balanced IPR (Intellectual Property Rights) approach.

## **3. Prerequisites and advantages of international R&D cooperation projects**

EC funded research cooperation projects are in fact cross-cultural knowledge sharing activities and in this connection also a kind of cross-institutional negotiation process in which the project consortium aims to agree on the following issues:

- who is going to share resources with whom of the other consortium partners;
- the degree of access to the before mentioned resources, and
- the degree of a possible compensation in order to obtain that access.

Such regulations are normally part of the work plan (Description of Work) as well as of a contract called "Consortium Agreement" which is concluded within the project consortium. In most cases a signed Consortium Agreement is obligatory before the EC Contract can be signed. However, it is quite obvious in regard with these regulations that all partners get a particular incentive to give their best in order to achieve the planned project goals and that the rights and obligations out of this contractual regulations are balanced between the different consortium members.

In comparison with industrial R&D departments Universities are more likely to deliver interesting and provocative out-of-the-box concepts/solutions, which might be of great interest for the development teams in companies in order to plan their next product releases (including testing of the market acceptance of new products). So for example, whereas company employees have a stronger focus on development issues with the underlying goal to bring forward their own product development (as this process is closely linked to the product life-cycle), the researchers of Universities or other public research entities are concentrating on targets like exploring new concepts and developing completely new approaches [3].

Prerequisites of projects operating on an international level are that project members of transcultural and interdisciplinary project teams have to appreciate to cooperate with people who are different. At the same time the project goals of such international R&D cooperation projects have to be very attractive so that the most talented people world-wide would like to participate within such projects.

## 4. Two case studies

In the following two different successful EC-funded projects including their particular project structure and their corresponding results are described. Both projects were running under the European Research Framework Programme/Information and Communication Technologies. However, these two projects are characterised by completely different research contents, project partners, management structures and processes.

Both projects consisted of multidisciplinary project teams who worked in an integrated way towards achieving a joint project goal across several partner organisations, countries and cultures.

### 4.1 Case Study 1: EC funded project DIAMANT (FP5/IST-1999-12078 – Duration: 2000 – 2002)

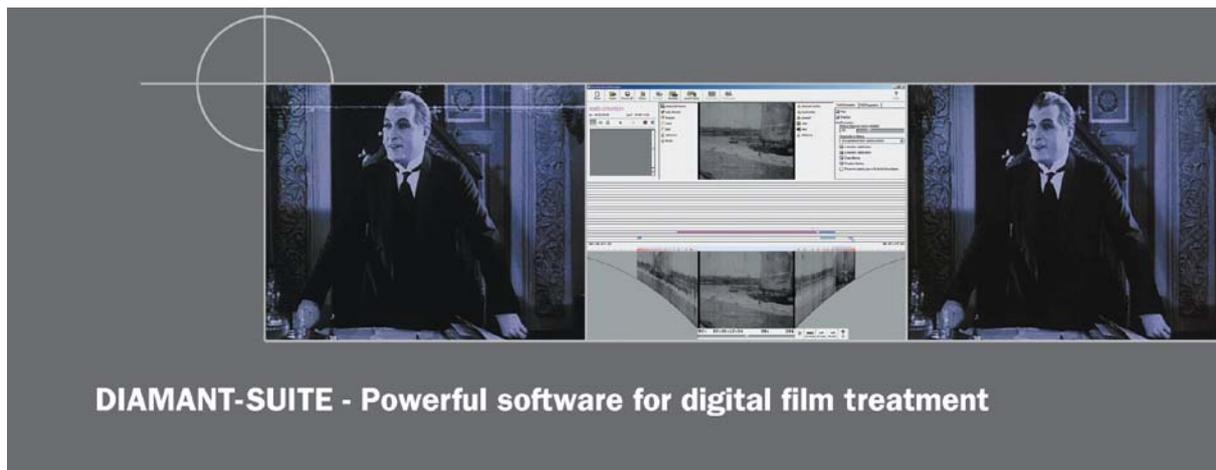
DIAMANT -Digital Film Manipulation System [4] is a project aimed at developing a digital film manipulation system and was the fundamental basis for a product called DIAMANT Suite [5] which allows the semi-automatic digital restoration of films.

The initiative for this project was launched by the research organisation JOANNEUM RESEARCH in Austria together with another Austrian company called HS-ART Digital Service GmbH. Other participants of the project DIAMANT were Filmmuseum (Netherlands), Technikum Joanneum (Austria), University of Southampton (Great Britain), Dolphine Interconnect Solutions AS (Norway), Laboratoires Neyrac Films (France) and Media Consult Buscher GmbH (Germany). The total budget of the project DIAMANT was 2,3 Mio. Euro with a total funding of 1,3 Mio. Euro.

In connection with this project it is also necessary to mention that background knowledge from some previous EC funded projects also contributed to the overall success of that particular project.

However, for the success of the project it was crucial that the film restoration knowledge from all participating project partners were exchanged and that a synergistic action of learning took place within the Consortium as a whole.

As the existing and above mentioned solution for digital film restoration is just serving a niche market within the global film industry market – such a project wouldn't have never been carried out successfully within one single European country alone. The project DIAMANT pooled together knowledge, values and experience from different experts located in different countries and which were dealing either with film, hardware/software components and/or the overall film market in general.



**Figure 1** System for digital film restoration

After the DIAMANT project was successfully finished, the Austrian company HS-Art Digital Systems won several awards in connection with its innovative product DIAMANT Suite. As financial reward for the successful pre-development of the product DIAMANT Suite - those DIAMANT partners who contributed to the system development received a part of the annual turnover in relation to the exploitation of the product DIAMANT Suite. Whereas the user partners Filmmuseum and Laboratoires Neyrac Films received special favourable conditions as they wanted to use the DIAMANT Suite in their own institutional environment.

#### **4.2 Case Study 2: EC funded project CLINICIP (FP6-IST-506965 - Duration: 2004 – 2007)**

The CLINICIP (Closed Loop Insulin Infusion for Critically Ill Patients) project [6] had a particular focus on the health status monitoring of critically ill patients and was accepted as an Integrated Project in the e-Health sector of the 6th EU Framework Programme. Within that project clinicians and scientists joined forces regarding the development of an intelligent glucose monitoring and control system for critically ill patients. The most important aims of the CLINICIP system were to help to improve the survival chances in the intensive care units and to increase efficiency and safety in clinical practice.



**Figure 2** Glycaemic control on an automated basis

Within CLINICIP 13 partners from 7 different countries contributed to the successful implementation of the project. The overall budget of the project was 11,2 Mio Euro with a community contribution of 7,5 Mio. Euro.

A key distinction of the CLINICIP project was that it was a clinically driven project. In the most other cases within the e-Health sector projects are going to be initiated by technicians and not by a clear clinical demand. This means that the project had a well established origin from medical sciences and clearly defined the need for such a system.

Close collaboration of medicine and engineering was necessary in order to realize the CLINICIP system containing several prototypes which were developed during the project duration (see Figure 3). So for example it took approximately half a year until engineers and physicians used the same wording for the same issues and could understand each other without any misinterpretations. Especially important for the project was also the consideration of the different legal and ethical frameworks within the 4 medical hospitals (Medical University of Graz (Austria), Royal Brompton Hospital in London (UK), Univerzita Karlova in Prague (Czech Republic), Katholieke Universiteit Leuven (Belgium)) which participated within the project. The exchange of a lot of explicit but also of tacit knowledge was necessary between the different project partners but also quite a number of impressive and fruitful discussions between the different professional groups in order to achieve a competence-based advantage in the prototype developments. Beside that a mix of experience, values, contextual knowledge and expert insight built a suitable project framework in which the evaluation and the incorporation of new experience and information was possible. Also within this project a cross-national and multi-disciplinary approach was necessary in order to achieve real breakthrough project results.



**Figure 3** Prototypes developed during the project

## 5. Reasons, why European R&D projects perform better than national ones

The R&D cooperation projects funded by the European Commission are seen as key strategic instrument in order to deal with R&D opportunities and challenges on a cross-national level. In the most cases this kind of projects embraces the best researchers, the most qualified institutions and companies in relation to a particular research topic. However, other important strategic goals of these R&D funding programmes are to reduce the imbalance of the scientific & technical capabilities of the different European countries and to improve the general competitiveness of the European industry [7]. Beside considering the special complexity of a project which is carried out on a European level, it has also to be mentioned that normally higher project budgets are available and different national situations have to be considered. In most cases these circumstances and regular extensive project reviews have a positive impact on the future commercial application of the project results.

## 6. Conclusion

As already mentioned in the sections before:

- increasing global competition in the world class research area as well as on the commercial consumer markets,
- shortening of product life cycles caused by rapid technological developments, and
- extreme knowledge growth,

leads to the increasing pressure that different actors (companies, research institutions, etc.) collaborate in international R&D cooperation projects (for example Large Projects within FP7 [8]).

According to Boutellier, Gassmann and von Zedtwitz [9] the necessity that organizations & companies are concentrating on their own core competencies and get access to complementary resources & knowledge through collaboration with other (national and/or international) partners will become even more important within the future. The form of future cooperation might be a flexible learning and business network in which the different parties with their complementary resources cooperate just temporarily on the basis of common interests.

In this connection EC funded research cooperation projects can be seen as an ambiguous system that offer interesting opportunities for mutual learning and introducing unconventional solutions. They might reveal new and unconventional opportunities that were not visible before.

The above mentioned R&D cooperation requirements will continue into the future, and those organisations which can best cope with it, will benefit the most.

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# Project Management Using Open Source Internet Tools

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Twenty first century has influenced companies of all kinds. Many of them turn to project organization of their business, or decide to outsource. In cruel market conditions and raising competition, it is necessary to keep up step with contemporary technology and modern business practices from domain of project management and monitoring of all aspects of enterprise business. If it is about internal organization or outsourcing, Redmine, issue based project management system, offers possibility to organize and monitor greater number of teams and projects simultaneously. This paper describes the methodology of project management and enterprise by using issues (cards), and gives concrete examples where these organizations are applied and results from using Redmine project management system.

## Keywords

Project management, Redmine, Agile project management, Open source web applications

## 1. Introduction

Agile project management lets software project managers and employees alike adapt to changing circumstances, rather than try to impose rigid formal controls, as in traditional linear development methods. Internet offers variety of tools for project management. There are both standalone PC or MAC applications and, web-applications. Some of them are available for rent and other are open-source, community based web-applications to download and install on server. Such open-source, community driven web-application is Redmine. In this paper, we are going to discuss web-based approach to project management, using Redmine, and a way how it is implemented and used in service providing public company.

## 2. Theoretical backgrounds

We like to say that project management is older than pyramids. As soon as humans started to build homes, cities and villages, organizational questions were raised. As projects became more complex and more people involved in project realization (like building a pyramid), resource management and project management became more important. Today, in 21st century, thousands of new projects are started, worked on, or finished each day.

Managing projects was never easier, electronic tools such as PDA's, iPads, notebooks and personal computers offer variety of software resources for storing data about projects, organizing timelines etc...

## **2.1. Electronic project management**

Electronic project management is a generic term which describes usage of computers and handheld computing devices as a tool for managing one or more projects [1]. In the following part of the paper we will give an overview of some common techniques for electronic project management, their benefits and setbacks, and overview of some modern concepts which help electronic project management using open source internet tools to show its best potential in modern changing environment.

## **2.2. Traditional computer based project management**

This type of project management considers using computer instead of paper-based planner. Meaning, you cannot get any statistics from it, you cannot see progress of other people unless you entered data by yourself. You can lose files on your hard drive; your notebook can be stolen, etc... This "Traditional computer based project management", means managing projects with email, using Excel for to-do lists, storing project's documentation on desktop folder, etc... Such project management suffers from baby-steps problems, which modern, web-based project management overcomes. Problems like data loss, non-accurate project status, document or source code versioning and location based data-access issues from which "Traditional computer based project management" suffers do not exist if some form of web-based project management is used. In next few chapters we are going to give an overview of usable web applications, and give an example of web-based PM software implementation at service providing company.

Sometimes software products for electronic project management tend to be a „project management Swiss-army knife". Biggest setback of such product is "shooting a fly with cannon" problem. Often, for successful project management, only simple issue management and document sharing is required. Otherwise, managing a project in such software might require too much effort.

## **2.3. Agile project management, using web-based tools**

Nowadays, every application which can be made as web application should be made as such, because of maintenance, upgrades, etc... Thus, Microsoft, for its Project offers web-based interface as well, in most of its product configurations. Standard desktop instance of MS Project is especially useful for construction companies. However web-based interfaces like ones for MS Project server, offer engineers of construction company to use PDA's, laptops, cell phones and handheld computers to interact with their projects onsite.



**Figure 1** Various PDA/phone devices used for web based project management

Software or Marketing companies however do not require such rigid form of resource control, as construction projects does. Thus, various Agile methodologies, like XP, CAS and SCRUM are developed [2].

## **2.4. Overview of standard web-based tool features**

Scope of this paper prevents us from describing each of features that web-based project management tools usually have. More various features and aspects can be found at [4],[5].Table 1 is a research-based overview of features [13].

Results of this research show that open-source software product called “Redmine” has all the features that we were looking for, thus, 3rd chapter of this paper will discuss experiences of Redmine implementation and usage at service providing company.

**Table 1** Overview of standard web-based PM software features

software/feature	Hosted	Open Source	Calendar/Milestones	Task Management	Task Dependencies	Time Tracking	Issue Tracking	Forum	IM Conferencing	Wiki	File Upload	Reports	Gantt Charts	Import	Export	Email Integration
AceProject.com	√		√	√	√	√		√		√	√	√	√	√	√	
activeCollab	√		√	√		√	√	√	√		√					
Basecamp	√		√			√		√	√	√	√				√	
Central Desktop	√		√	√				√	√	√	√					
Clocking IT	√	√	√	√	√	√		√		√	√	√				
Comindwork	√		√	√		√	√			√	√	√	√			
DeskAway	√		√	√							√	√				
devshop	√		√	√	√	√						√	√			
dotProject		√	√	√	√		√	√			√			√	√	
Enterprise Project 2.0	√		√	√		√	√	√			√		√			
Goplan	√		√	√			√		√		√					
Huddle	√		√	√							√					
Mentat	√			√												
OfficeZilla	√		√	√				√	√		√					
OnStage	√		√	√				√			√					
phpCollab		√	√	√			√	√			√	√			√	
Project2Manage	√		√	√				√								
ProjectPier	√	√	√	√							√					
Redmine	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Smartsheet.com	√			√							√	√				
Streber		√	√	√	√			√		√	√					
TeamWork Live	√		√	√		√		√			√	√				√
Trac	√	√	√	√			√			√	√	√				
Unfuddle	√			√			√			√						√
Web Collab		√	√	√				√			√					
WhoDoes	√		√	√		√					√					
Write	√			√							√	√				√
Zoho Projects	√		√	√		√					√	√				

## 2.5. Modern hosting environment for web-based project management

Another important aspect of web-based project management is cloud computing. It is a modern term, describing a concept where person, as a user of some kind of software product, does not know or even care, where and how is that software physically stored. To be more specific, term is used to describe computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services. Parallels to this concept can be drawn with the electricity grid where end-users consume power resources without any necessary understanding of the component devices in the grid required to provide the Service. Web based project management, also uses this concepts for it's operations, and there are ready-made virtual machine images that can be downloaded and added to your virtual servers farm. The analyzed service providing company, has successfully adopted concepts of cloud computing and virtualization for it's internal, and it's clients needs. Thus, web-based PM tool (Redmine) is hosted as virtual machine in cloud.

## 2.6. Redmine as Enterprise information portal

Redmine itself or through its plug-ins provides all features of enterprise information portals [6]. Figure 2 gives overview of modules/building blocks of such company's portal.



Figure 2 Standard features of Enterprise information portals [6]

Some of those features come packed with Redmine, and some of them are available through 3<sup>rd</sup> party plug-ins, such as Document management and workflow plug-in for eDocumentus (Document management and Workflow software product implemented at our case study service providing company).

## 3. Redmine implementation and usage experiences at service providing company

The City of Novi Sad has a rich informatics tradition. Owing to the wisdom of the City authority, by the end of the '60s, the City-Regional Computing Centre was formed. Significant resources were committed to equipping the computing centre and providing a high-qualified personnel support. At the beginning of the '80s, the development of the City Information System experiences a new swing through the purchase of new, modern equipment, an appropriate operating system and software for databases maintaining. At that time, a developed unified billing system for utility-residential services was already in place, with processing coupled with databases and public records of the General Information System of the City. At the turn of the century, a migration to PC technology was carried out. As time went by, both hardware and software have experienced transformations and development. Nowadays, we boast modern equipment, latest operating and database maintaining systems, exploitation of the Internet and cutting-edge architecture of the Information Systems and telecommunications. Today, we have over 110km of optical infrastructure throughout the city, and 2 data-centers with modern network and server infrastructure.

Situation at the company featured various software and hardware platforms and solutions, due to position in city's government and time that it exists. Such various platforms, solutions and projects, where some of them were not even developed by the company, but due to circumstances become its problem were hard to maintain. As time goes by, source codes get lost, security credentials, and project documentation in paper or electronic form. To overcome those problems, company decided to use web-based open source project management application called "Redmine", freely available at [www.redmine.org](http://www.redmine.org). The Redmine virtual machine was chosen, also freely available to download and use from Turnkey Linux.

### 3.1 Why choose Redmine?

Since the developers used variety of development tools and software platforms, they needed a solution that could integrate various source code types via source control management. Such SCM (Source Control Management) system is SVN (Subversion numbering) [6].



**Figure 3** Security aspects of SCM/SVN [8]

Various tools like CVS and Teamsystem were used, it was decided to seek for a project management tool that could integrate more than one SCM system, and possibly support newer SCM as they become more popular. Redmine supports most of popular open source VCS (Version Control Systems).

Source control management becomes increasingly valuable as time goes by. In case study company, there were cases of total source code loss due to human overload problems. So if company's profile is like the one's in this study, which means producing over 15 different software products per year, SCM becomes exponentially important, even without its collaboration features.

Another reason for choosing Redmine is a structure of human resources. Structure of this service company varies from electrotechnic engineers and computer science engineers to law and accounting workers. Judging by this, most of them are not very familiar with project management. So they should use systems like e-mail, which they are already accustomed with. Since Redmine features two-way e-mail integration, this was very important aspect of the evaluation.

Internationalization and localization is also one important reason for choosing Redmine at service providing company. As public company, it is trying to use domestic literals (Serbian Cyrillic) anywhere it can. Redmine does have Serbian translation and Cyrillic support, done by Vladimir Medarović.

### **3.2 Implementing and using Redmine**

Company's Redmine is hosted internally on vmware ESX system Turnkey Linux Redmine stack, virtual appliance. It's a plug & play Redmine installation to download and use in your cloud environment. However company's Redmine is heavily customized and configured per it's needs. First baby-steps that company took with Redmine were with web-based birth certificate ordering application. Today, this application is still in function, and still tracked as active project with Redmine.

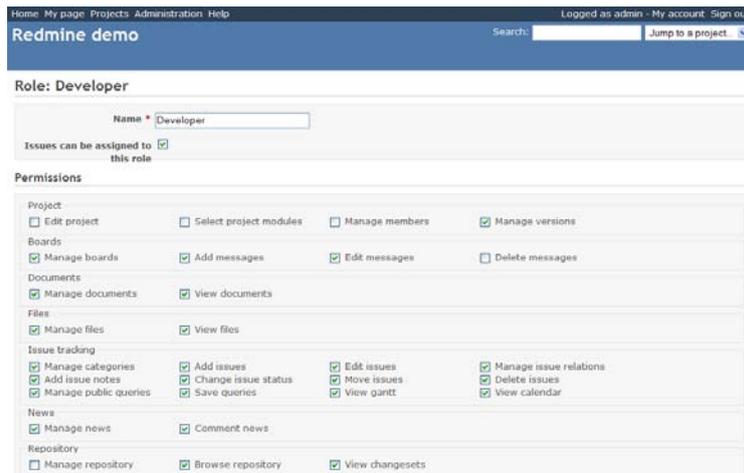
**User groups.** Since the company is of medium size, around 180 workers, assigning users to groups is really important aspect of Redmine's usage. Groups let company replicate it's organizational structure to Redmine's user structure in elegant way.

**Collaboration via user roles and permissions.** This role-based permissions lets users see what Redmine administrator intend them to see. For example, company owner will have role named Company Owner, he will be able to see project status, but will not be able to interact with it directly.

First level of collaboration at case study company:

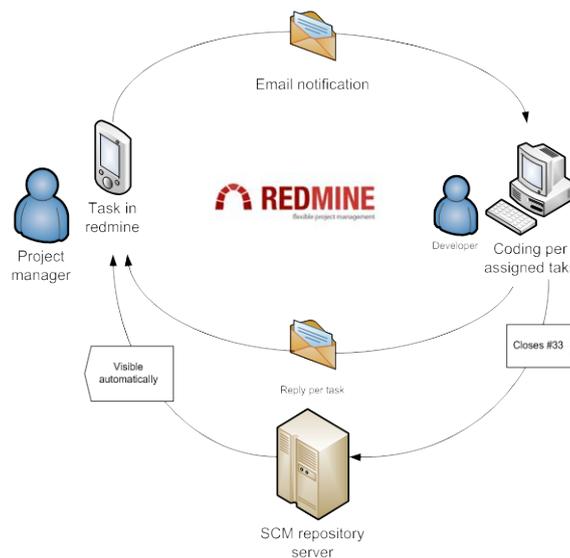
- Design Engineer -> Programmer
- CEO -> Overview of Project activities
- Testing clerk -> Members of development team
- New team member -> Training
- System maintenance -> Information
- Design Engineer -> Programmer

This is accomplished through flexible role based access control, based on per-role permissions (Figure 4).



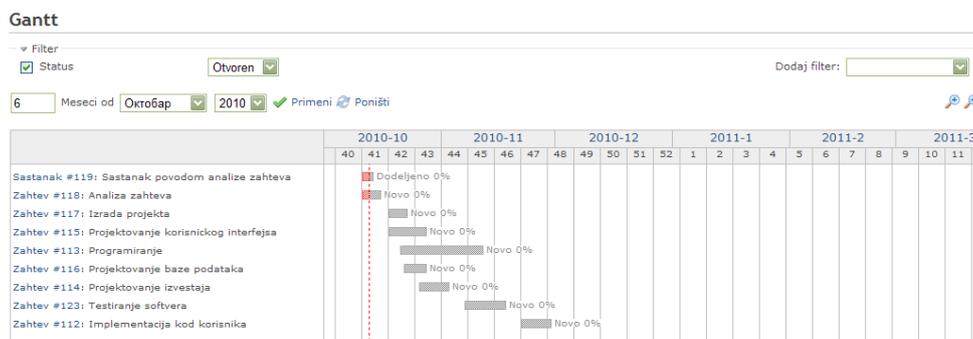
**Figure 4** Redmine role editing

Programmer gets task details on e-mail (those details are also available when user logs-in to Redmine). Programmer can reply to task details directly from e-mail client, or via web interface. If some of supported SCMs is used, task can be closed via SCM.



**Figure 5** Project manager and developer communicating via Redmine

**Aspects of use for management and reporting.** Executive offices can quickly get various reports about project's status and overall activity on projects - various gantt-charts, pdf tables, etc. can be generated with Redmine's standard reporting capabilities.[9]



**Figure 6** Typical gantt chart for management use.

There are also filtering capabilities, and custom queries, which can be saved for quick access, available in right menu bar. Important accomplishment is detailed tracking between connection of assigned task and software's source-code done via revision control.

**Reminder summary e-mails.** Important accomplishment is detailed tracking between connection of assigned task and customer's request being worked on. This feature enables worker to have 1 new e-mail each morning he comes to his workplace and opens his e-mail client. This mail gives a summary of tasks that are waiting to be done in next 7 days, or tasks past due date. This has a psychological effect, that worked does not have to think or ask boss, or look anywhere for his notes and tasks, he simply clicks on task in his e-mail message and starts working on it. It saves time and makes workers feel better about their place in company.

**Usage of documentation module.** Documentation is particularly important, for storing server and various other credentials. For example, if a worker leaves the company. In presented case study Redmine is also used as Enterprise knowledge environment, so all product documentation is stored in it [6].

**Issue extensibility.** Custom issue types are created for each project, with some common issues featured across projects. Using this capabilities, lets company use Redmine for any type of case or order management [10].

**Workflows.** Another very important and modern feature is workflow. At our case-study company, workflow is defined for bugs and features, so developer can not close bug until it is tested and reviewed by project manager or design engineer [11].

**Key aspects of important internal organizational company rules regarding Redmine.** To successfully adopt Redmine into the organization several key aspects of internal organization need to be adopted. Aspects like project oriented organization, and set of rules supporting it. One such rule is that no e-mail from Redmine should stay unread, and no task can be ignored. Also electronic media (email, documents, and Redmine) should be made official communication channels in organization. Anything that can be assigned or written to Redmine should be done that way. No punishments should be applied to ones who do not obey those rules, but they should be addressed and explained the benefits of Redmine usage, each time they skip it in daily work. At case study company, such rules have not been adopted yet, but as time goes by, the company is converging to it, simply because it has issues related to who said what, too many e-mails regarding one task, no visible connection between task and e-mail regarding it, etc.



**Figure 7** Organizational aspects of agile project management

**Productivity practices.** One extremely good practice, regarding productivity is setting up e-mail folders and filters. If person is involved in one or more Redmine installations, he/she should setup a folder in e-mail client for each installation and filter which automatically places messages to assigned folders. Such virtual organization helps navigate through messages quickly if user heavily depends on e-mail. Redmine provides us with employee monitoring capabilities [7].

**Human aspects of Redmine implementation.** At first, people were skeptical and accustomed to old ways (telephone, sticker notes, excel charts, e-mail and word documents). But features described above which enables Redmine to integrate with e-mail, incorporate word documents to searchable forms, made people gradually switch to this kind of project organization. Main turn point at Redmine usage is when management became aware of need for some kind of project tracking, since company's amount of development work increased, and started to use Redmine by themselves [12].

## 4. Conclusions

This paper discussed the open source web based project management applications and Redmine implementation at one service providing public company.

To successfully implement Redmine or any other web based project management application at any company, determination is required.

Hardware and software infrastructure (standalone, virtual or hosted Redmine server) and web browser are essential. SCM and Email are optional.

To successfully implement Redmine, organization must have following requirements:

- clearly defined work scopes,
- clearly defined who assigns the tasks,
- clearly defined who gets tasks and
- clearly defined who submits errors.

If the previous requirements are met Redmine will make the following work easier:

- Simultaneous managing of multiple projects,
- Accurate determination of worker's daily workload,
- Project documentation management,
- Source code management and
- Collaboration on work tasks.

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# Innovation Networks and SMEs Competitiveness

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**Competitive market positioning and successful operation of SMEs in contemporary conditions is increasingly determined by the application of innovation. Hence, the establishment of a system for ongoing development of innovation through mobilization of internal resources and potentials and/or their associated innovation networks is essential to enhance the SMEs competitiveness. Empirical research indicates that SMEs are becoming more dependent on external networks of knowledge primarily because of limited financial and human resources to realize their own research activities.**

**Innovation networks include cooperation and interaction between the subjects of innovation system. These networks enable entrepreneurs and SMEs to overcome the limitations arising from scarce research resources on the one hand, and utilization innovations from external institutions and entities, on the other side. Hence, this paper is primarily focused on considering the possibilities for increasing the linkage of SMEs with innovation networks as an important prerequisite for fostering their competitiveness.**

## **Keywords**

Competitiveness, innovation networks, SME

## **1. Small businesses and competitiveness**

Although frequently used, the concept of competitiveness may possibly be elusive and subject to many debates. As to enterprises, the meaning of competitiveness and competitive strategy is being relatively clear, since it usually refers to the capacity of the firms to compete for markets, resources and revenues assessed by indicators such as relative market share, growth, profitability or innovation. Nevertheless, the concept is to be a subject to a worth mentioning debate if expanded from enterprises to economies. That is to say, the possibility to perform nations as compete with each other on the world market and become more or less competitive is considered as to be a "dangerous obsession". [1]

Partially to response, the competitiveness is being assessed as a multilevel concept thus national competitiveness is closely related to the enterprise one. At national level, competitiveness is usually defined as a nation's ability to produce goods and services that meet the tests of international markets while simultaneously maintaining and expanding real incomes of its people over the long term. [2] Put differently, the capability to compete in international market is thought to be a function of macroeconomic conditions and policies, factor endowment (land, labour and capital), as well as microeconomic factors, counting for a quality of business environment, sophistication of firm's operations and the state of cluster development. From this point of view, national competitiveness is ultimately considered to reflect productivity. That is to say, competitiveness is dependant not only on macroeconomic adjustment or natural endowments but also on the national economy's ability and

more specifically the enterprise capacity to achieve higher productivity levels by using these assets (human resources, capital and physical assets) more efficiently.

Macroeconomic fundamentals are therefore necessary but not sufficient to reinforce the nation's competitiveness, if there is a weak enterprise sector. Or, as Porter says, "for sound policies at the macro level to translate into an increasingly productive economy, than parallel microeconomic improvements must take place". [3] Hence, competitiveness is being an ultimate firm - level concept that brings up the relative enterprise performance in particular markets. In other words, enterprise competitiveness is the ability to sustain a superior market position by providing quality products on time and at competitive prices with the flexibility to respond quickly to changes in demand, as well as successful product differentiation management by building up innovative capacity and an effective marketing system. [4]

Generally, the main distinction between enterprise and national competitiveness is that the firm will cease to exist if it stays uncompetitive for a long time unlike the nation that never goes out of business regardless of how badly it is managed or how uncompetitive it might be. That is to say, the loss of a national competitiveness may well be reflected in a possible aggravation of welfare conditions instead of the market elimination. Competitiveness is therefore based on permanent increases in value added which requires the companies to shift from comparative advantage (low cost labor) to competitive advantage i.e. the capability to compete on quality and cost, flexibility and delivery. This, in turn, depends on business environment and sophistication of the firms' operations. To sum up, one may possibly notice that a number of factors at different levels affect the competitive performance of enterprises, such as: resources (people, skills, physical capital and technology), capability to respond effectively to competitors, market power, flexibility to act in response of changing circumstances, capacity to create new market slots, business environment, policy and regulatory setting and the supporting services provided either by public or private organizations.

Globalization and liberalization of markets enhance competitive pressures and force firms to create mechanisms that will ensure their successful performance. Competitive strive for better positioning in the global market imposes an immanent need to the companies for development of internal mechanisms that will encourage technological awareness through systematic monitoring of technological advancements and implementation of innovative solutions in business processes. Adoption and application of new technologies as well as development of innovative activities are particularly relevant for survival and progress of small businesses.

Taking into consideration the economic development of the countries, as well as the access to global markets alike, the SMEs crucial success factors to increased international competitiveness are to be found in their innovation capacities, capability to properly implement information technology and networks, but more generally the ability to innovate and transform knowledge into competitive products and services.[5]

Specifically, smaller firms need to observe market signals constantly and to adapt effectively to competitive changes. Analysis shows that competition is the main driving force of innovative activities of small businesses. Small businesses operate in a competitive and changing market environment, which creates continuous pressure for reduction of costs and prices, and enables better customer supply. Consequently, their performance is directly determined by the ability and willingness for permanent changes and improvements of the business. Because of their size and customer proximity, SMEs can easily identify opportunities, anticipate customer needs and quickly respond to changed market conditions. Such flexibility and adaptability to market changes creates more opportunities for innovation. Moreover, practice shows that their innovation efforts are determined by the influence of other factors. There is widespread evidence about the impact of innovation and technology on SME growth and competitiveness. Thus, the fastest growing SMEs in Asia Pacific region are distinguished by the huge technology assimilation. In this context, the high growth rates noticed in some countries such as Taiwan have been actually achieved by SMEs activities heading for the technological innovations that have led them to production and export of high value added goods and services. These SMEs in particular have still preserved their remarkable capacity to innovate and permanently create the leading edge technologies besides their flexibility and ability to resist the external challenges such as the global competition and market conditions [6].

## 2. Innovative activities of SMEs

Despite the fact that SMEs account for a very small part of total national innovation activities, they have been considered as one of the "driving forces" of modern economies. The general assumption is

whether SMEs have significant impact on innovation system in view of the fact that they are more flexible and more adaptable to the customer's needs and introducing the new products and services. Innovation is a key factor for competitiveness of enterprises and there is strong relationship between competitiveness and innovation. Since competitiveness of the enterprises may be defined as the manner in which companies are trying to create and develop a unique comparative advantage [7], the innovation processes encourage development by successful introduction of the new goods, new services, new technologies, new ideas, new methods, opening of new markets, new ways of organizing the business or new sources of supply. Since the "innovations are resulting in qualitatively new products or processes, which differ significantly from the former state" [8] they are significant source of distinctive competitive advantage.

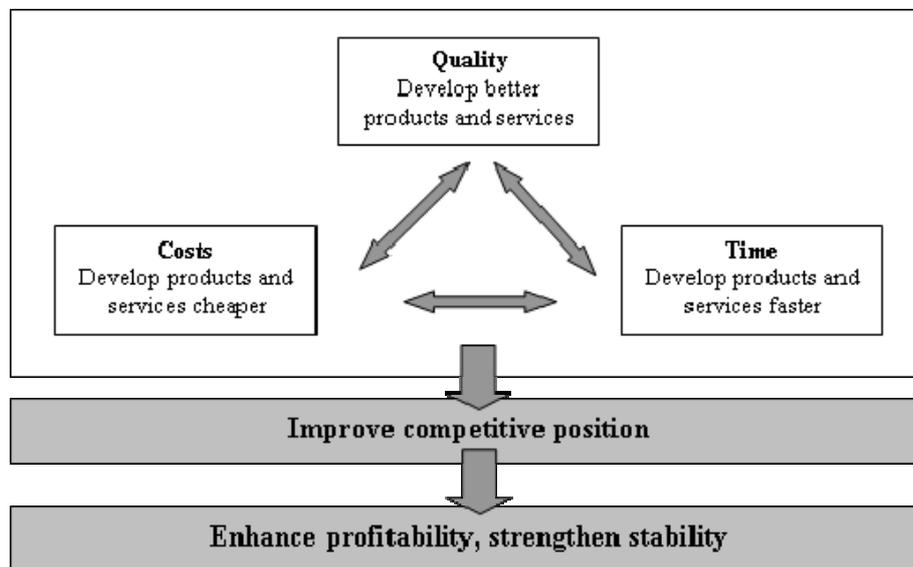
Companies consider innovations as a major engine of enhancing their performances and strengthening their competitive position in the market. Most companies and SMEs as well, connect innovation only with the development of innovative products. However creating new products is only one category of innovation. There are several types of innovation such as: innovation of process, innovation of product/service, and innovation of strategy. Innovation specialists in addition, argued that there are two basic types of innovation: incremental innovation and radical innovation.

Incremental innovation exploits existing products, processes or technologies by improving on what currently existed. This type of innovation is negatively correlated to breakthrough innovation and nowadays most of innovations are incremental. Incremental innovation is the improvement in component performance that builds upon the established technological concept.

Radical innovations pull up existing markets by providing something completely new. This kind of innovation dramatically changes social or business practices and involve new fundamental technological approach [9].

Harvard Business School professor Clayton M. Christensen [10] described new type of innovation named disruptive innovation. Disruptive innovation describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves 'up market', eventually displacing established competitors.

Providing innovative products with improved convenience may help firms reinforce their competitive position in home as well as global markets. This necessitates innovation efforts to bring new and/or better goods into the marketplace while developing organizational and manufacturing processes that enable more efficient and cost-effective production, distribution and after-sales services [11], [12].



**Figure 1** "BCF model for innovation in SMEs

One of the main challenge for the SMEs, if they want to became more competitive and to enhance profitability and reinforce stability, is to innovate products, services or processes making them better, cheaper and faster. Tiwari and Buse suggest BCF (BCF referred to better, cheaper and faster) model for innovation in SMEs. [13] (Figure 1).

### 3. Innovation networks

Small businesses innovate both reactively and proactively. They innovate reactively in response to customer, market and competitive pressures. But they are also proactive innovators, scanning for and acting on new business opportunities [14].

Due to limited financial and human resources SMEs are less able to invest in R&D and to produce innovative outputs. Hence the ability to exploit external knowledge is a critical component of developing innovative capability and competitive advantage.[15].

Literature review clearly indicates that “innovation activities, including the diffusion and adoption of new technology, do not occur in isolation. The actions of innovating firms are determined by the wider socio-economic context within which they exist. A firm exists within more or less complex networks of suppliers and customers, sources of labour and skill, finance, and so on. These networks may include inter-firm relations, but they also comprise public sector institutions such as research institutes and universities.” [16]

Innovation networks are defined as groups of businesses, research organizations, universities and government working together to achieve shared R&D goals [17]. Many countries such as the United States, Australia and the United Kingdom have recognized the importance of these networks in developing innovation capacity and international competitiveness [18]. Democratic and open networks based on a shared innovative culture enabled by regular direct interaction provide an effective environment for a collective learning process. Such organisational framework allows diversity of knowledge, competencies and backgrounds with regard to a maximum range of reachable synergies. In order to ensure cohesive and efficient functioning of the network, a high level of coordination between network participants is necessary to be achieved [19]. Coordination may involve a level of formalization and clear definition of deliverables.

Therefore, in order to encourage innovation and provide competitive advantage SME may be involved in multiple innovation networks (innovation networks with suppliers and customers as well as with knowledge institutions). It is generally recognized that networking enables small firms to establish formal and informal co-operation, which may include exchange of knowledge through business cooperation or a more articulated web of relations which involves different actors. Many studies confirm that a key role in such complex networks is played by universities, research centres, local institutions, which provide external support in many stages of the production as well as in innovating activities [20]. Setting up network synergy allows creating new business opportunities for SMEs and gaining strategic competitive advantages. Networking is significant source of competitiveness. Networks enable companies involved to work together in development and transfer of knowledge. Recent researches indicate that inter firms networks of collaboration are positively correlated with the firm's growth while institutional collaboration emerges as a key source for innovation.

Innovative impulses provided by customers, suppliers and competitors have equal relevance as the innovative inputs from scientific institutions. However, the effects of networks may be different for different types of innovation. Basically the SMEs efforts are focused on product and process innovations as an important source for increased productivity, competitiveness and growth. The experience shows that customers give a significant innovative impetus to SMEs to create or adapt products according to their needs [21]. Process innovation, on the other hand, is more likely to depend on interactions with the suppliers who provide new elements to the production process and/or the organization of the firms. Innovations regarding the improvement of existing products and processes are important for maintaining competitiveness but in conditions of stronger competitive pressures, they are not enough. At present “competitive conditions are imposing necessity for more radical innovation that will allow differentiation as a precondition for the survival of companies” [22].

Innovation networks can be initiated by SMEs or other participants in the network. The governments usually play a “facilitating role in the formation of networks but leaves decisions on network objectives, composition, structure and activities to the member firms. Governments can play an important role in facilitating network development through the provision of funding that encourages organisations to collaborate.” [23] General and specific policies are being applied by governments for encouraging innovation. Universal policies are mainly focused on promoting education and developing a strong research community. On the other hand, specific programmes are designed to encourage innovation and R&D comprising tax incentives; subsidies for start-up businesses; creation of high technology incubators etc.

Evidently, innovation networks, whether science-based or business related, create broad opportunities for SMEs to promote innovativeness as a basic prerequisite for enhancement of their competitiveness.

## 4. Conclusions

Competitiveness is generally accessed as a multilevel concept as national competitiveness is being closely connected to enterprise one. That is to say, competitiveness is not to be a subject merely on macroeconomic adjustment or natural endowments but also on the national economy's capacity and more precisely the enterprise ability to raise productivity by using assets (human resources, capital and physical assets) more efficiently. Macroeconomic fundamentals are necessary but not sufficient to underpin the nation's competitiveness, if there is a weak enterprise sector. Consequently, competitiveness is ultimately a firm - level concept conducting the relative enterprise performance in a certain product market.

The SMEs competitiveness and growth depends on a number of factors emphasizing primarily the relevance of innovation and the ability to absorb new knowledge. Consequently, small and medium firms have an important role in the development and spread of innovation. Innovation activities of SMEs generally arise from two sources: a) innovation generated by SMEs based on their own research and experience resulting with improvement and advancement of the business process and existing products or introduction of completely new products and processes; and b) innovations resulting from systematically structured and organized research and development activity being implemented in collaboration with other business entities or in cooperation with research institutions (universities, centers, institutes).

Due to the limited research resources SMEs are forced to enhance innovation cooperation through innovation networks. Successful innovation networks allow SMEs to gain access to new markets technologies and external knowledge.

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# Investigation of Start-up modeling frameworks

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The paper presents an overview and investigation of business modelling frameworks. It is based on current research in the field of business modelling innovation. The paper is also based on the experience from the author's participation in a number of business plan competitions in 2010 across Europe. It observes and analyzes common steps in the business modelling process with the goal of extracting best practices. We also identify and present a number of requirements on business modelling tools. The long term goal of this research is to develop a generic business modelling methodology for young fast-growing start-ups particularly in the IT field.

## Keywords

entrepreneurship, business model innovations, business modelling frameworks

## 1. Motivation and goal setting

According to Prof. Howard Stevenson, business modelling is an integrate part of the entrepreneurship process, succeeding the opportunity recognition and preceding the marketing and finance elements in the process of resource acquisition [1]. As such business modelling can be seen as a starting point towards commercialization, in contrary to new technology currently perceived as the trigger for innovation. Recent research suggests that most of the start-ups do not use business plan if any structured business modelling tools. Start-ups who do use such tools, in the contrary, seem to stick to their business plans even in cases it is obviously leading to wrong decisions. A good business model can not only leverage profits, but it also is a requirement to capture value from the innovation at all [2]. Therefore, the outcome of the commercialization of one technology depends on the business model it is based on [3]. In other words value is created not only by the technology itself, but also through the business model.

Choosing the right business model is one of the challenges with which new companies are confronted. Scientific research suggests that a sound business model is a key success factor for start-ups in the current dynamic economy. Venture capitalists can be divided in two groups regarding their position to this statement – the one that support it, like Randy Komisar, partner at Kleiner Perkins Caufield & Byers [4], and the one denying the first priority of the business model at the beginning of a venture, like the founding partner of garage technology ventures and former chief evangelist of Apple Guy Kawasaki [5]. True or not, 70% of companies in 2009 were engaging in business model innovation, and 98% were modifying their business models to some extent [6]. This empirical evidence for the importance of the business model is one of the reasons for the current study of its nature. Another reason for this research is that most business modelling frameworks fail to provide the dynamic tool, necessary in the ICT industry, especially in today's uncertain and volatile market environment. For this reason, our goal is to propose a framework that serves the needs of young ICT companies in the very beginning of their existence in an unsteady and complex environment. In order to develop such framework we will first define the term business model and review existing business modelling frameworks. We will then investigate current research on business model innovation and extract the requirements for a framework in the ICT industry. We will also define the basic elements of a business model of an IT start-up, which can be co-ordinated in a graphic instrument that can be used by entrepreneurs in the ICT industry to model their business ideas into real businesses.

The paper starts with a common definition of a business model and discusses its statistical importance on the success of young ventures. We represent different success factors discussed in contemporary research. Next, we give an overview of the entrepreneurial process and the business plan as a tool for

setting it in boundaries. We analyze the practical use of business planning tools in the start-up phase in a number of representative companies across Europe. In this process we identify reasons for failure of early business modelling, lessons learned and tools to overcome it. The paper finishes with recommendations for a practical and easy-to-use methodology which can be applied by young fast-growing IT start-ups to model their business in the early-stage phase. The theory-based conceptual framework aims at the identification of inefficiencies in the business planning process. It also can be used as a red line for encouraging entrepreneurs to experiment with their business model and stay open for changes in today's dynamic business environment.

## **2. The business model nature**

The business model has gained importance after the bubble burst in 2001. With the internet and the complex environment of the globalization the term business model evolved to an individual science sector, investigating the question why some companies succeed and others don't. There are contradictive opinions not only about the importance of the business model, but also about its nature. Whereas some almost exclusively define it from a clearly financial perspective, e.g. How does one business make money, others accentuate on its competitiveness, e.g. What is the value proposition. Teece even sees business models as conceptual rather than financial models [7]. This paper will review popular definitions and pursue by choosing the one particularly suited for the start-up case.

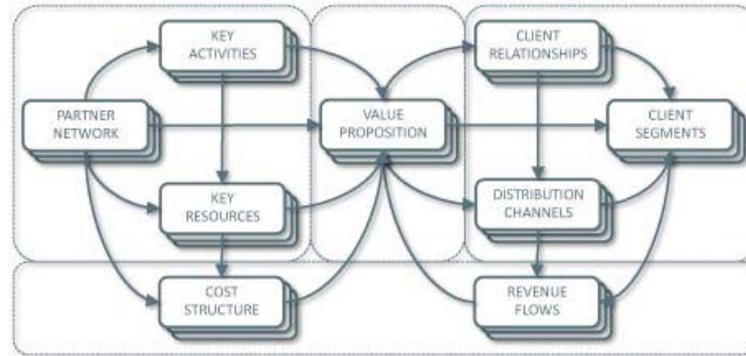
### **2.1 Definition of a business model**

Joan Magretta, a management writer, defined a business model as "the story that explains how an enterprise works" [8]. Although there is no clear definition of the term business model, we can round it up as follows: A business model is the way a company creates value for profit. For this reason Chesbrough believes that business models usually contain two basic pivots – the value proposition and a revenue mechanism [9]. The value proposition consists of the value created for a specific market segment that would pay for it. The revenue mechanism describes the value chain in which the value is delivered to the customer, as well as profit and cost factors that derive from its specific implementation. McGrath also formulates those two basic components slightly differently: the unit of business, which constitutes what customers pay for, and the process or operational advantages. Business plan and pitch competition judges usually ask for a sustainable competitive advantage, when discussing the business model. This is what a start-up can make better, cheaper, faster, or cooler than the competition, and most importantly cannot be copied by others. Although we believe that every company has some sort of explicit or implicit business model, some research suggests that a business model concept is a superior way of analyzing opportunities to traditional concepts like positioning within a market segment [10][11].

### **2.2 Business model vs. strategy**

Some may argue that the business model is then equal to the firm's strategy. However, they differ in a couple of elements. The business model should be kept dynamic, whereas the strategy usually is part of the a long-term plan of the firm. The business model is based on capabilities, whereas strategy is usually promoted on a resource-based view of the firm [12]. Rita McGrath summarizes those differences in the following four criteria.

- Business modelling implements an outside-in rather than an inside-out focus.
- Business models cannot be entirely designed in advance, whereas strategy formulation is key to success.
- Business modelling should consider the changing basis of competition
- Business models therefore require a discovery-driven rather than a planning oriented approach.



**Figure 1** The business model canvas [14]

### **2.3 Business modelling frameworks**

There are a number of business modelling tools [13]. Below we have selected two of the most popular ones in order to illustrate some main patterns. The business model canvas by Alexander Osterwalder in Figure 1 is a mapping tool which consists of nine elements: value proposition, client segments, distribution channels, client relationships, key activities, key resources, partner network, cost structure and revenue flows. This ontology, as the author calls it, has proven its simplicity, ease-of-use and affectivity, since it has spread widely throughout the start-up community.

Figure 2 represents the virtuous cycles method for mapping business models. It has been developed by Ramon Casadesus-Masanell, an associate professor at Harvard Business School, and Joan Ricart, a professor at IESE Business School in Barcelona, out of the assumption that a business model comprises choices and consequences. By designing self-feeding cycles of choices and consequences, successful companies can assure their competitive advantage. This model, even if more eloquent, is however a little bit more complex, which is possibly the reason for its relatively narrow spreading in the start-up scene.

## **3. Business model innovation**

### **3.1 Key aspects of business model innovation**

The widely accepted key aspects of business model innovation are novelty, lock-in complementarities and efficiency [16]. Business model innovation can only prevail in an environment with dedicated experimentation processes, leadership commitment and authority [3]. There are several principles and parameters supporting effective experimentation, like fidelity, cost of conducting tests, cost of failure, time for feedback, amount of information learned [17]. The more difficult factor of leadership and authority is a question of organizational culture. In today's dynamic market environment companies are found to be dealing not simply with one innovation S curve, but with a total of 3 hidden S curves for competition, capabilities and talent [18]. While there is evidence that companies consciously are trying to deal with the first and the second one, many fail at the hidden talent S curve, because it requires change at the top.

### **3.2 Barriers to business model innovation**

Main barriers to business model innovation are obstruction, like in the case of conflicts with the dominant business model, or with the supporting assets configuration, and confusion, like in the case when it is not clear what the business model should be at all[3]. As a market is changing successful companies succeed to adapt their business model to its new requirements. Those who fail are not necessarily bad at fixing failures, but are often too late in their attempts to do so [18]. The reason is, that adaptation requires a priori experiments with the business model, especially in industries where current business models are obviously outdated. Investigating the barriers for such experiments it

turns out that the main conflict lies between the current business model and the new one[2]. In the case of disruptive innovation that barriers are especially high. There is also a cognitive barrier to business model experimentation, also known as dominant logic [19], which postulates the information flow into and out of the company's decision making process. It means simply that companies are filtering out information that conflicts with their logic, and are in contrary looking for information that supports it. Dominant logic is necessary in the daily business but can harm on a strategic level.

### **3.3 How to innovate the business model**

A CEO has 3 main tasks (1) manage the present, (2) selectively forget the past, and (3) create the future [20]. Following this path, we can extract a generic approach to business modelling innovation. First, in order to overcome the barriers towards business model innovation, companies should retain a constant commitment to experiments with it [3][12]. Secondly, given this commitment a business model innovation could then start by mapping the prevailing business model with a mapping tool, like the 9 elements mapping approach of Alexander Osterwalder [13] or through the Virtuous Cycles method[6]. Mapping the "old" would then help changing it, by identifying key areas of changes or challenges. Unfortunately, innovation is not done by mapping the business model alone. Creating the future, at last, can be accomplished by redesigning the mapped business model, or in some cases entirely replacing it by a new one.

### **3.4 A case study for business model innovation: GymZap**

#### **3.4.1 Customer problem**

Sports instructors are faced with inherent limits of the scalability of their services as sports facilities can only accommodate a certain amount of customers. Furthermore, commercial fitness studios, where instructors typically offer their services, rarely offer very large halls. These factors, as well as the participants' specific requirements with respect to the time and location of a sports session, significantly limit the revenue potential of a freelance sports instructor. One way to overcome this scalability limitation is the production of home exercise videos. This approach, however, requires a significant financial investment, which makes it most attractive to celebrities and less accessible to others.

#### **3.4.2 User problem**

On the other hand, the lion's share of the population tends to dread going to the gym for one or the other reason. Fitting sports into the family and career planning is a complicated task for mothers on maternity leave, frequent travellers, elderly or disabled people, and especially for the exercise shy ones. Gyms and sport associations are one way to stay motivated in the daily routine. But for many people, they are no option. Finding an affordable and available alternative often results in home exercising. Unfortunately getting in shape on one's own or by the means of an aerobics DVD often fails. No interaction with the trainers on the video and missing personal identification with their iron bodies and perfect movements mostly bores, decreases effectiveness and discourages by and until the New Year's resolutions for losing weight and getting sports on the agenda are soon forgotten once again. Home exercisers confess that without appointment they lack discipline. Keeping up with sport requires knowledge and motivation, which are usually unavailable at home.

#### **3.4.3 Solution and value proposition**

GymZap connects professional instructors and home exercisers. We provide the infrastructure necessary to enable fitness professionals to offer their classes live additionally through the Internet against payment. Home exercisers can access those through a web interface. Users engage in the platform either by broadcasting their own workout or by participating in available ones, such as indoor sports, dancing, martial arts, general fitness or relaxation classes, or new services like a 5 minute face workout or back exercising. Our solution creates a win-win situation for all involved parties. By using

GymZap, instructors can scale their service to reach more people without any investment and make money out of new services. Young instructors can gain experience and popularity. Fitness studios and health care insurance companies provide a low cost value-added service to their existing subscribers by enabling them to attend sessions remotely. This improves customer loyalty and most of all customer health. Online they can reach new customers unable or unwilling to make it to the gym, who are likely to convert to offline subscribers once they get in shape. Our users benefit from the advantages of live trainings independently of their location and gain access to a great variety of classes unavailable locally. They can find a suitable training spontaneously whenever they have time for exercising, e.g. when the baby sleeps or in the break. They save travel time and organizational resources, but still can influence the tempo, discuss with the trainer or other users, or change the training any time. They don't get bored with unchanging exercises and can improve their fitness level due to professional guidance.

#### **3.4.4 GymZap: Innovation**

Despite the rising number of live broadcasting services online, during our market analysis we could not identify any other platform providing live broadcasting infrastructure dedicated to the needs of instructors and home exercises. The key elements of our value proposition to the end users are real-time, flexibility, availability, communication, and diversity. Our platform is silhouetted against traditional home exercising alternatives, like videos and books, by the integrating user-generated content with professional trainings, which allows for personal identification, spontaneity and diversity. We deliver the two key success factors for exercises, knowledge and motivation, through our service by providing the user with an individual sports network. Our users gain access to the experience of like-minded sportsman, and to a variety of sports which keeps them on track. GymZap is the first provider of live exercise videos online. Unlike other home exercise alternatives, GymZap sessions are live so that users can benefit from real-time professional guidance independently of their location. Users can ask their questions, influence the tempo, discuss with other users. A direct communication with the instructor is guaranteed. They don't get bored with repeating exercises. Unlike organized sport classes, they save travel time, and have an on-demand access to a great variety of sports, so that they can also participate in very short trainings.

#### **3.4.5 GymZap: Business model**

GymZap started as an online fitness company. The team was nominated and awarded at a number of international and regional business planning and pitch competitions in 2010. GymZap is an online platform which connects home exercisers and fitness instructors. GymZap was primarily addressing a two sided market serving end users as well as business customers. End users included everyone who is practicing sports at home or while travelling. Those could be mothers on maternity leave, business travellers, the overweight, and many others, comprising 20% of Europeans. The initial business model of the company was based on the proven freemium model: User-generated content was provided for free to other users, and professional sessions were offered as paid-services on the pay-as-you-go principle. End users was supposed to use GymZap as participants in free or paid exercise sessions, or alternatively, as broadcasters of their own sessions. The customers were, in the first place, freelance sports instructors, who would like to expand their customer base by offering live exercise sessions through the Internet. Those would freely offer their services online, they would set the price for the sessions, the content, the frequency and everything else themselves, paying only a commission on sales for using GymZap as a marketing channel. The idea was a success, especially among end users.

#### **3.4.6 GymZap: Changing the business model**

Analyzing the business model in detail it turned out that it neither proposed barriers to copycats, nor did it prove to be sustainable in the long-term. Offering group fitness session in real-life is connected with the social context, the studio assets, the smell, the location of the facilities according to the living place. In the online world all those were replaced by the price. This would result in a heavy price competition leading to a lose-lose-lose-situation for anyone involved. Session prices would fall until the cheapest ones wouldn't serve their purpose anymore. This would make end users in contempt and

probably reduce their usage. The company itself was supposed to profit by sales commissions. If prices fell margin and revenues would also decline. Realizing those factors, the founders decided to re-model the business. The goals were:

- To create lock-in effects or other major barriers to entry
- To ensure at least mid-term sustainability of revenue growth
- To really connect home exercisers with live fitness sessions online, without challenging the quality

## **4. Business modelling tool for ICT start-ups**

### **4.1 Characteristics of ICT start-ups**

To design a business modelling tool for ICT start-ups one should take in account the specifics of their businesses. First of all, they usually “trade” with intangible goods, which influences the need of a warehouse. Secondly, the cost of goods sold is almost entirely determined by marketing and human resource spending, whereas the marginal manufacturing cost is negligible. This results in a relatively high proportion of variable cost, and low fix cost factors. This not only facilitates rapid growth, but also significantly reduces investment amount and respectively capital costs.

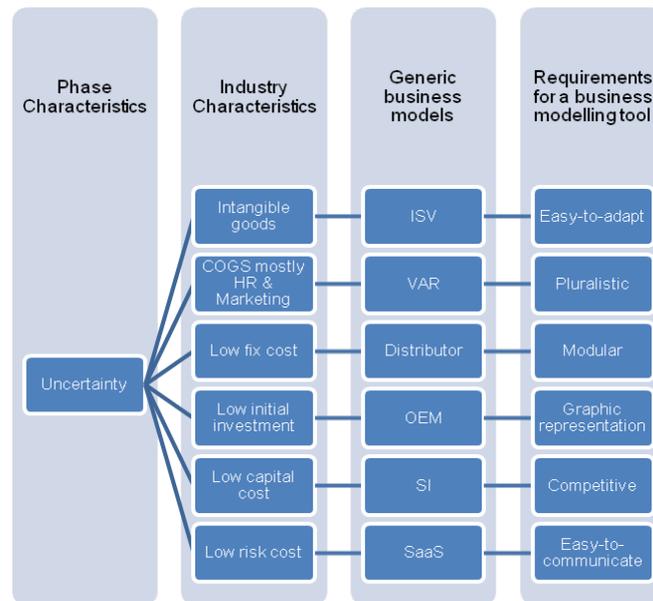
### **4.2 Classification of generic business models in ICT**

To classify the business models in a generic way, ICT start-ups can follow one of the patterns below:

- Independent software vendors (ISV) – software manufacturer, who can sell software in different ways, directly or through a distribution channel
- Value added reseller (VAR) – companies reselling software licenses from ISV to consumers or business, and offering additional services, like consulting, installation, customization, maintenance and so on
- Distributors – Intermediaries in the software distribution process, usually between ISV and VAR
- Original equipment manufacturers (OEM) – companies buying whole-sale licenses from vendors, who modify and repackage them to create a separate self-branded product. The latter can be redistributed in either way.
- System integrators (SI) – Companies realizing solutions on the basis of products of a couple of vendors for business customers
- Software-as-a-Service (SaaS) providers – software provided as a service through the internet

### **4.3 Requirements for a business modelling tool for ICT**

A business modelling tool for ICT start-ups should take those characteristics in account. Those are represented in Figure 3 on a conceptual level. This combines the generic business models of ICT start-ups with the uncertainty of the development stage and the ICT industry characteristics. Thereby we extracted six requirements to a business modelling tool for ICT start-ups. First of all, it should be easy to adapt, because business models are likely to change very often especially in the beginning. In the case of GymZap we wrote 13 different business plan version in the first 6 months only. A graphical tool should reduce the effort of adopt new business models, or simply test them on paper. A business modelling tool should also be pluralistic, meaning that it should allow for more than one scenario, market segment, revenue stream etc. It should be modular, in order to allow for changes in the value creation chain. For efficiency reasons it should have a graphic representation. Furthermore, it should combine mechanisms for creating competitive advantages against copycats and newcomers. Last but not least, the outcomes should be easy to communicate, since start-ups need to pitch their business and send in business plans and presentations on almost a daily basis.



**Figure 2** Requirements for a business modelling tool for ICT start-ups

## 5. Conclusion

Business models are an element of the value creation when it comes to the commercialization of an innovative technology. Therefore they are at least as important as the technology innovation and should be handled by companies consciously. Since new ventures exist in highly unpredictable market and company environment the business model is a subject to change and deliberate experiments far beyond one of the tests prove successful. To proceed with business model innovation companies should start by mapping their prevailing business model with some mapping tool in order to identify change potential and risk factors. Following that, weaknesses of the prevailing model should be identified and redesigned. In some cases it is necessary to entirely replace the model by a new one. A tool for business modelling for ICT start-ups should be easy to adapt, have a pluralistic view on market segments, revenue streams, cost factors etc, be modular, possess a graphic representation, offer tools for elaboration of competitive advantages and be easy to communicate to stakeholders. Following the generic business models of ICT start-ups presented in this paper, the business modelling tool should help answer specific questions like “What type of licensing is in use?”, “How volatile is human resource cost?” etc. Such a tool needs significant empiric evidence and is an object of consequent work. All in all, business model innovation is virtually indispensable in the current market conditions for sustainable success. Business leaders need to grasp and live its principles by implementing continuous experiment practices on a business model level. This requires leadership and authority, as well as diffusion throughout the company.

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# JA-YE Graduate Student Company Strategy

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The paper presents authors experience and learned lessons in the field of Graduate Student Company (GSC) education from years of experience at master's degree level. It analyses information about the status and good practices in the Graduate Programme and how countries in Europe implement the Graduate Programme and what their best practices are. The application of Junior Achievement – Young Enterprise entrepreneurial education model and strategy has been developed in the creation of student's entrepreneurial mindset.

The goal of the paper is also to share and discuss the latest findings and future creative effective strategies about practical entrepreneurial education.

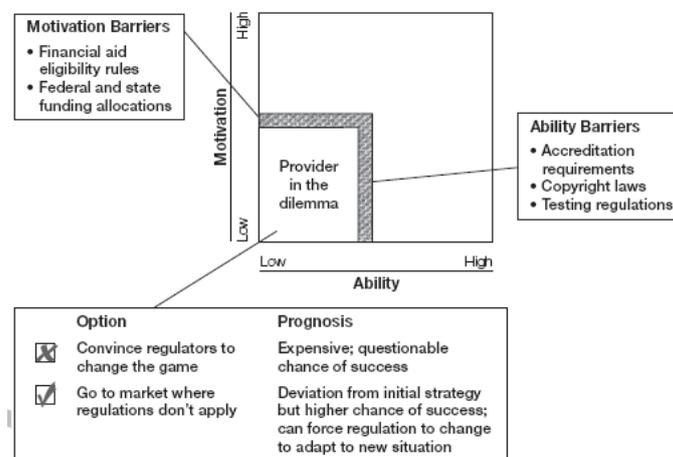
## Keywords

Graduate Student Company, strategies, practical entrepreneurial education

## 1. Introduction and problem statement

We study, live and work in a new reality, i.e. a reality of global competition, knowledge economy, successful cooperation between business and education. [1, 2, 3]. In this global competitive business environment, the educating young people and equipping them with entrepreneurial competences, especially those with technological and engineering background, becomes critically important for their realization. To our mind, improving and increasing the potential for innovation and entrepreneurial competence will be a major factor to ensure competitiveness on the market of the graduating students. Innovation and entrepreneurship which are based on technology, the mobility of intellectual and financial capital, are some of the basic factors for successful realisation [20, 21].

While most of the stakeholders keep promising that education reforms are coming, government and big agencies change slowly. Innovators have two choices in such circumstances - Figure 1.



**Figure 1** Strategies for dealing with nonmarket forces (Clayton M. Christensen, Scott D. Anthony, and Erik A. Roth, *Seeing What's Next* [1])

Clayton Christensen wrote “Many think of innovation as antithetical to education. But important innovations are reshaping the delivery of education. In 2004, for-profit competitors offering distance learning via the Internet, corporate universities, and some community colleges were growing robustly. All of these developments bear the hallmarks of disruption. Online learning offered by for-profit providers such as the University of Phoenix and Concord Law School create opportunities for thousands of previously non-consuming adult learners to obtain degrees in their spare time” [1].

The authors of the present paper perceive the work that has been done so far in creating a subject within the elective courses curriculum in the masters and bachelors degree programs that focuses on and develops entrepreneurial competences for students from technology and engineering specialties, an example and good practice in bringing disruptive innovation to education. The high interest in the course shown by the students, its applicability and the support demonstrated by different stakeholders for its further expansion and development, strengthen the argument and open opportunities for bigger investment in this educational method.

## 2. Methodology and research design

This study is based on a research project (started in 2005) that is coordinated by the Junior Achievement Bulgaria [5, 6] and Master of Sciences “e-Business and e-Governance” and “Technology Entrepreneurship” Programs at Sofia University [13, 14, 17, 18]. The methodology of this study rests on the following pillars:

- Practical Education [5, 15]
- Disruptive innovation [1,12]
- Value Co-Creation [2, 9]
- Profit patterns [19, 11]

This combination of interpretive methodologies is deemed appropriate as we are studying and applying a complex phenomenon. This kind of methodology offers context-rich descriptions of strategic pattern and implementation aspects of disruptive innovations in student education.

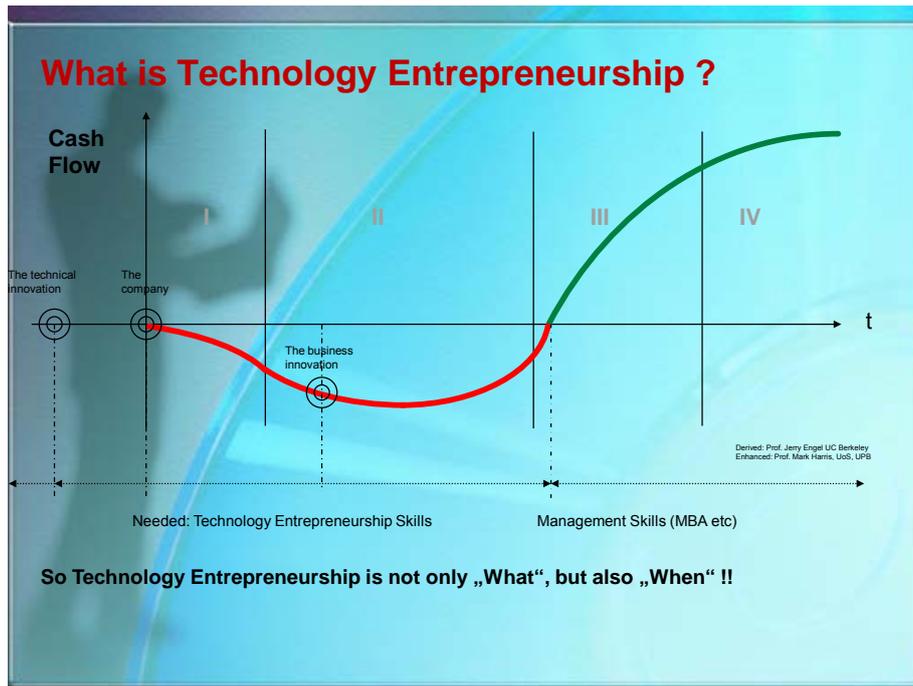
Our methodology includes research and analysis of best practices on national and international level and innovation in the field of learning by doing, taking into consideration the local ecosystem [4, 5]. On the other hand our joint work in a network with many Bulgarian and European universities, participation and conducting of forums and competitions, gives us the opportunity to expand the reach of the entrepreneurial education and ensure its sustainable development [16, 18].

## 3. Student education processes and experience

Education in the subject “Graduate Student Company” is innovative and interdisciplinary (technology and business), combining the theoretical and practical education, and has been developed in cooperation with leading European and American companies and universities. While developing the subject, we have used best practices and introduced innovations, reflecting the Bulgarian business environment. It gives the students the necessary competences for real participation in innovative business processes and entrepreneurial companies. The main purpose of the subject is to prepare students from bachelor’s ad master’s degree programs who will discover and validate critical needs in the consumers:

- to evaluate opportunities, develop concepts and find resources to solve the problems of the consumers
- to develop business plans and prototypes of innovative projects and start-up companies in the sphere of IT/IC, healthcare and clean technologies ;
- to think critically, analytically, creatively and innovatively
- to develop entrepreneurial way of thinking and successful entrepreneurial competencies.

The education in the subject “Graduate Student Company” is used also to increase the motivation and impact of the education, introducing different active styles of delivery, as well as acquiring skills for life-long learning. While developing the program, the best practices of Junior Achievement, as well as the definitions and stages of technology entrepreneurship program of UC Berkeley и Intel Corporation [15] have been used – Figure 2.



**Figure 2** Technology entrepreneurship phases

The values that lead us in pursuing the mission of the program are as follows:

- education directed at the students;
- constant improvement of processes;
- collaboration among all parties involved in the work on the program;
- innovative and creative thinking;
- variety and alternativeness of ideas;

The number of students that have undergone the study and the number of companies established by them in different universities in Bulgaria is shown in Table 1. The interest in the subject by universities in different spheres of study as well as the progress achieved is impressive.

**Table 1** Student companies in Bulgaria

Year	2005	2006	2007	2008	2009	2010	2011
Number of Universities	1	1	1	5	9	13	15
Number of Students	25	39	45	51	108	305	500
Number of Student Companies	1	2	2	6	11	28	35

We follow the job base thinking to identify the opportunities for GSC [12]. Based on the 10 years of experience, annual meetings, competitions, and discussion at a pan European level, worldwide forums and roundtables, we have summarized in Table 2, some of the most important findings in the field of disruptive innovation in education related to the learning by doing method of teaching and experience.

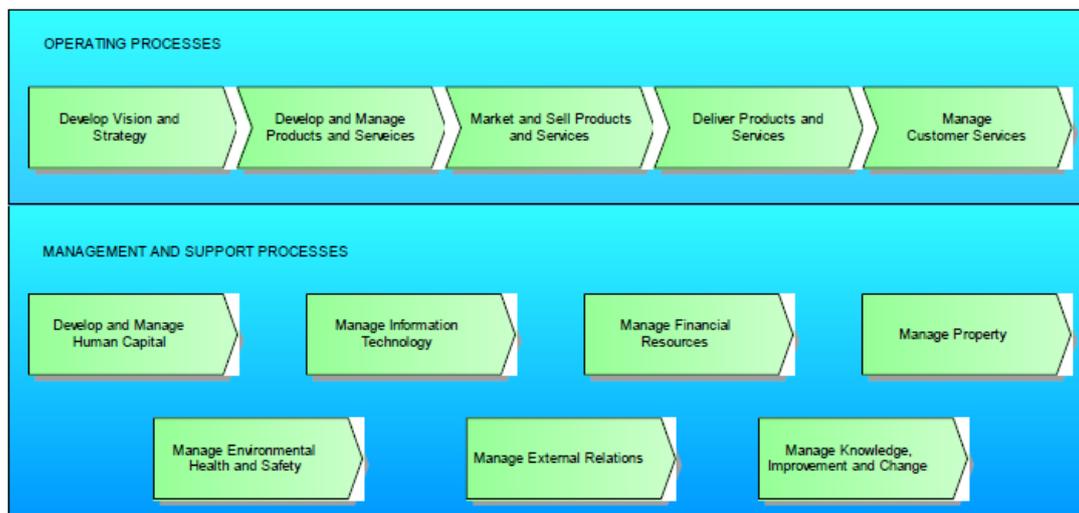
**Table 2** Job to be done list

Job to be done	Importance	Frequency	Frustration	Score	Rank (1 – high 5 – low)
1, To create competitive new ventures	Strong	Yearly	Low	60%	2
2, To stimulate entrepreneurial mindset	Very strong	Long term	Very high	100%	1

Job to be done	Importance	Frequency	Frustration	Score	Rank (1 – high 5 – low)
3, To generate sources of innovation	Strong	Yearly	Medium	50%	4
4, To contribute to the entrepreneurial ecosystem	High	Medium term	High	40%	3
5, To develop a more entrepreneurial culture	High	Long term	High	80%	5

Our experience shows positive results related to the higher motivation and activity of the students, more tolerance to risk when making decisions and executing activities.

Classification of GSC processes - operating, management, and support processes is shown on Figure 3.



**Figure 3** GSC operating, management and support processes

The execution of thus presented processes gives the opportunity to students who participate in the education to go through the whole life-cycle of a company – from the stage of idea generation to establishment, running, and closing all processes and procedures and archiving documentation [11, 12].

#### 4 JA-YE students' companies' strategy

Understanding the processes by all participants as well as the development, discussion and execution of the strategy for the development of the student company is an important key stage. We have started with creation of a resume of disruptive ideas – Table 3.

**Table 3** Disruptive ideas resume

Our strategic intent is to:	Essence of an idea
The target customers are:	<p><b>Users:</b> scientific and engineering students, start-up owners; people changing careers, etc.</p> <p><b>Providers:</b> universities, associations, academies, other NGOs, etc.</p> <p><b>Payers:</b> government, associations, companies, VCs and angel investors, etc.</p>

Our strategic intent is to:	Essence of an idea
Our sources of revenue will be:	Government, VCs, angel investors, companies, corporations
We will minimize competitors by	Existing network of human capital and practice, flexible processes, more cost effective training
We will create it by:	Volunteer business expertise and competence, distributed knowledge, value co-creation
We will deliver it via:	All Stakeholder's networks
We will market it by:	By student networks and organizations, stakeholder's networks, higher yield of results in starting-up,

The development of the strategic plan, its communication to all stakeholders and its execution is another opportunity for analysis, planning, modelling, execution and improvement of the work while studying. To this purpose we are using the System of Balanced Scorecard (Balanced scorecard) [6, 7]. It encompasses four areas – knowledge about and development of the organization, its internal processes, customers and finances. The different stages and sequence in the development of the strategy are shown on Figure 5.

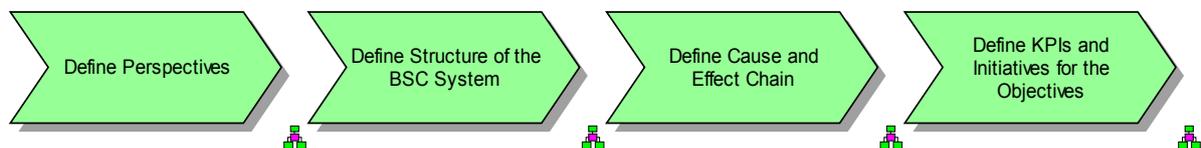


Figure 4 BSC strategy phases

Organizational chart of the Graduate Student Companies in Europe (JA-YE Europe) is shown on Figure 5. The strategic goals for every stage of the balanced scorecard system have been defined as shown on figure 7.

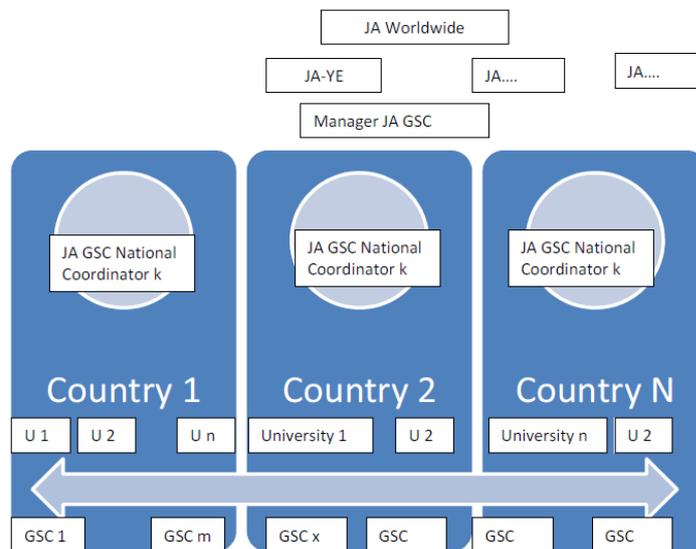


Figure 5 JA-YE Organizational Chart

We have modelled also and created the strategic goal of an appropriate structure for innovation for GSC education – Table 4.

**Table 4** An appropriate structure for innovation for GSC education

	Potential	structures
Stimulate	GSC	Stakeholders
Shepherd	JA - YE	JA-YE European Council
Spearhead	GSC Incubators	JA-YE European Competition
Stringent	GSC National Coordination	GSC Development team

We conducted a SWOT analysis and defined strategic goals for every one of the Balanced Scorecard fields – Figure 6.

### JA-YE GSC Strategy

Leading goals	<b>Learning &amp; Growth</b> <ul style="list-style-type: none"> <li>• Talented, open minded and highly competent staff</li> <li>• Leadership</li> <li>• Mobile and Communicative</li> <li>• Visionary and Risk Taking</li> <li>• Transparent Organization</li> <li>• Open standard ICT infrastructure</li> </ul>	<b>Internal Processes</b> <ul style="list-style-type: none"> <li>• Innovation</li> <li>• Teamwork</li> <li>• Synergy</li> <li>• Carrier growth/path</li> <li>• In real environment</li> <li>• Creating added value</li> <li>• Incubating business start up</li> </ul>
	<b>Stakeholders</b> <ul style="list-style-type: none"> <li>• Improve the ecosystem</li> <li>• University-Business collaboration</li> <li>• Creating opportunities for policy making</li> <li>• Long term positioning and impact in the society</li> <li>• Family support</li> </ul>	<b>Finance</b> <ul style="list-style-type: none"> <li>• Business sponsorship</li> <li>• Financial efficiency in real environment</li> <li>• ROI</li> <li>• Real Business Start Up</li> </ul>
Lagging goals		

**Figure 6** JA-YE GSC Strategy

The work on the modelling and implementation of the Balanced Scorecard system is being further developed.

## 5. Conclusions

Based on the presented results and the feedback provided by the different stakeholders we can reach the following conclusions:

- The education based on the presented methodology and processes has a strong competitive advantage when teaching entrepreneurship, especially in specialties orientated at engineering and technology faculties;
- The Graduate Student Company attracts the most innovative and motivated students and the educational process is very attractive and can be recognised as best practice;
- The Graduate Student Company has the potential to position itself as an open and disruptive innovation model for active practical education of students from different levels/degrees of education.

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# Exploring the collaboration between industry and academia in South-Eastern Europe within the scope of the I-SEEMob project

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Collaboration between industry and academia, as one of the cornerstones of innovation, is becoming one of the central points of European research policies. Increasing knowledge transfer between academia and industry is a key goal of the European Commission's innovation plan and it is thus important to understand the level of communication between these two sectors, their motivation for mutual collaboration and the barriers that exist to such collaboration. This paper examines the level of inter- sectoral collaboration in eight countries of South-Eastern Europe from both points of view – academia's and industries. The paper further explores both stakeholders' motivation for collaboration, satisfaction with existing connections and the barriers they both perceive as impeding to better collaboration. In order to contribute to the development of researchers' careers, the paper also addresses the additional skills that researchers need to acquire in order to be more attractive to the private sector.

## 1. Introduction

Co-operation between industry and science is considered one of the most important elements of the innovation system due to its expected positive effect on a company's innovative potential. Since launching the European Research Area (ERA) initiative in 2000, the European Commission has concentrated on the need to create a more favourable environment for transnational and inter-sectoral mobility of researchers as an inherent element of the greater agenda to establish a European knowledge-based society. According to the Green Paper on the 'European Research Area: New Perspectives', one of the features the ERA should have is "*an adequate flow of competent researchers with high-levels of mobility between institutions, disciplines, sectors and industries*" [1]. Nowadays more than ever, the EU puts a special emphasis on the collaboration of research with industry. The Europe 2020 Strategy, adopted by the Council of the European Union in June 2010, puts forward three priorities: Smart growth: developing an economy based on knowledge and innovation; Sustainable growth: promoting a more resource efficient, greener and more competitive economy; and Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion [2]. In order to initiate progress on the headline targets, the European Commission put forward seven flagship initiatives. Among the first to be launched was the Innovation Union, to improve framework conditions for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs. Concretely, the Innovation Union proposed, among other, that the "*cooperation between the worlds of science and the world of business must be enhanced, obstacles removed and incentives put in place*" [3].

Since most existing studies on cooperation between science and industry were conducted in developed economies, the results of the I-SEEMob project, examining this issue in eight South-Eastern European (SEE) countries, will be significant for the region.

## 2. About the I-SEEMob project

In accordance with the ERA objectives and priorities, the main goal of the I-SEEMob project is to contribute to the enhancement of the career development of R&D personnel in the ERA by examining the existing legal and research policy gaps hampering the inter-sectoral mobility of R&D personnel in the South-Eastern European countries participating in the consortium and, accordingly, provide recommendations and guidelines to the respective governments so as to raise the remaining obstacles and promote inter-sectoral mobility and the career development of researchers. The activities foreseen to be carried out are the following: a mapping exercise on the current state of industrial representation on R&D sector in SEE and its respective needs; a legislation gap analysis which will examine the legislative framework for career development of researchers in SEE; development of policy guidelines for the formulation of common research policies for enhancing the inter-sectoral mobility of researchers and, finally, establishment of a set of networking initiatives with other relevant national and European networks.

The consortium consists of nine governmental and public research organisations from eight countries: Greece, Bulgaria, Turkey, Romania, FYR of Macedonia, Serbia, Bosnia & Herzegovina and Croatia (see Table 1).

<b>Organisation Full Name</b>	<b>Organisation Acronym</b>	<b>Country</b>
General Secretariat for Research and Technology	GSRT	Greece
Centre for Research and Technology Hellas	CERTH	Greece
The Scientific and Technological Research Council of Turkey	TUBITAK	Turkey
Sofia University "St. Kliment Ohridski"	SU-NIS	Bulgaria
University of Nis, Mechanical Engineering Faculty	MEF	Serbia
Agency for Mobility and EU Programmes	AMEUP	Croatia
Macedonian Academy of Sciences and Arts	MASA	FYR of Macedonia
Unitatea Executiva pentru Finantarea Invatamantului Superior si a Cercetarii Stiintifice Universitare	UEFISCSU	Romania
Ministry of Civil Affairs	MoCA	Bosnia and Herzegovina

**Table 1** Organisations of the I-SEEMob consortium

Although these South-Eastern European countries are challenged by similar issues, every country has an individual approach to Science and Technology policy-making regarding inter-sectoral mobility which the I-SEEMob project wishes to examine and provide recommendations pointing out their strengths and weaknesses. The most significant achievement of the I-SEEMob project will be the development of a set of policy recommendations to the national governments for improving and supporting the inter-sectoral mobility of R&D personnel and, thus, enhancing their career development.

The synthesis report that will be developed after the conclusion of the national reports will include the common inter-sectoral mobility challenges faced in today's South-Eastern Europe and provide policy recommendations to national and European research policy making bodies for their solution.

### 3. Methodology

The first phase of the I-SEEMob project encompassed a mapping exercise in the eight previously listed countries of industrial subjects which conduct R&D activities. For each country a priority industrial sector (or sectors) was chosen (see Table 2). These subjects were then approached in order to pinpoint a contact person in charge of those R&D activities who would take part in a survey on the needs of their company regarding R&D personnel and inter-sectoral cooperation. In total, 569 contacts in industrial subjects were identified and subsequently contacted (see Table 2).

Country	Chosen priority sectors	Number of identified contacts
GR	1. Information technologies- Telecommunications 2. Food industry 3. Pharmacy 4. Chemical industry 5. Metallurgy	122 contacts
TR	1. Biotechnology 2. Electronics 3. Materials 4. ICT	49 contacts
BG	all industrial sectors	30 contacts
RS	1. ICT 2. Energy Industry 3. Biotechnology 4. Materials 5. Civil Engineering Industry (constructions)	130 contacts
HR	all industrial sectors	85 contacts
MK	1. Biotechnology 2. Pharmacy 3. Metallurgy 4. Energy Industry 5. IT 6. Construction	54 contacts
RO	1. IT 2. Agriculture 3. Biotechnology 4. Healthcare & pharmaceutical 5. Security & defence industry	51 contacts
BA	all industrial sectors	48 contacts

**Table 2** National priority sectors for the mapping exercise and identified contacts

Using these contacts, as well as the already existing contacts in the academia sector of each partner in the consortium, a survey was conducted, focusing on (a) the needs of industry for additional skills and competencies researchers should acquire to make them more attractive as employees and cooperation partners to the industry sector and (b) both sectors' opinion on remaining barriers to inter-sectoral mobility. Two questionnaires were developed to survey the two sectors, one for industry subjects and one for academia representatives.

The survey is still ongoing, but the preliminary results already show some trends and opinions on inter-sectoral mobility in South-Eastern European countries. The preliminary results were based on the following number of responses (Table 4):

Country	Responses from industry	Responses from academia
RO	25	13
HR	16	195
RS	11	49
MK	11	22

Country	Responses from industry	Responses from academia
BG	8	0
GR	7	0
BH	5	2
TR	3	0

**Table 3** Number of responses by March 1st 2011

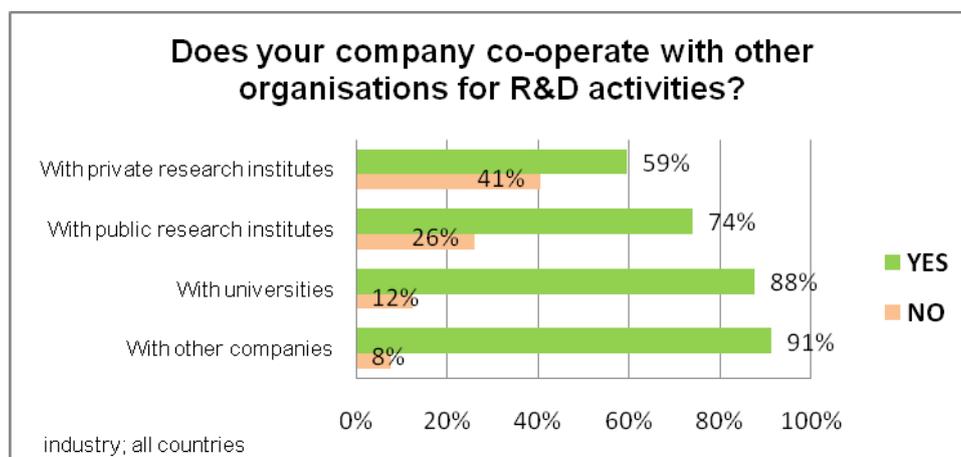
The respondents covered industry subjects of all sizes, 78% of which confirmed that they run a specialized R&D department. In almost two-thirds (64%) of those companies which have an R&D department, the company employs less than 10 researchers.

From academia the responses came from various fields, and mostly from public organisations – public universities and public research institutes. The respondents' positions in their respective organisations are diversified, ranging from assistants to full professors.

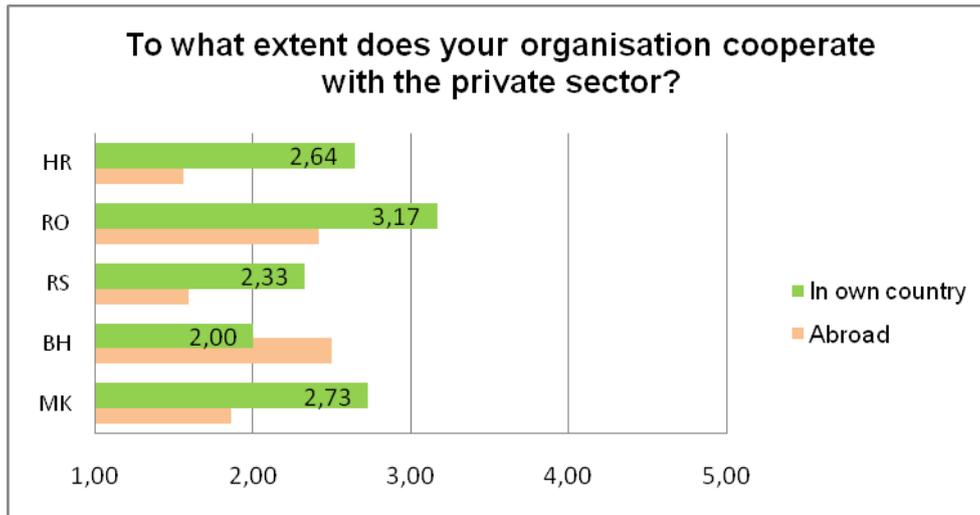
## 4. Results

### 4.1 Level of cooperation and satisfaction with the achieved cooperation

The results show that a majority of surveyed companies cooperates with other organisations for their R&D activities, mostly with other companies and universities. On the other hand, the academia respondents in all involved countries believe that their organisation cooperates with the private sector only to a small or moderate degree. The academics gave an even smaller value when asked about their opinion on inter-sectoral cooperation in their country in general. Conversely, they believe that they are more interested in inter-sectoral cooperation than industry subjects – on a scale from 1 to 5 (1 being the worst), they give their own interest a grade of 3,73, and they grade the perceived industry's interest with a 2,34.



**Figure 1** Level of cooperation; industry's view

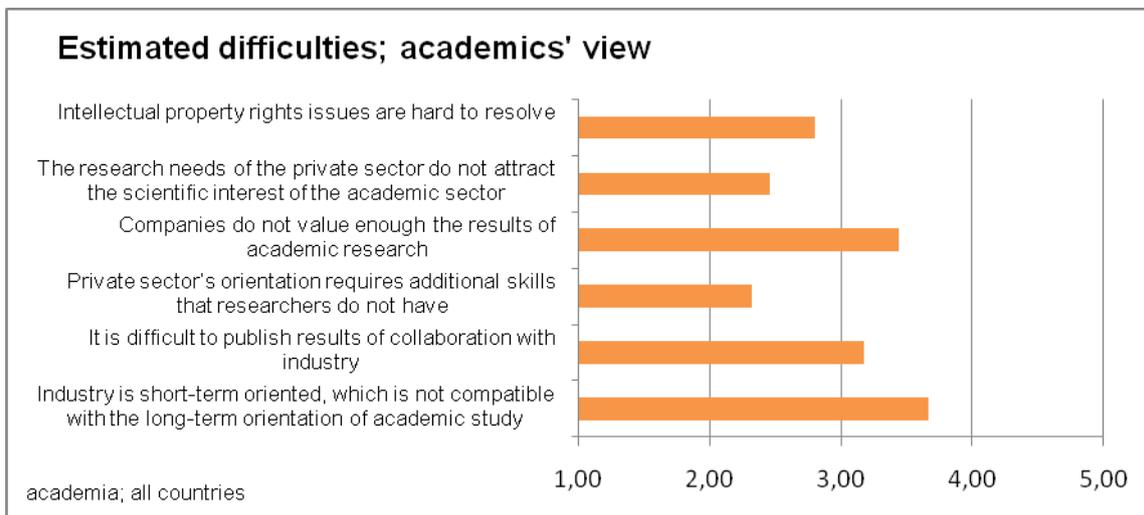


**Figure 2** Level of cooperation; academics' view

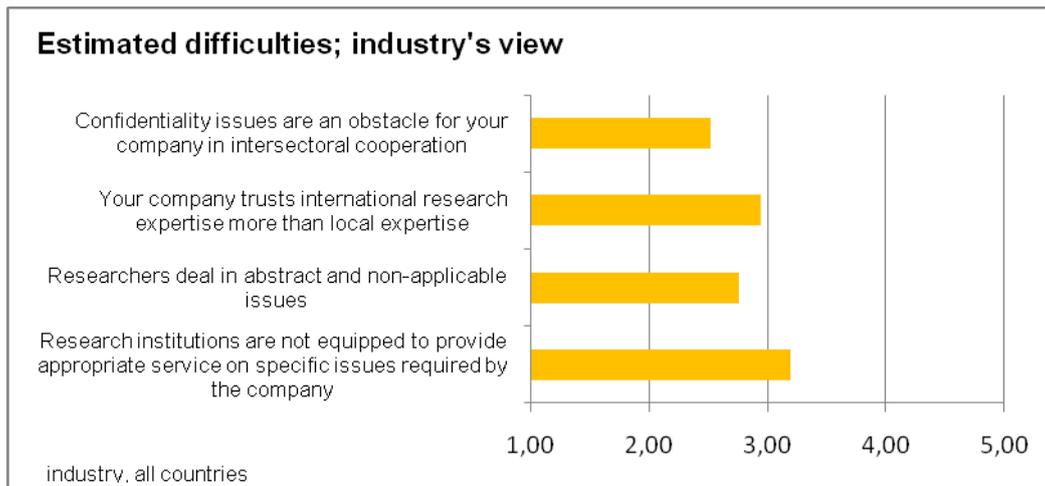
When asked about their satisfaction with the already achieved inter-sectoral cooperation, the industry gave a relatively high grade of 3.63 to the quality of the cooperation and 3.15 to the commercial value of the cooperation. The academics on the other hand gave a lower grade of 2.62 to the already achieved cooperation between their organisation and an industry subject. However, the 43% of the respondents in academia who have had a personal experience in inter-sectoral mobility report high levels of satisfaction with the experience – 50% were “very satisfied”, with a further 22% “satisfied”.

#### 4.2 Difficulties and how to overcome them

Both questionnaires contain the question on the perceived barriers to cooperation, asking the respondents from both sectors to grade them from 1 to 5 (1 being the lowest). These preliminary results show that the academics perceive the barriers as stronger than their counterparts in industry.

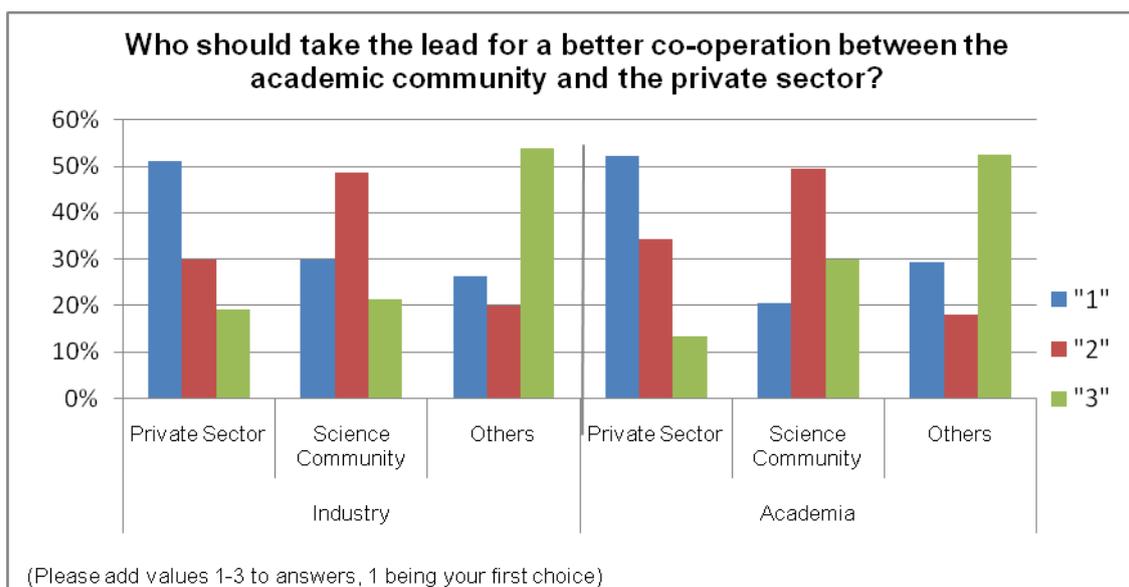


**Figure 3** The estimated barriers to cooperation from the academics' point of view



**Figure 4** The estimated barriers to cooperation from the industry's point of view

When representatives from both sectors were asked from where the initiative for better collaboration should come, they were given three choices: industry, academic community or third party (such as a liaison office, mediating agency etc.) and asked to rank those choices from 1 to 3 ("1" being their first choice). The cumulative answers for this question were very similar in both industry and academia, with both giving first choice to industry for taking the initiative to establish a better inter-sectoral collaboration.



**Figure 5** Opinions of both sectors on who should take the initiative for a better cooperation

### 4.3 Researchers' skills

Respondents from both sectors were further questioned on their opinion of their national education system and how it prepares researchers for work on the market, and specifically in the private sector. The questions examined the level to which young researchers possess particular skills necessary for work in industry (innovative thinking, computer literacy, technology transfer skills, team work, presentation and communication skills, knowledge of IPR, managerial and entrepreneurial skills), as well as the general level of knowledge received at universities (whether it is up-to-date, adequate for the market, as good as knowledge received in foreign institutions). The respondents from both sectors were asked to assign grades from 1 to 5 (1 being the lowest)

The industry's opinion of the received skills was higher than academia's, with the acquirement of four skills getting a grade higher than 3, and none lower than 2. The academia graded only the reception of two skills with a grade higher than 3, and most of the others around 2,2 – with the acquirement of knowledge of IPR graded with 1,68.

The general opinion of the quality of education received in national universities shows lower grades from both sectors, especially when asked about the adequate preparation of university graduates for work on the market.

## 5. Conclusions

The results shown here are preliminary, with more questionnaire responses coming in every day. The final results will be achieved with a multivariate statistical analysis, exploring in more depth the correlations between the variables.

These preliminary results however point to a more sceptical attitude of the academic community towards inter-sectoral cooperation – whilst they are interested in cooperation, they perceive more barriers than their counterparts in the private sector.

The study also shows several gaps in the education of young researchers and their preparation for work in or with the private sectors.

These indicators can serve towards concerted regional and national efforts in order to create and foster a better environment for inter-sectoral cooperation.

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# Strategy Europe 2020, the Concept of Knowledge Economy and Global Competitiveness of EU Economy

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Europe 2020 Strategic Document was adopted on 17 June 2010 the European Council meeting in Luxembourg. It is a document that should be not only "organic" as successor of such a strategic document - the Lisbon Strategy 2010 (inaugurated in March 2000), but essentially and qualitatively much more - you need to truly revitalize the strategic commitment of the Member States of the Union its global economic competitiveness, performance and relevance be based and built on the foundation of the concept of knowledge economy.

Research - empirical knowledge unambiguously confirmed in the EU that higher rates of growth of rival global economies are basically due to their higher level of competitiveness in global markets, and that higher level of competition is essentially the most direct product of a thorough and highly successful installation and developing economies such as economies of knowledge.

Europe 2020 document is (only) defined as "Strategy for smart, sustainable and inclusive growth," and very similar to the Lisbon Strategy 2010, is based on three basic groups of priorities:

1st Smart growth - through knowledge - based economy and innovation;

2nd Sustainable growth - through the "green" economy, based on more resources to be environmentally friendly - sustainable climate and, 3rd Inclusive growth – achieving high employment, followed by social and regional cohesion.

## Keywords

Concept of knowledge economy, Europe 2020, Lisbon 2010, Scientific research and innovation, Smart growth.

## 1. Introduction

Strategy Europe 2020 as the successor of the Lisbon Strategy in 2010 cannot be based on the same tenets of which was grounded and the Lisbon strategy, as it cannot and does not share the same goals. Europe 2020 and the Strategy and the Lisbon Strategy in 2010 have the same generic nature and background - as fundamentally important strategic documents founded to build and ensure stable and sustainable high growth economy EU level developed globally competitive economies. The emphasis that this growth should be competitive with the growth of developed economies globally competitive, which primarily refers to the economies of the U.S. and Japan (despite all the current problems that they face), he clearly and obviously implies a very significant refinement which must in this place to emphasize elementary. Namely, "cosmic" rate of growth of rapidly growing economies such as those of group BRIC (Brazil, Russia, India and China) or those of the G-5 (Brazil, India, China, Mexico and South Africa), or some other rapidly growing economies really are not members of some more formally established and transparent (narrower) groups of countries, but, meanwhile, are members of the G-20 - the first hint of Turkey, not simply reference the rates of growth the developed

economies. Clearly the enormously high rates of growth of rapidly growing economies (eg, those almost two-digit growth rates) are possible within the social - economic conditions of developing and implementing economic - development policies that are characterized by low initial level of (no) development.

Despite such social - economic conditionality within the socio - economic backgrounds developed, most realistic looking and judging, it is impossible for the developed economies, or social - economically developed societies, to achieve those growth rates that are characteristic of rapidly growing economies - they are such (rapidly growing) economies due to poor or socially - economic low, initial level of the base on which the calculated rates of growth. His remark is essential and permanent need to have in mind when the comparative and competitive context are talking about growth rates - growth rates of developed economies versus rates of growth in underdeveloped economies (emerging economies). In this paper when talking about growth rates of the EU economy (or economies of EU countries) or never explicated, nor imply "naked" comparison between the calculated growth rates of developed economies versus developing economies (rapidly growing economies) . Therefore at the very beginning of this introduction stated that the growth rates of the EU economy has real economic - sense and scientific justification competitively to compare growth rates globally - competitive economies, which, quite normal and understandable, we primarily the economies of the United States and Japan. So, the strategy Europe 2020, taking, developing the postulates, tasks and goals of the Lisbon Strategy 2010, to enable rehabilitation and resuscitation rates of growth of the European economy that it will be competitive in terms of growth rates of competing (developed global ) economies.

## **2. Global competitiveness of the German economy - anticipation of meaning and justification of Europe Strategy 2020**

Strategy Europe 2020 is produced within the European Commission ("government" of the EU) was officially submitted as a proposal to the European Council (comprising the heads of states or governments of the Member States of the Union) on March 3, 2010, and by Council was adopted at a summit in Luxembourg on June 17, 2010.

Strategy Europe 2020 contains the defined objectives of the Union in the area of social - economic relations, which would need to be implemented in the coming ten years - so by 2020. These goals largely essentially identical with the goals specified in the Lisbon Strategy 2010, which is quite normal when we know the undeniable fact that the strategy Europe 2020 should be a kind of resuscitation and revitalization of the Lisbon strategy 2010th I really do not have to specifically indicate that the overlapping objectives defined in two successive strategies has its genesis in an obvious fact, which causes very great dissatisfaction, even resignation to the Union - the goals of the Lisbon Strategy[1] is not implemented (in the period 2000 - 2010) at the required level and quality required dictate that real social - economic situation in EU countries, and current global (world) social - economic conditions and trends. This statement is a separate specific gravity obtained by the impact of the global (Stagg - deflation - recession plus deflation) financial - economic crisis and by the impact of the crisis on the eurozone[2].

Speaking at the most basic level could be particularly noted that the first of the two mentioned crises (that of global financial - economic crisis) does not hit with equal weight the economies of EU countries, some economies from the crisis came faster and some slower, extremely obviously is in this sense that, for example, the German economy, which was not seriously threatened by the crisis short of it came out pretty revitalized and has extremely serious and respectable growth rates of GDP, of course, on the basis of its export force, as a free single market of the Union, also, more importantly, and social - economic quality and far-reaching effects on the global market. The superiority of the German export economy, primarily set on the basis of proven quality of its products is upgraded in the early years of this century through reform of the German labor market - Hartz reform (Peter Hartz, who was head of the team that conceived and operational reform), conceived, conceptualized and modeled in four reform - successive steps (as it must be emphasized that the essence of the reforms contained in the fourth step - because the reform is best known as Hartz IV reform), which neo-liberal and consistently liberalized deregulating the German labor market, that he more flexible. Previous rigidity of labor markets in EU Member States, i.e. the complexity of the procedures for starting and termination of employment, together with the enormously high guaranteed employment rights (a phrase "enormously high" in this place we use to mean that it refers the ratio of capital to the obstacles to achieving quality possible competitive market position), especially at the end of the 90 s of the last century and the beginning of this century, it is actually one of the most important elements of T. us.

Americanization of the European Left are imposed on the European left ideological - political scene as one of the top (neoliberal) reformist priorities. Priority primarily determined by the necessity to achieve the maximum possible quality and high level of market competitiveness, and above all in terms of the price - it is the market price-cost necessity, along with, as one of the most important factors, the price of um, can be downloaded to, most realistic and objectively looking at, the lowest possible level[3]. By the way mentioned, a kind of paradox lies in the fact that reform was an expression of political will, determination and action of the coalition government whose main pillar was the German Social Democratic Party. So left government, but reformed left (social democratic) government, reformed in terms of t. us. Americanization of the European Left, ie the government ie. us. New Center (Social Democratic Party in Germany, at a time when its president was Gerhard Schroeder) or t. us. third time, or T. us. New laborizam (Labour Party in Britain at the time when its president was Tony Blair)[4]. The reform essentially means that the European left parties accepted, with some leveling, especially with regard to dienziite of key parameters, basically - neoliberal, social - economic policies, they own policies (and, of course, with their ideological matrix) to the long line of neo-liberal tenets, abandoning the classical left (socialist, social democratic, Labour) piles tenets of the socio-economic policies.

The quality and competitiveness of the German economy, ie its exports, essentially laid the foundations of the German economy of knowledge (the organic unity of the scientific - research and knowledge of economics or the scientific - research and economic / business communities in Germany) are eventually the right answer question regarding the "secret" of success on the German economy through stag-deflation cycle of global financial - economic crisis not to suffer serious damage, quickly get out of it and realizes high post-crisis growth rates of GDP.

In the context of the theme of this analysis - the organic unity of the concept of the knowledge economy (defined first in Lisbon 2010, and then taken, developed and developing strategy in Europe 2020) and the global competitiveness of the EU economy / economies of member states EU, reserve the right to elaborate on the case of the German economy because it is exactly the best example of successful design, conceptualization and modeling and practical application of the concept of knowledge economy and its absolute validity and importance as social - economic framework that determines very high level of global market competition (at a national or regional economy) and has such a level of GDP growth. Undeniable fact, especially in the context of the theme of this paper is that the objectives defined in the Lisbon strategy, and then basically taken, developed and developed in Europe Strategy 2020, are not actually related to the German economy in general and the German social - economic relations (conditions, trends, processes), because these goals have largely been a reality when it comes to the German economy and German society in general, as the economies and societies more advanced European economies, especially the Scandinavian ones. The goals identified and contained, first in Lisbon and then in Europe Strategy 2020 targets are actually related and should meet economies and societies of less developed economies and societies of member countries of the Union. Export competitiveness and strength of the German economy has also a very important feature which refer to a kind of liberation and security of the fiscal policy of the German government, understood in the sense that there is a need / necessity of entering a larger budget deficit. Namely, the global financial - economic crisis proved too obvious and confirmed that the global neoliberal capitalism is deficient and failure in terms of its financial - economic crisis. The crisis is not overcome indigenous market. Laws of neo-liberal market ("steel" and "invisible"), or the autonomy of markets, are exposed and are certified as incompetent and irrelevant in critical conditions. Because inevitably imposed necessity of heteronomy counter crisis intervention. The only institution that could do it was the state or its interventionism. This interventionism, this must be strongly emphasized, contrary to the postulates of the maximum freedom of "steel" market rules - (rational) Maximum liberalized and deregulated markets, immediately apply the outset of the crisis, even then the administration of George W . Bush (Secretary of the Treasury, or finance minister, in those moments was Henry Paulson), ideological administration - was the outstanding political opposite - that neoliberal. Counter crisis state interventionism, obviously that was proposed and favored by the president of the Federal Reserve (ie the U.S. central bank) Ben Bernanke - and the fact that just like the neo-liberal ideology was eligible to be nominated by President Bush for his position as chairman of the Federal Reserve. We want this way, and that the most basic possible level, to say, to document and argument that global financial - economic crisis very clearly demonstrated deficiency and counter insufficientnost crisis of neo-liberal market, and the necessity of counter-crisis intervention the neoliberal state[5]. It is a state interventionism essential set of postulates of the theory of John Maynard Keynes, at which practically the only counter Crisis / counter recession / counter stag deflation (specifically when it comes to the global nature of financial - economic crisis, a phrase first stag deflation has used Nouriel Roubini ) macroeconomic policy is the policy of state interventionism,

which through activation of counter-crisis monetary and fiscal policy (their leisure) must necessarily (if it wants to overcome the crisis recession ) to raise the level of aggregate consumption, which in turn continues to be appropriate to raise the level of aggregate demand, both elemental and fundamental prerequisite for revitalizing the economy crisis facing a crisis situation, with knowingly accepting parallel, of course - however, as the lesser evil in the given socio - economic and financial circumstances, quite patronizing the growth of the budget deficit and the loss in value (depreciation) of currency. Just as an illustration of this depreciation: Federal Reserve (with Chairman Ben Bernanke) got her off its reference interest rate of only 0.25%, Bank of England (with Governor Mervyn King) removed the reference rate at 0.5%, while the European Central Bank (President Jean - Claude Trichet) removed reference rate of 1%. By the way, the recognition by the neo-liberals (and neo-liberal theorists among the academic community, and neo-liberal ideological profiled politicians) that the neo-liberal market does not have an autonomous capacity and counter crisis mechanism and that inevitably must be activated counter crisis capacity and mechanism of state interventionism was extremely relevant and valid facts and arguments for sentence - paraphrased: "The global financial - economic crisis and its efforts to counter any crisis violation (and theorists and politicians) did supporters of the theory of Keynes". Simultaneously, the necessity of acceptance and practical application of the concept of counter Keuness for solving global crises financial - economic crisis forced the neo-liberals, at least as inevitably require some kind of counter-crisis management, to accept the deeply hated responsibilities and powers of the capitalist state interventionism, ie (state) capitalist "big government"[6]. Returning to the problem of the German experience with global financial - economic crisis, and look at this problem defined especially in light of global competitive power of the German economy, primarily have a very strong conclusion that generally speaking the German Bundesliga government and the bank did not have to enter the adventure of a large budget deficit, simply because of the global export strength / power of the German economy. Exactly because of that force, precisely because of that power, the government and the bank did not have to raise the level of domestic aggregate consumption, aggregate demand, ie, using / relaxation of fiscal and monetary policy, at least not on the level and extent as that forced the U.S. government and Federal Reserve. Not that the German government in crisis global stag deflation conditions are reached for the application of instruments of a package of state interventionism of Keynes, but their sizes were not so much to produce larger budget deficit. Government, for example, subsidize automobile industry (in the crisis was particularly problematic Concern Opel, but his government helping to terms with one course - informal, protective clause: even the smallest part of the assistance does not redirect to a total crisis ailing U.S. concern Chrysler, which was the majority shareholder in Opel), of course because it is an industry that is highly export, increased trade surplus, a large number of employees, self binds a number of other industries and trades and so on. Global competitive strength / power of the German economy (in fact, the German economy of knowledge) is the fundamental reason for the fairly comfortable position in which the country found. Namely, the crisis conditions stag deflation German government and central bank were downgraded in a necessary situation through extremely high level of instrumentation (ie, relaxation) of fiscal and monetary policy to raise the level of aggregate domestic consumption, ie the level of domestic aggregate demand , thereby entering the risks of growing budget deficit. The fact, however, that Germany has no more budget deficit and enable very hard to perform in relation to the actual definition of common policies of the Member States of the euro area, ie to seek and successfully impose gradual entry into the framework / conditions posed by the Stability Pact and growth of the eurozone. In this context, as an anecdote (but too serious anecdote) may be recalled the reaction of the Deputy Prime Minister of Greece Θεόδωρος Πάγκαλος (Theodoros Pangalos), who in moments of "draconian" German conditioning for the assistance that Greece has demanded the Union extremely resignation and "hysterically" nervous (in his well known style) will be called to look at and properly analyze (who actually uses that, exploited, manipulated... ") level of the German level of surplus versus deficit Greek in mutual trade. In this context, quite elementary, to notice that the height of the German trade surplus, ie, low budget deficit, the German government at the last summit of the G-20 (in Seoul in November 2010) put in the position of leader one of two diametrically opposing macroeconomic poles. Namely, there is Germany (with Wolfgang Schäuble as Minister of Finance) loudly, clearly and expressly advocated strongly for abandonment of a package of instruments of state interventionism of Keynes, ie to reduce the budget deficits that cause relaxation of fiscal policies, thus entering into direct conflict with the U.S. administration (with Timothy Geithner as Treasury Secretary) and her insistence indications regarding the dangers processes of post crisis recovery of the economy if we abandon the "doping" the arsenal of policies of state interventionism of the Keynes. So, to emphasize once again, by using the case of Germany, ie the strength / power of the global competitiveness of the German economy, concluding in a certain way, we want to illustrate and to emphasize several important features essential to the positive effects, especially in Business -

Financial crisis - economic circumstances produced by the high level of global competitive strength / power of a national (or regional - in the context of this theme is no essential difference) economy, a fundamental set, developed and upgraded as a knowledge economy.

### **3. The economic - sociological holizam of the Strategy Europe 2020 - goals, initiatives and components**

Immediately and inevitably there is a something that is of utmost importance when you need to determine the nature and mission or objectives of the strategy Europe 2020<sup>th</sup>[7] It is extremely obvious that the strategy in Europe 2020 overcame a holistic, or economic - sociological approach rather than an approach that would closely economically. The definition of growth in this document Europe 2020 is definitions that transcends narrow framework of economic growth, for example, defined as a specific growth rate of GDP[8].

Growth strategy is defined as: 1. smart - with substantial growth under such growth means founded and built the foundation of the concept of knowledge economy, the second sustainable - growth that will not cause environmental damage, but quite the opposite - growth that will be environmentally sustainable, and, third inclusive - growth that will contribute to the qualitative increase in the number of employees and growth that will be a function of regional and social cohesion - in fact, cohesion policy and the EU Cohesion Fund occupy very important place in the range of policies of the Union.

The bottom line, with full rights can be brought successfully to argue and defend the claim that in fact the need for social cohesion is the ultimate goal and ultimate interest to be achieved through a multitude of separate objectives defined in the document Europe 2020[9]. The required level of social cohesion may never otherwise be achieved except through the mechanism of social inclusion, or by reducing the level of negative impact on all relevant social reality existing differences, competition and conflict.

We think we can talk for a few most significant that is the most important and most essential goals, and a few with the same meaning and importance of such initiatives, contained in the strategic document Europe 2020<sup>th</sup>.

These objectives could the next "tight" way to recognize and define: increasing the rate of employees aged 20-64 years from the current 69% to at least 75%; realization of the goal of investing 3% of GDP research and development, reducing emissions that cause greenhouse gases by at least 20% compared with the level of 1990 or 30% if conditions are favorable move in that direction, raising the share of energy from renewable sources in the whole of energy consumption of 20% and achieve 20% increase in energy efficiency, reducing early school leaving to 10% compared to the current 15% and raising the level of the population aged 30-34 years who have completed tertiary education 31% of at least 40% reduction in the number of Europeans living below national poverty line of 25% and extraction of 20 million people out of poverty.

Also, despite the most essential goals of the Strategy Europe 2020, and closely related to them, can identify a few most essential and most significant initiatives contained in it: Union innovative - improving the framework conditions and moves in the area of finance research and innovation ; youth movement - changing the characteristics of education systems and strengthen the international attractiveness of higher education in Europe, European digital agenda - further accelerating the broad - the Internet and explain the benefits of utilizing digital single market for households and firms; Europe with efficient resource - helping economic growth through exploitation of available resources, decarbonization of the economy, increase the use of renewable resources, modernization of the transport sector and promote energy efficiency, industrial policy for an era of globalization - raising to a higher level of business environment, especially for small and medium enterprises; agenda for new skills and work - modernizing the labor market to facilitate labor mobility and to develop skills throughout life; European platform against poverty - through achieving social and regional cohesion.

All this is in fact contained in the name of the strategy - in her very precisely defining direct and flagrant as a strategy for smart, sustainable and inclusive growth. Through the implementation of the strategy should ensure the achievement of growth is essentially based on three components contained in it, that he should be founded on three pillars: the economy of knowledge / smart economics, "green" economy / sustainable economy, reducing the rate of unemployment, together with the achievement of fundamental socio - economic and regional cohesion and achieve higher levels of social inclusion in the Union.

## 4. Conclusion

Strategy Europe 2020, as "a strategy for smart, sustainable and inclusive growth" in reality should be relevant and worthy response to the European Union, cardinal and crucial challenge of the situation, trends and developments in the global economy. In fact, it should not only be the basis on which to build growth in the European economy and its global competitiveness, but has far wider coverage and social function - they should, ultimately, dramatically raise the quality of social inclusion and social cohesion of European societies.

Strategy Europe 2020 must necessarily be seen and understood in relation to the Lisbon strategy 2010<sup>th</sup>. In essence, the strategy intends Europe 2020 is an attempt to revitalization the Lisbon Strategy 2010<sup>th</sup>. Indeed, more than obvious conclusion, and it is aware of her share and the highest representatives of the Union, that, speaking at the level of the Union, it is quite unsatisfactory level of implementation of the majority of the commitments and objectives contained in the Lisbon strategy especially those essential-sublimated through the upgrading of European economies as a knowledge economy.

Indeed, in some EU countries, primarily about economic / social - economically more developed countries - for example, Germany and Scandinavian countries, key and essential goals of the Lisbon strategy a reality. Indeed, one could say, without any greater danger would be unjust and would be wrong to say it is a reality that is independent of the Lisbon strategy. For the fact is that in these more developed countries of the EU objectives and goals of the Lisbon strategy was designed, conceived and practically - politically defined and implemented by their political elites even before the official Lisbon 2010<sup>th</sup>

Strategy Europe 2020, as an heiress of the Lisbon Strategy 2010 actually like her specifically economic - sociological development, a concrete materialization in the form of a strategic document, the vision of Europe's political elite of the society (not just strict / close economic) growth European societies, as well as their competitive potentials and capacities in the modern world of globalization and universalization.

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# Some aspects regarding IP stimulation and awareness in the field of technology transfer, key position in regional development (Part I)

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The paper presents some aspects regarding IP in Romanian universities and research institutes, establishing a stimulation and awareness methodology of the innovative spirit at level of researchers such as: teaching professors, students, start-uppers, PhD and master students, young people, and others, so as to protect their research results. This principle was promoted at the WIPO reunion in The Hague in 2008, also in Iaşi, Romania, (2009) and Bucharest (2010). The purpose of these reunions was to establish a road-map in order to introduce IP knowledge in universities, steps to realise high performance innovative products, with protected IP rights. All these performing products can be realised within entities like technological and business incubators or technology transfer centres that exist in Romania.

## Keywords

Networking, innovation and R&D, Intellectual Property, technology transfer

## 1. Introduction

The numerous challenges of the new century call for new approaches. One such challenge is in information technology, notably in the worldwide spread of the Internet use, and all the issues it raises in copyright and related rights, as well as in fair practice in industrial property, most urgently in the use of domain names. Another challenge is in the field of biotechnology, which has seen momentous breakthroughs in genetic engineering, generating questions that are not only of biological and technical order, but also human and ethical ones. The use of traditional knowledge and genetic resources is also evolving in ways that particularly affect the developing countries: it should bring rewards to the societies that produce it, as well as to its users.

Intellectual property in itself has always been an integral part of general economic, social and cultural development worldwide, but these new challenges emphasize all the more how globally interlinked national and regional intellectual property systems have become. Fresh approaches to meet the challenges have become correspondingly global, with concerted action at national, regional and international levels, to enable developing countries to participate in and benefit from technological advances.

Inventiveness and creativity are features which have favored the differentiation of mankind in the course of evolution from all other living species. The capacity to put these features to productive use continues to be of fundamental importance within the social and economic structures of human society. Indeed, the survival of any enterprise, organization, or even nation, may be said to essentially depend on its capacity to keep pace with development and progress.

## 2. Theoretical notions

*Innovation* is the creative process (generating ideas) followed by making the changes generated by it. Product or system innovation must be protected. The State Office for Inventions and Trademarks is the special body of the central public administration, subordinated to the Government, with sole authority to ensure protection of industrial property, which makes and submits to the government the development strategy of industrial property protection in Romania and also implements the Government policy in this area. The legal basis which entitles these above mentioned attributes is the Government Decree no 573/1998.

*Intellectual property (IP)* refers to mind creations: inventions, literary and artistic works, as well as symbols, names, images and designs used in commerce.

IP is divided into two categories: *a) Industrial property*, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source; *b) Copyright*, that includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works (drawings, paintings, photographs and sculptures) and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings and those of broadcasters in their radio and television programs.

IP has long been recognized and used by the industrialized countries and is being used by an ever increasing number of developing countries as an important tool of technological and economic development. Many developing countries are aware that it is in their best interest, on the one hand, to establish national industrial property systems where they do not exist and, on the other hand, to strengthen and upgrade the existing systems which, inherited from their historical past, are no longer adequately responding to new needs and priorities [1].

Countries have laws to protect industrial property for two main reasons, related to each other. The first one is to give statutory expression to the moral and economic rights of creators in their creations, and the other is to promote, as a deliberate act of government policy, creativity, dissemination and application of its result and, at the same time, to encourage fair trading, thus contributing to economic and social development. The materialization of IP protection is represented by *industrial property rights*, which allow the creator or owner of a patent or a brand to benefit from his work or investment. The industrial property rights are outlined in Article 27 of the Universal Declaration of Human Rights, which states that everyone should enjoy the protection of moral and material interests resulted from any scientific, literary or artistic production of which is the author. They reward the effort and creativity that are driving human progress.

*IP protection* is regulated mainly by the following laws: Law no 64/1991 on patents, GO no 41/1998 on property taxes in industry and their use approved by Law No.383/2002.

*Advantages*: a number of fee reductions for the legal protection of IP objects, according to the average gross monthly income on the last 12 months of the person (either applicant or holder) or depending on the turnover of the trader; profit or income through effective implementation in the country by the proprietor/by the licensees of inventions patented in Romania, including the manufacture of the product or, if necessary, application process is exempt from tax in the first 5 years after the first application, calculated from the beginning of the application and included in the patent validity. The patent holder, respectively individuals and / or legal persons are the ones that exploit the invention, by the above provisions benefits. The income obtained by the holder of the patent from the disposal is tax exempt.

IP rights offer opportunities for the creators of innovations to penetrate new markets with minimum risks and to amortize the investments made in the research that led to the innovations in the first place. In a practical sense, these innovations become the spearhead of some of the most advanced technologies.

*Patent* confers exclusive rights on an invention which may be a product or a process that offers a new way of doing something or to create a brand new technical solution so as to solve a problem. It ensures the protection of the invention holder, granted for a limited period, which generally is 20 years. *A patent holder has the right* to decide who can and who cannot use the patented invention for the whole duration of protection. He may, on the basis of a license, allow third parties to use the invention based on conditions mutually agreed. He may also sell the right on the invention to a third party who thereby becomes the patent holder.

No industrial property system, no matter how well its basic laws are drafted and efficiently implemented, can make an effective contribution to economic and technological development unless the system is known to, and used by, those for whose benefit it was established. An industrial property system is established to serve the needs of traders, manufacturers, industrialists, researchers, businessmen and consumers. The list of potential users and beneficiaries is inexhaustible and the

benefits to be derived from an effective use of industrial property cut across the sectoral lines within an economy.

An essential task is to promote industrial property among owners and users, as well as among potential owners and users, from the public and private sector, and, at the same time, the awareness of industrial property nature and how its main components can be developed and successfully exploited in commerce and industry, so as to enable the industrial property system to serve better the national interest and development goals.

An *efficient patent system* contributes to the stimulation of innovation in three main ways [2].

First, the existence of the patent system, with the possibility of obtaining the exclusive right for an invention to work for a limited period of time, constitutes an important incentive for the inventive and innovative activity.

Secondly, the limited period of time during which the patent owner is entitled to prevent others from using his invention creates an environment which facilitates the efficient development and utilization of patented inventions. It protects the inventor against uncontrolled competition from those who have not taken the initial financial risk. It thus creates conditions in which the risk capital can be safely advanced for the transformation of an invention into an innovation [2]. The inventor will be at ease to further develop the invention into a final, commercially polished, product or process that could be marketed and produce a benefit.

Thirdly, the patent system provides the framework for the collection, classification and dissemination of the richest store of technological information existing worldwide today. In other words, it contributes to the dissemination of new knowledge since the right of the inventor to prevent others from using his invention for a limited period is not freely granted. In return for the grant of a patent, the inventor must disclose to society the details of his invention. Thus, the information contained in a patent is available for research and experimental purposes (although not, for commercial use) by anyone, during the term of the patent grant. At patent deadline, the information falls into the public domain and is freely available for full commercial use by all [3, 4]. The patent system thereby contributes to the evolution of the technological base of industry.

Innovation is often influenced by the environment in which innovators work. The factors that generate a favorable overall environment for inventions and innovation are: the state of science and technology; the legal, fiscal and general financial systems; the scientific and entrepreneurial culture; the technological and manufacturing infrastructure; human resources and their level of knowledge and education.

The specific factors that influence innovation are represented by the relationships between universities, financial institutions, governmental offices and industry networks among others. Furthermore, the administrative and financial regulations governing the creation of new companies play an important role.

Since these factors can be influenced by national policies, the establishment of support services or a structure for invention and innovation should be considered as a governmental priority. At the same time, the national innovation support structures and programs for services should be viewed as a unified whole, with the main objective of increasing the capacity of society to generate inventions and innovations, including technology transfer, both at national and transnational level.

*Technology transfer* is the introduction or acquisition in the economic circuit of the technology and specific machines, equipment and facilities resulted from research, in view of new or improved processes, products or services, required by the market that induces an innovative behaviour, including the disseminate information, to explain, to transfer knowledge, to provide consulting and communicate with people who are not experts on the issue of basic research, applied and precompetitive research so as to increase the chances of applying such results, provided there was a results owner [5].

This is carried out by the network of innovation and technology transfer entities (*ReNITT*).

*The infrastructure of Innovation and Technology Transfer* was created and is functionally assessed and accredited by the National Authority for Scientific Research under GD no 406 / 2003 and aims to support economic and social development, foster innovation and technology transfer, attract investment to capitalize results of research and innovation, as well as human resources from the national research and development system.

Its role is to support SMEs and the interface between them, as beneficiaries and producers of innovation, "inventors" (natural or legal persons) represented by universities, research institutes and companies with research and development activity. Innovation and invention support structures and services have to develop their own type of management, with planning and policies depending on the circumstances prevailing in each country [3].

*Competitiveness* is a complex concept which, at a general level, expresses the ability of persons, companies, economies, regions to maintain competition on the internal and / or especially international scale, and to get, in terms of a specific business environment, economic benefits, resulted in constant increases of productivity and standard of living. As a result, one can speak about SMEs' *profitability*. Research has shown that SMEs can and should contribute considerably to employment creation and trade, which ultimately promote economic growth. It has also been shown that, given the opportunity, SMEs are innovative and competitive. However, SMEs need to be encouraged to take full advantage of the existing intellectual property protection system in order to compete more successfully in the global economy. This is a snapshot of economic activity, both at micro, and macro levels, and the extent to which companies are in the competition and are competitive. Functioning as a binding element and a balance between the potential, resources and costs, research-development networks support SMEs in their efforts [1,3,5].

## **2.1 Technology Transfer Centre**

As part of a research and development network, a *Technology Transfer Centre* is the entity whose business is to foster innovation and technology transfer for the purpose of placing into the economic circuit the obtained results, transformed into products, processes and new or improved services. Other results of technology transfer: the modernization of production, including manufacturing costs and lower economic resources, organization and management, production and services under the ISO quality standards, investment in industries of the future: IT / Hi-Tech; services / consultancy.

## **2.2 Technological and Business Incubator**

According to a definition of the European Committee, a Technological and Business Incubator is a place where, in a limited space, new created companies are concentrated. The incubators' objective is to increase, for these companies, the chances to grow up and survive time. This objective can be accomplished due to the supplying of modular spaces with common services (copiers, communication services and computers) and to an enrolment for specific services (production spaces having modern technology). The accent is stressed on local development and creation of new jobs, the technological orientation coming afterwards.

The Business Incubator represents a property initiative which assures a small office and/or manufacturing units for new or young companies. It usually assures a flexible work space for accessible prices, common services and direct affairs consulting, as well as access to specialized assistance (such as support in R&D and risk capital).

Business Incubators and Contractor Supporting Services help people become independent due to their own small business. The Contractors are persons who recognize opportunities. Once an opportunity is identified, the contractor's action line will be drawn. In other words, Business Incubators promote an environment where the new business can develop.

Business Incubators transform an idea into an opportunity. Once the idea is moving, the contractor's way is open and it is time to look for the working instruments. These instruments include business analyses, management, marketing and technological support. They also include business software, communication skills and presentation means [6].

The Incubation and Technological Transfer Program aim is to stimulate the sub-products (spin-off) and applications which develop the newest technologies in different research fields, all these in the actual context of R&D activities. One major objective is represented by the assurance that SMEs having no technologies now have opportunities to easily use advanced technologies. Another objective is to support the technologies' renewing and to help technology developers to learn from other sectors. Beside the offered spaces, the assistance includes presentations of affairs inside a network dealing with business and technical consulting that promotes legislation in the field, marketing, engineering, design, relationships with financial institutions, access to universities' resources and new business opportunities in cooperation with other incubator's clients.

In order to become one of the selected potentially valuable businesses, assisted within an incubator, a company is submitted to a rigorous analysis. Its stages are: the analysis of the economic potential to be incubated; the selection of the incubated company, depending on potential, interests, activity field; incubation with a coherent and steady program of support / collaboration activities; making the product in prototype phase; accreditation and technology transfer; consultation and logistic support; transfer from incubation to independent activity.

## 2.3 IP in Universities

Although different by their nature of activity, universities should not be seen as a self-centered system, but always take into account the labor market as a reference system compulsory to establish those landmarks necessary for self-definition in society. It should focus on the society's dynamic, graduates' development, the condition of secondary schools. Basically, the role of the university in society is to create culture. Moreover, for a contemporary approach, its role is also to provide welfare.

IP culture is an organizational value system resulting from an environment oriented to observing and protecting industrial / intellectual property. It consists of all the behavioral and professional reactions related to observing the right to intellectual property, reactions supported both by a law system and by a system of unwritten rules, structured over the time in institutions and society. As a result to a study performed in the most important universities, the academic environment does not consider IP culture very substantial in the Romanian universities. Some reactions are very rough and they can sometimes be conditioned by an exaggerated self-critical attitude of those interviewed. Anyway, the general conclusion is that, at this point, one cannot talk about authentic quality culture in the Romanian universities [2].

A possible manner to develop IP culture in universities is to identify those already existing successful practices and to generalize them. Taking into account that the university is very responsive to outside intrusions, it is highly advised that the IP techniques, methods, procedures, and methodologies that proved themselves efficient should be undertaken and, as much as possible, generalized at national level [7, 8]. The current state of Romania shows that there are many similar university reactions regarding the IP issue.

In this respect, universities should adopt IP policies according to the dominant activity profile. Therefore, the priority of technical universities should be to achieve and enhance their own inventions (the technical side should prevail), economical universities should promote evaluation and transfer procedures (the economic side should prevail), law universities should foster aspects related to defending and observing intellectual property (the legislative side should prevail) a. s. o. It would be wrong for universities to be offered a single orientation framework by the specific national organisms.

Concerning the IP issue in universities, it should be noted that [7]:

1. Generally, the Romanian universities have not managed to create an efficient and coherent way of thinking and acting regarding IP and, especially, regarding IP achievement and enhancement. There are no distinct and practiced university policies in the IP field.
2. Despite the important potential and the significant overweight on a national level, the contributions of the university researches to national production of inventions, brands, and industrial models are not so relevant.
3. The inventions achieved by university specialists have a higher confirmation rate than the national average and approaches especially top technical fields. This could be taken into account as a real starting point for improving the criteria of performances that are specific to top universities in the world evaluation.
4. In most universities, there are no adequate forms of training, informing and assistance in the IP field. Everyone seems to ignore the fact that universities (especially the technical ones) have significant human and operational potential that could produce inventions liable to be enhanced, could offer specialized evaluators and could help operational centers to enhance industrial property.

The main coordinates of a university policy in the field should envisage the following operational systems:

- A system for assuring industrial property culture (education, good practice, operative information);
- An assessment system (procedures, methods, specialists);
- A capitalization system (regulations, service patents);
- An evaluation system (cessions, licenses, know-how).

## 2.4 Why should we?

Because innovation has a strong impact on economic growth.

1. Impact upon productivity
  - R&D activities determine labour productivity growth, by introducing new technologies (products, processes).

- The impact of a new technology upon productivity depends on the complementary investments supposed by the organizational changes (structure, procedures, management modifications).
  - The impact upon growth also depends on the investment degree, at societal level, in training human resources.
2. R&D investment type
    - The most important effect on the economic growth by private companies, preferred as a result of some public initiatives.
    - Public investments in R&D have a positive effect on private investments, because they reduce the uncertainty degree and raise the recovery degree, expected as a result of the R&D investments made by the private companies.
  3. Impact. In the last 15-20 years, the scientific effort of the R&D activities (both private and public) in the industrial production have been oriented towards large impact “technological breakthroughs” (but of whose results are less frequent).
    - The impact has significantly increased, especially in the new industries area.
  4. Waiting time
    - The impact upon economic growth, as a result of increasing the industrial R&D investments made, becomes visible after approximately 3-5 years and this period is reducing rapidly.
    - The impact of the R&D public investments is visible only after 7-8 years, this period extending towards 20 years.
    - The complementarity with positive effects between the two types of investments (private and public) depends very much on the institutional characteristics and the linking mechanisms between the decisional factors of the two mentioned fields [9].

**Table 1** Differences between public and private R&D units:

	<b>PUBLIC</b>	<b>PRIVATE</b>
<b>PRIMARY GOAL</b>	<b>Knowledge production and circulation</b>	<b>Knowledge use in production</b>
Operational principles	Scientific freedom Priority rule Large scale dissemination	Industrial secret Hierarchical control
Typical results	Publications Scientific works Presentations in conferences	Prototypes Execution documentation Encoded application software
Waiting time	Long time No pressure time	Short and medium time Significant time pressure
Performance criteria	Precompetitive research Demonstrators	Aplicability Productibility (repetability) Measurability
Satisfaction followed	Free knowledge Scientific community Community value	Economic value

## **2.4 What should we?**

Peter F. Drucker found 7 stimulation sources of innovation [9]:

- Internal: Unforeseen events; Contradictions; Change of work process; Change of industrial structures and of market.
- External: Demographic changes; Changing the way of seeing the world; New knowledge emergence.

Main objectives:

1. setting up a network between the State Office for Inventions and Trademarks (OSIM), National Council for Scientific Research in Higher Education (CNCSIS) and Romanian universities, in order to allow and facilitate an inter-institutional information exchange and a practical framework able to stimulate research, ways of IP protection (using IP specific elements) and thorough use of research results;
2. setting up Technology Transfer Offices attached to certain universities; the TTOs will receive logistic support from OSIM and will have as main functions:

- to achieve an optimal bidirectional technology transfer between universities and the industrial and business environment at national and international level;
  - to develop strategies in order to stimulate and protect technical creation in universities and to enhance research results by means of patents;
  - to offer access to technological information in patent literature and to information on the legal status of protecting the technical creation; dissemination of such information;
  - to increase the awareness of the importance and role of industrial property protection within the Romanian academic environment;
  - to appoint representatives authorized by TTOs so as to display procedures to OSIM concerning the protection of the original technical creations developed by universities.
3. extending the teaching of an IP course module (optional) in technical and economic universities in Romania. OSIM will grant assistance for this action by offering:
    - specialized materials elaborated by OSIM specialized staff;
    - other relevant materials in the European and world-wide specialized literature;
    - training of specialized lecturers;
    - teaching courses or specific elements of courses by OSIM lecturers;
    - a project for developing an industrial property education system based on the concept of e-learning.
  4. ensuring access to European and international programs in the field of industrial property protection the rights for original creations made in universities;
  5. jointly organizing seminars, symposia and round tables on current and resonant topics concerning industrial property protection in technical fields, such as:
    - information technology and business environment;
    - biotechnologies;
    - nanotechnologies;
    - pharmaceutical products;
    - European patents, Community mark and design etc.
  6. including in the Draft Law on employees' inventions (which is currently being elaborated as a legislative initiative of OSIM) a special chapter concerning inventions made in the academic environment;
  7. setting up, within CNCSIS, an office of about 3 persons, that should coordinate, at national level, the patenting activity within universities;
  8. improving the current regulations with the purpose of increasing the importance of patents in awarding scientific degrees to university research staff and professors that are applicants and/or owners of those patents;
  9. providing, within the framework of the programs coordinated by CNCSIS, specific funds meant to support the patenting with OSIM, or, in case of special valuable inventions, for getting European patents with the European Patent Office or international patents.

CNCSIS and OSIM will elaborate annual collaboration programs meant to contribute to the stimulation of creativity and innovation in universities, to support the patenting process and to enhance the scientific research results, through specific transfers of technology and knowledge to the economic and business environment.

### 3. Conclusions

Innovative ideas used in new products and services, are essential to business success, increase the ability of businesses to obtain profits and to discover new opportunities so as to adapt to the rapid change, characteristic to globalization. If one would maintain current technological endowment of most SMEs, their risk of becoming uncompetitive quite soon is imminent. A real solution is provided by technology transfer centres, which by the nature of their activity, as they work with intellectual capital, allow SMEs to access both research results and funding sources for the implementation of new technologies /innovations.

The existence of business incubators inside universities, research institutes and R&D platforms, definitely stimulates the entrepreneurial initiative, improves the innovative spirit and contributes to regional technological development and economic growth.

The benefits resulted from the cooperation of SMEs with research centres, through the technology transfer entities, are very high. The effects are noticeable in the concrete economic results achieved by SMEs in the position that they manage to enforce or maintain on the market (the market share, quality of products /services) the positive effects generated in the chain at the level of national economy (raising the living standard of the population, increased exports).

The contribution to increasing awareness and interest towards the development of RDI activities by the economic agents and at legislative level, optimizing the technology transfer / industry ratio, promoting a culture about the importance of technology transfer, increasing the added value of production (technological and non - technological elements of innovation: organizational innovation, innovative marketing), promoting a knowledge-based dynamic market: regional innovation systems, clusters of innovative enterprises, participation in international networks so as to promote innovation, creating virtual collaborative systems and mechanisms, an integrated information system (web site, portal, database, e-newsletters), obtaining patents and registering trademarks, in direct collaboration with OSIM, encouraging public-private partnerships in order to attract capital to technological companies and start-up companies. All of these represent only some issues that recommend a Technology Transfer Centre or a Business incubator as a reliable partner both for the creators of innovation and its users.

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# Some aspects regarding IP stimulation and awareness in the field of technology transfer, key position in regional development (Part II)

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The simple presentation of the worldwide valuable facts regarding Intellectual Property (IP) and technology transfer is not enough, so the authors have decided to exemplify the facts. The article presents examples standing for the implementation of the IP stimulation methodology at University of Brasov level; how a Technological and Business Incubator, such as “Products and Technologies for Sustainable Energy”, can actually sustain the SMEs from within; explains what two technology transfer centers, one from Bucharest and the other from Cluj-Napoca, Romania, have done for the surrounding economic environment.

The authors are willing to convince the others of the importance of innovation, IP protection, technological development through technology transfer and money production, all coming out from exploiting IP rights.

## Keywords

Innovation and R&D, Intellectual Property, technology transfer, efficiency

## 1. Introduction

The present economy of Romania has been passing through the same crises as well as other countries have or already did, reason enough for SMEs to adopt measures to enrich resistance to potential waves due to new arrangements of the involved actors - clients, suppliers, competitors, the state and government institutions [1]. There are several solutions offered by specialists in the field, but for the present paper, the authors have chosen to analyze the viability of innovation stimulation theory, applied at company level, instead of macro level. If proven as functional at micro level, one could expect, in certain conditions, to generate a structure on which an economic viable program can be made, in order to re-launch the Romanian economy.

## 2. Case Study – IP Connections: University- ITA – CTT- Economy

### 2.1 CTT-CCIB

In the Chamber of Commerce and Industry of Bucharest there is a Technology Transfer Centre (CTT-CCIB) that was accredited by the Ministry of Education and Research – National Authority for Scientific Research (NASR), by Presidential Decision No. 9434/06.12.2007, as an entity member of ReNITT. It has the mission of supporting absorption of innovation in the economy and the purpose to provide services to promote technology transfer [2].

Its general objectives are: promoting technology transfer to increase competitiveness of products and services in light industry, furniture industry, electrical and electronics industry, the construction machinery and equipment, information and communication technology in the city of Bucharest.

Long-term objectives:

- CTT- CCIB integration into the national information and communication regarding demand and supply of technology transfer; provide technology transfer through knowledge transfer and staff training;
- development of partnerships between international European organizations, R&D units and SMEs in Romania;
- attracting more SMEs to benefit from technology transfer; increase public information on science and technology; training / human resources innovative improvements;
- increase the number of SMEs applying innovative technologies;
- increase the potential for technology absorption of the economic agents.

Short and medium term objectives:

- facilitating cooperation in research between R&D units, universities and industrial partners (in particular SMEs);
- training and development of culture of innovation in SMEs through seminars, courses, contact scholarships;
- involving SMEs in programs financed by the Romanian Government and international organizations through information and advice;
- promotion of science and technology specific activities through scientific events, promotional materials, trade fairs and exhibitions;
- organization of events to promote companies: "Ranking of R&D activity companies in Bucharest Municipality";
- improving the role of CTT- CCIB within the national information and communication system on technology transfer demand and supply;
- development of international partnerships between European organizations, R&D units and Romanian SMEs.

Target groups: SMEs, other companies, research units, institutions of higher education in the field; industry specialists who will be trained for the application of R&D results; specialists who want technological, economic training so as to establish a SME; SMEs and other economic agents, research units, higher education institutions in Romania and other countries of the European area that are interested to capitalize R&D results through technology transfer.

CTT- CCIB has been authorized to provide the following services:

- Technological information services, technology audit, technology forecasting and wakefulness;
- Support services and consulting for the operation of intellectual property rights;
- Support services and advice on legislation at national, European and international level;
- Support services to obtain funds through national and international programs;
- Identify partners from academic and research institutions;
- Provide access to specialized databases;
- Information on the national, regional and local priorities;
- Services for the organization of conferences, scientific events and specialized exhibitions;
- Information services on intellectual property.

In order to achieve the objectives of CTT-CCIB the following activities and services are planned during the period 2008-2011:

*Technology Transfer* ([www.ccib.ro/ctt](http://www.ccib.ro/ctt)):

- Creating an interactive stock exchange of demand and supply of technology in the fields of light industry, furniture industry, electrical and electronics industry, industry of machinery and equipment construction, information and communication technology, by creating a database that includes the demands of SMEs for technological products and another one covering the supply of technology products available;
- Creating a database with providers of support services for SMEs (information services, consulting services, assistance, training);
- Brokering contacts between companies, research establishments and universities to strengthen / develop their cooperation;
- Developing partnerships between R&D units, universities and industrial agents, especially SMEs;
- Support the development of innovative activity in SMEs;

- Providing assistance and consulting services on industrial property rights;
- Collaboration with other technology transfer entities to allow the access, as quickly as possible, of users to the innovation supply;
- Advanced training through workshops, roundtables, seminars etc.
- Dissemination of information:
- Provision of technological information through printed material, electronic material (CDs, email, website);
- Information - documentation in the technology fields: light industry, furniture, electrical and electronics, construction of machinery and equipment, communications and information technology;
- Organization of scientific events and exhibits;
- Promote R&D programs, supporting development of capacity to absorb and disseminate the RDI results in the economic environment.
- International Collaborations:
- Facilitate contacts between foreign investors, R&D units and SMEs;
- Organization of scientific events, bringing together researchers and potential foreign investors for research projects
- Facilitate contacts between companies, research institutions, foreign organizations;
- Identification / search of partners for European projects;

Services provided by CTT-CCIB for SMEs' business development and other economic agents:

- Providing general information about companies in the fields of activity: light industry, furniture, electrical and electronics, construction of machinery and equipment, information technology and communications;
- Organizing business meetings, presentations of companies, products and services;
- Assistance provided to SMEs to identify partners, domestic or external;
- Organizing campaigns for information / awareness on the opportunities of access to finance for SMEs;
- Supporting the internationalization of SMEs' business through their participation in trade missions organized by CCIB and international fairs and exhibitions.

## **2.2 ICIA-CENTI**

Another example of a Technology Transfer Center is given by CENTI, that is a department inside the Research Institute for Analytical Instrumentation Cluj-Napoca, ICIA, one of the three subsidiaries of the National Institute of R&D for Optoelectronics INOE2000 Bucharest.

CENTI was set up in 2004, at the initiative of the Romanian Education and Research Ministry (MECI). Due to its employees and external consultants, who have continuously developed their skills and experience, CENTI is able to provide professional consultancy in the following accredited activity fields:

1. environment;
2. medical instrumentation;
3. food;
4. non-conventional energies (bioenergy, biomass and alternative fuels).

CENTI has developed a very sustained and diversified activity, such as:

- market and feasibility studies, business plans for SMEs;
- professional consultancy for the SMEs that have been willing to modernize and retechnologize their activity;
- on-request identification of partners belonging to the academic field (universities, research institutes) as providers of applicable research results;
- technology transfer from research institutes to SMEs.

In 2006-2007, CENTI managed 2 important national technology transfer projects, which aimed to the transfer of the national research results belonging to an important Romanian research institute to different associations of SMEs that wanted to develop their activities.

- dissemination of the information regarding the national, regional and local priorities, by organizing several roundtables and workshops;

- organizer and co-organizer of several national and international workshops, conferences and summer schools.
- on-request access of SMEs to the specialized databases of CENTI.
- support regarding the participation of Romanian companies in economic missions and brokerage events.
- identification of financial resources and writing project proposals for SMEs.

As an example, CENTI has identified funding resources at the Romanian Administration of Environmental Funds and has written a project proposal for a local SME that aimed the control and reducing of the water pollution by modernizing the galvanization flux.

- partner in several projects belonging to the National Program for Research, Development and Innovation.

In 2008, CENTI became a partner organization of Enterprise Europe Network (EEN), as a member of the consortium of the Business Innovation Support Network Transylvania project- BISNet. As a EEN member, CENTI offers a large range of high quality integrated services, such as:

- dissemination of information regarding EU policies, programs and legislation; assistance in foreign business partner identification;
- organization of events related to communitarian information, participation in European projects competitions, innovation, IP;
- support regarding the SMEs participation in economic missions or brokerage events;
- assistance in writing project proposals for European financing competitions;
- services destined for boosting innovation, advanced technologies and technology transfer.

Beneficiaries: The target groups of CENTI are situated in the 12 counties of Transylvania region (RO1) and comprise: SMEs; large companies, entrepreneurial and sectoral associations; research and technology transfer institutions; universities.

For its activity and consequent results, in 2006, CENTI was awarded the prize of the Education and Research Ministry for the best results obtained by a Romanian technology transfer center.

### **2.3 Transilvania University & ITA Pro-Energ**

Intellectual creation has always been a relevant coordinate of the whole activity in Transilvania University of Braşov. The main organizational interest on stimulation and promotion of intellectual creativity has been influenced, in time, by objective factors like: law foresights, material and human resources, but also subjective, circumstantial ones like the importance of managerial vision on protection and valorisation of the intellectual creation, the authors' interest to protect their original creations.

Founded in 1993, "The Centre of Technologies, Inventors, and Business (C.T.I.B.) S.A.", activates mainly as an interface between the university and the business environment, on three dimensions [3]:

1. Micro-production and technology transfer:
  - Creating prototypes and experimental models resulted from scientific research papers;
  - Transferring technologies from the university to the business environment;
2. Inventors – encouraging students, researchers, and teachers and supporting innovative activities in the university environment;
3. Supporting entrepreneurial initiatives of student - innovators through activities specific to business incubators. C.T.I.B., through its Inventors Department, has had, since 2000, the status of Regional OSIM - PATLIB Centre focused on Industrial Property Promotion, disposing of engineers and consultant lawyers specialized in industrial property and certified by OSIM.

One has made an IP data base and has organised a „Best ideas contest”, with prizes for the best ideas sustained for patenting.

Starting with 2007, in Transilvania University has been working the Department of Legislation and Intellectual Property (DIP). The first important activity of DIP was to establish procedures and needed documents, to recognise, identify and register IP products. During its first year of activity (2008), DIP registered 38 patent applications from Transilvania University of Brasov, the authors being professors, PhD students as well as students involved in scientific research activities.

Taking into account the major importance of IP protection and the necessity of competitive information management in the IP field, DIP focuses on IP promotion by developing a service system that offers useful information regarding industrial / intellectual property protection. DIP performs activities of

didactic staff training and scientific research, as well as student training concerning activities of patenting and/or artistic creation protection, and also concerning documentation in the IP protection field.

DIP has its own headquarters, equipped with all necessary office facilities and a specialised staff. The department consists of two sections:

- Intellectual Property;
- Legislation and Permanent Development.

The department is assisted by a Scientific Council, consisting of professors, researchers, specialists in the main IP scientific fields, technical science and technologies, modern art, natural sciences, legislative sciences, etc. The role of this Scientific Council is to analyze intellectual property objects (intellectual creations) and industrial property objects, which are liable to be protected by copyright laws or IP rights, according to the law. This council also has to offer counselling regarding the opportunity of requesting protection.

The IP Department has the following strategic objectives:

1. Annually attracting to the University and forwarding to OSIM a number of minimum 20 patent applications;
2. Enhancing the obtained patents (starting with 2010);
3. Training for patent implementation at interested firms;
4. Contacting firms known as producers of tools / devices similar to the patented ones;
5. Training activities in the field of patenting and IP in all university departments, concentrating on training and promotion activities for senior, Master and PhD students;
6. Displaying the obtained results and the semi annual updates on the university website;
7. Quarterly dissemination activities of updated results within the IP Department;
8. According to the patent type, achieving prototypes and contributing with them at profile exhibitions with the purpose of patent enhancement;
9. Starting 2010, editing a magazine centred on Inventors related activities.

Within Technical Faculties, the study programs of the 2<sup>nd</sup> and 3<sup>rd</sup> years of study include courses and seminars about Intellectual Property- identifying IP objects, ways to protect and enhance them. Within the Faculty of Product Design and Robotics, the disciplines Invents, Fundamentals of Technical Creation and Creativity Techniques and Methods, include chapters on IP.

The Faculty of Law has a course on Intellectual Property Rights, while the Master Degree programs include themes in the field of IP.

The Doctoral School holds an Intellectual Property Course (176 PhD students in the first year and 30 in the 2<sup>nd</sup>) with the following chapter-themes: Legislation in the field of Intellectual Property; Identifying Intellectual Property Objectives; Documentary Researches in Databases related to Industrial Property Objects; Patent Applications and How to Describe a Patent, Ways to Evaluate and Enhance Inventions.

DPI activity has been centred on supporting the deposit of CBI (demand of patent), but also, in the same time, on offering consultancy in IP resort, dissemination of IP notions by using fliers, brochures, books, and opening a new information / documentation centre at the University's Technologic and Business Incubator .

The promotion and protection of IP activities, as well as the obtained results were presented in 2008 OSIM Annual Report, where Transilvania University occupied a top position, on one of the first places among innovative R&D entities and universities.

Since "Transilvania" University of Brasov has decided to do something concrete to stimulate and support innovation within SMEs, a Technological and Business Incubator "Products and Technologies for Sustainable Energy" (ITA Pro-Energy) was built within. It was certified to work in February 2008, by NASR and MECI and is presently affiliated to: ARoTT – Romanian Agency for Technological Transfer; RENITT, being as well an active participant in an international consortium belonging to Enterprise Europe Network, affiliated to the European Community.

ITA Pro-Energy was created to initiate and develop innovative companies, based on advanced technologies in the field of Sustainable Energy, especially in: industrial processes' energy efficiency, renewable energy systems and buildings' energy performance [4].

The strategic goals are: consolidation of relations between the university and the economic environment to increase economic competitiveness in the field of sustainable energy at the level of Development Region RO7, especially for SMEs; increase the implementation rhythm of innovative results due to the enforcement of loading advanced technologies for energy efficiency, for buildings' thermal rehabilitation and for developing renewable energy systems by the economic environment; efficient use of the economic and human potential existing inside the university and in the region, its

orientation toward advanced technologies in the field of sustainable energy; development of competence level and entrepreneurial spirit, especially for young people from the university, and support for physical implementation of innovative ideas, limiting thus the intelligence exodus.

The daily activities of ITA Pro-Energ consist of:

- incubation activities for investments and business;
- activities of technology transfer and entrepreneurial training;
- promotion of inventions and innovations; development of entrepreneurial spirit to the specialists community, researchers, professors, designers, students and also the stimulation of private initiative;
- attracting of private investment in the R&D field, creating new jobs in small companies;
- knowledge dissemination – organizing seminars, workshops, demonstrations; business consulting – analyses, offers, partnerships assurance, promotion etc.;
- specialized assistance – investments at product level, increasing efficiency for time to market;
- innovative ideas promotion by means of projects, training for writing successful projects, accessing finances due to eligible projects, partnerships assurance, promotion etc.;
- expressing of strategies for cooperation with local, regional and national authorities.

Following its goals and the very essence of a business incubator, ITA Pro-Energ offers its incubated SMEs all sorts of facilities, helping companies to start-up and evolve, preparing them for the most important confrontation, that with the real, competitive market.

Due to its activities, besides common spaces, ITA Pro-Energ provides:

- accomplishment and promoting of activities in the field of sustainable energy;
- partnerships building and financial incomes through grants;
- logistic support for the incubated companies and partnerships created in the national industry;
- prototyping and micro-production in the sustainable energy field;
- testing and homologation for products and materials in the sustainable energy field;
- presentation of products, systems and results at fairs, exhibitions, symposiums and / or publishing scientific paper works;
- promotion of offers and necessities of incubated companies, innovations, inventions and technological transfer requiring systems through its own network and also through partnerships, at national and international level;
- the support needed by SMEs to remain successful in the competitive environment;
- human resources improvement, training courses, dedicated software; a company's level mainly depends on the company's accessibility to competitive human resources.

At present time, there are 7 real incubated SMEs and another 8 virtually incubated ones. They all benefit from the facilities offered by the incubator and beyond any reasonable doubt, they have developed, already proved themselves on the market (although the time since incubation started has been quite short) and most definitely they will maintain their market share in the future, if not conquer more and more of the specific activity field layer.

### 3. Conclusions

The existence of business incubators near universities, research institutes, R&D platforms, definitely stimulates entrepreneurial initiative, improves the innovative spirit, and contributes to regional technological development and economic growth.

Big companies have their own resources, but they are distant in assuming the risks that emerge from a quick development of the innovative field. SMEs are more flexible and interested in sustaining innovative activities but, they have no human, material or financial sufficient resources that are vital for innovative process's ignition.

Through their services, the business incubators are a real supporting instrument for the new-born SMEs, hoping to evolve to the rank of recognized competitiveness elements on the market.

ITA Pro-Energ has directed its effort to perform this important operation especially in sustainable energy field, alternative solutions for heat pumps, wind turbines, PV panels.

Today, it offers to its incubated SMEs modern locations, offices endowed with all necessary facilities, training, consultancy (including on intellectual property rights), financial facilities, access to the micro-production and testing infrastructure, prototyping and micro-production workshops, modern

manufacturing line for products in the field of sustainable energy, testing – homologations laboratory, material testing and characterizing laboratory.

Through their work, the technology transfer centres offer the SMEs and industry the possibility to help each other in becoming even more performing than before, assuring financial support for the transactions through research projects that foreseen technology transfer as one of the final indicators. If transfer is not possible yet because of some unforeseen delays, then, at least IP rights are to be obtained. The possible provided help would consist of completing the file the inventors need to deposit at OSIM, in order to obtain protection rights, that is prepared with the help of the IP counsellors from these technology transfer centres.

One last thing, important to be emphasized: since one of the reasons for the creation of the National Network for Innovation and Technology Transfer (ReNITT) has been to provide support for SMEs and innovative entities, the services and assistance provided are usually free of charge, up to a point. Beyond that, the required fees are far below the market prices.

All in one, one might say that it is really convenient: well prepared employees, free of charge or low prices professional services, best possible results.

The authors think it is worth a while.

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# Green Innovation - Value Oriented Design

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The value-oriented innovative design for the complete life cycle – with the Concurrent Costing-/DFMA-tools (Design For Manufacture and Assembly) has proven to be particularly beneficial in the concept stage. This approach aims to reduce the complexity and number of parts within a component/module design via parts synthesis as well as fulfil ecological requirements. Complexity reduction is very important for the automotive industry (e. g.), which has to cope with an enormous increase in the number of models and variants. This paper shows successful results of industrial applications such as: Preventive improvements in costs, quality, teamwork, creativity, and enhanced project management, solving problems and challenges in the early stage of product design, balance between manufacturing costs vs. environmental requirements and quality.

## Keywords

Industrial application, Innovation, Life cycle design, Process optimisation, Teamwork-tool.

## 1. Introduction

We have now entered a time where global warming is an irreversible reality. A challenge of this magnitude calls for immediate and comprehensive response. The traditional automotive industry is a crucial part of this development. Will the traditional car companies go green? Sooner or later they will all have to be green – that is if they want to survive.

For the coming years, one solution to the problem could be the development of a value-oriented creative design for the complete life cycle, which fulfils ecological requirements and leads to: more creativity, fewer parts, less complexity, lower manufacturing costs, less weight, reduced CO2 emission, and better quality.



Figure 1 We can't stop climate change, but we can slow down climatic disaster [1]

Model	Bodies	Power trains	Paint-and-trim combinations	Factory-fitted options	Total number of variations	European sales 1 2002 [units]
Peugeot 206	3	8	70	5	1,739	596,531
VW Golf	3	16	221	26	1,999,813,504	595,466
Ford Focus	4	11	64	19	366,901,933	523,356
Renault Clio	2	10	57	9	81,588	502,497
Peugeot 307	4	8	70	9	41,590	441,468
GM Astra	4	11	83	14	27,088,176	440,567
GM Corsa	2	9	77	17	36,690,436	420,296
Fiat Punto	2	5	51	8	39,364	416,843
VW Polo	2	9	195	27	52,612,300,800	357,539
BMW 3-Series	3	18	280	45	64,081,043,660,000,000	350,723
Ford Fiesta	2	5	57	13	1,190,784	294,360
Renault Megane	2	6	52	14	3,451,968	261,383
Mercedes C-Class	2	16	312	59	1,131,454,740,000,000,000	254,836
Toyota Yaris	2	6	30	8	34,320	194,256
Fiat Stilo	3	7	93	25	10,854,698,500	173,453
Mercedes E-Class	2	15	285	70	3,347,807,348,000,000,000,000	157,584
Toyota Corolla	4	5	24	6	162,752	139,837
Nissan Micra	2	6	30	4	676	106,428
Mini (BMW)	1	5	418	44	50,977,207,350,000,000	105,617
Nissan Almera	3	5	30	5	3,036	87,474

**Figure 2** The challenge of product variety [2]

The fulfilment of ecological requirements, costs and quality of manufactured products are largely determined at the early phases of the design stage. The shift from a Just-in-Time production system to a value-oriented innovative design and development for the complete life cycle means that it is possible to cut life cycle costs (including the costs of logistics), improve quality at an early stage, reduce time to market and enhance customer satisfaction. Team- and value-oriented innovative design and development for the complete life cycle aims to reduce the complexity and number of parts within a component/module design via parts synthesis. Complexity reduction is crucial for the automotive industry, which has to cope with an enormous increase in the number of models and variants. Even with shared platforms, chassis, motors etc. the total number of variants has risen drastically, as for examples Figure 2.

The goal encompasses the development of the design, purchasing and the supplier network into a strategic function that is now regarded as a key tool for greater competitiveness and profitability in an increasingly global and exacting business economy. In order to meet these challenges, the need for new ways of fulfilling ecological requirements as well as increasing productivity and quality is evident, and includes recent developments in team- and value-oriented innovative design for the complete life cycle – with the Concurrent Costing-/DFMA-tools (Design For Manufacture and Assembly).

## 2. Value Oriented Innovative Design and Development for the Complete Life Cycle

Lean production (or lean management respectively) gained popularity in several waves. Its roots can be traced back to Toyota's just-in-time production. In 1990 the report of MIT's "International Motor Vehicle Program" (IMVP) was published as book under the title "The Machine that changed the World" [3]. It illustrated the principles of a production system, which was superior regarding productivity and quality and coined the term "lean production". Such a "Big Bang" had rarely been seen in this industry. Seminars and conferences on this topic as well as pilgrimages to Japan by legions of managers and consultants demonstrated the frantic activity resulting from attempts to close the gap. Books depicting new methods of management were published every few months – looking back this could be called a "wave of new methods", e. g. [4].

At the time sustainability was still a widely unknown concept. The majority of companies were too preoccupied with other matters (development of a global player etc.). The last three decades have been filled with numerous attempts to apply these concepts in German companies. However, this has only been partially successful, as [4]. Even today enormous efforts continue to be invested in the implementation of lean production. However, the early phase of the design stage determines ecological requirements, costs and quality of manufactured products and a large percentage of the design tasks are executed by the suppliers.

Costs for manufacturing processes could be lowered substantially. While they are preoccupied with getting their manufacturing process under control, they lack the focus necessary to facilitate improvement by redesign [5]. In order to be able to cope with the development of complex products,

the design, procurement and supply have to shape up to a mutual strategic network [6]. Suppliers are not only required to deliver just in time, but will also collaborate from the early stages of design onwards. Value-oriented innovative design and development for the complete life cycle closes the gaps between design, procurement as well as suppliers [7]. Therefore the tools for the design for the complete life cycle are very profitable – refer to [8] for detailed descriptions and results.

## **2.1 Design for the Complete Life Cycle**

Concurrent Costing®/Design For Manufacture and Assembly (CC/DFMA®) has been widely applied for the improvement of 'product profitability' by increasing manufacturing and assembly efficiency in the U.S.A. and now in Europe. Over 70 per cent of costs, quality and environmental impacts are determined during the early stages of design. CC/DFMA is a method for the value-oriented innovative design and development and is the only method for process and production orientated design, which promotes creativity [9]. The benefits are [5]:

- Team building in early stages and improved creative team work
- Enhanced quality and functional reliability
- Simplification of product design, leading to a reduction in costs / assembly time
- Integration of parts, resulting in a decreased number of parts
- Weight reduction
- Realisation of ecological requirements / sustainable manufacturing
- Reduced development time and shorter time to market

The tools of the CC/DFMA-software lead the team of experts methodically and step by step through the analysis and optimisation process, thereby supporting each procedure. A team consists, for example, of a project leader, designer, production planner, technology expert, after sales service, controlling, quality, procurement and supplier. The effects on costs of design decisions and potential future manufacturing problems will be quantified by the system. This gives the team direct feedback regarding the cost of their ideas and plans. The teamwork is speed up and, by having this direct feedback of improvement or deterioration, the time spent on product and process development is drastically reduced. In order to be able to cut complete life cycle costs at an early stage, the following teamwork-tools have been developed:

- DFM® Design for Manufacture
- DFA® Design for Assembly
- DFS® Design for Service
- DFE® Design for Environment (® of BDI and amc)

Considerations of environmental impact, recycling and disposal must take place at the early design stage. This relates to individual materials and processes in order to minimise material and energy use as well as to reduce toxic wastes that may occur during manufacture and from eventual disposal. The structure of the product must also be taken into account. This must also include the goal of a simple structure with a minimum number of different materials and parts, as well as an overall reduction in the amount of material used in manufacture. To tackle this issue, Design for Environment (DFE) has been developed and used successfully in different projects.

With the above mentioned tools, it is not only made possible to optimise one single aspect such as cost reduction for manufacturing proactively, but it also enables an overall optimised process over the whole live cycle of the new product, including the collaboration of the suppliers network. It begins with the complexity reduction and cost optimisation of the first step in manufacture and reaches right up to the optimisation of toxicity, energy and costs of the last step in recycling and disposal. This renders CC/DFMA a powerful management tool for both value-oriented innovative design and development for the complete life cycle, including the concurrent control of costs, and a strategic launch of new products [5], [6].

## **2.2 Design For Environment DFE at EDS in Germany**

The task of optimising products while at the same time minimising the impact on environment over the complete life cycle leads to a significant improvement of environmental characteristics by using DFE:

Reduced use of material, energy and emission, minimised scrap, easy to disassemble and to recycle, low in harmful substances and suitable for the environment and live cycle. Improved costs by using DFE: Manufacturing, assembly, service, disassembly, recycling and operational costs. Disassembly of old products is important and necessary because of:

- Removal of harmful substances or components
- Disassembly of components for re-use
- Disassembly of required parts according to legislation

The recycling company EDS GmbH uses DFE in many consulting projects ([1], [5], [6], [10]). Among the goals of the redesign were the ease of disassembly and saving of material. As an example Figure 3 shows a comparison of the actual design of a converter and the same converter, redesigned with DFE. The redesign results in reduced part count, disassembly time and costs, assembly time and costs, total weight and significant improved MET points (converter totally scraped / disposed from - 58,7 to -30 MET points; converter totally disassembled / recycled from -30 to -7,8 MET points). The result of the redesign of a converter is shown in Figure 4.

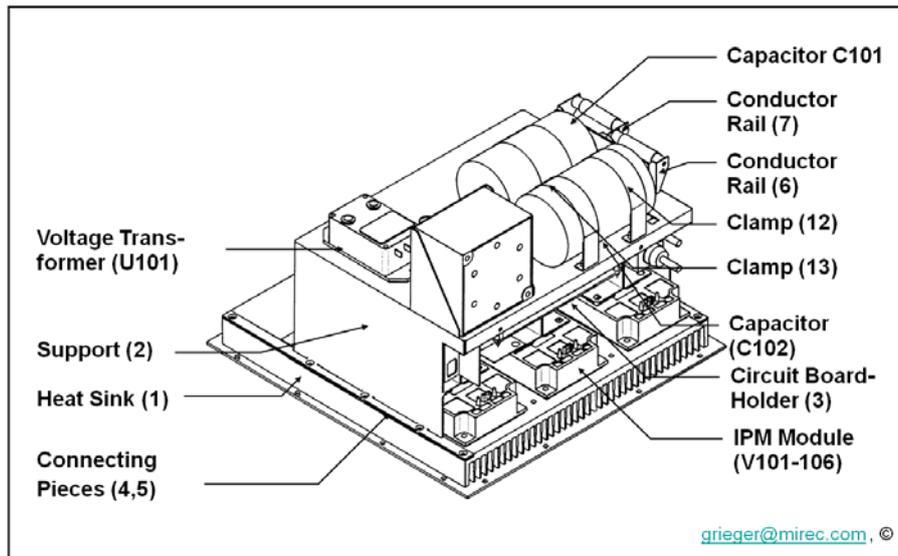
	Actual Design of Converter	Redesign with DFE	Average Reduction (%)
Part count	180	150	17
Disassembly time (s)	600	400	33
Disassembly costs (€)	ca. 5,00	ca. 3,30	33
Assembly time (s)	8450	7400	12
Assembly costs (€)	ca. 90	ca. 75	17
Total weight (kg)	32,6	29	11
MET points: converter totally scraped & disposed	- 58,7	- 30	49
MET points: convert. totally disassembled & recycled	- 30	- 7,8	74

**Figure 3** Comparison actual design and redesigned converter with DFE

The costs are calculated for the whole life cycle of the products with the DFMA tools, but DFE determines the environmental impact with a value-assessment, called MET points. They also display the use of material and energy and the toxicity. The material assessment considers the product's impact on the exhaustion of the earth's resources. The energy portion examines energy-related effects, such as the greenhouse effect, acidification, and smog. The toxicity factor measures toxic effects in terms of humans and ecotoxicity.

The MET points are used as an indicator to measure ecological implications of design choices in a quick and easy way, rather than providing an extensive analysis - it is not necessary to make ecological experts out of designers. They offer immediate results while maintaining a broad scope for the life cycle analysis and do not require a special ecological background. MET-points are a practical decision support tool, using a single figure indicator, which evaluate environmental effects. They are always negative. One MET-point is the equivalent effect of one average citizen on one day in a political desirable (or sustainable) situation (e.g. 1 kg of virgin ABS represents 1.16 MET).

As questions in the disassembly and environmental sections of the software are answered, step-by-step change-and-improvement options are presented along with the product structure, costs, and eco-



**Figure 4** Design of a converter

effects. A graphic display summarises the entire product analysis and allows tracking of disassembly costs with environmental impacts. Alternative designs or disassembly sequences can be compared on a single graph, allowing for various scenarios. The ecological line is the sum of all effects (production, incineration, landfill, rest fraction disposal, reuse, recycling).

### **2.3 Successful Concurrent Costing / DFMA Applications**

The CC/DFMA procedure as a preventive optimisation process is profitable when a new product has to be designed and marketed or if an existing one needs to be improved upon in order to meet new targets of costs and functions. Results of some applications are shown in the following [6], [8]:

- Automotive industry: Reductions of the number of parts and operations per glove box by 42 per cent, and of the assembly time and costs by 52 per cent [11].
- Electrical industry: Improvements of the DFA index, reduction of assembly time/production costs by 80 per cent and a part count reduction by 60 per cent.
- White goods industry: A project has been performed and implemented within a time span of only nine weeks. The results show significant product improvements, complexity reduction and savings of several million Euros.
- Designer products: This winner of nine design awards in one and a half years reduced the costs by 15.4 per cent and the number of parts by 23 per cent which is equivalent to a saving of 15 millions Euros [12].
- A redesign of the front end of an automobile saved more than 30 kg in weight. This reduction of the vehicle's dead weight will save 400 to 800 litres of petrol over its entire life-span, which represents a reduction between one to two tons of carbon dioxide emission and 30 kg of material less to recycle [6].

### **2.4 Case Study: Product Development System Automotive Industry**

The following 13 management principles of a product development system should include the fulfilment of ecological requirements in all essential points as listed below [13]:

1. Establish customer-defined value to separate value-added activity from waste.
2. Front-load the product development process while there is maximum design space to explore alternate solutions thoroughly.
3. Create a leveled product development process flow.
4. Utilize rigorous standardization to reduce variation, and create flexibility and predictable outcomes.
5. Develop a chief engineer system to integrate development from start to finish.

6. Organize to balance functional expertise and cross-functional integration.
7. Develop outstanding technical competence in all engineers.
8. Fully integrate suppliers into the product development system.
9. Build in learning and continuous improvement.
10. Create a culture to support excellence and relentless improvement.
11. Adapt technology to fit your people and processes.
12. Align your organization through simple, visual communication.
13. Use powerful tools for standardization and organizational learning.

The Toyota Prius, the first mass-produced hybrid car in the world, was introduced in Japan in 1997 and three years later in Europe. As the Prius was named “Car of the Year” by the European media in 2005 and Toyota replaced Ford as the second largest car manufacturer in the world, the car industry was torn from its sleep: Toyota displayed development competence and was poised to become the market leader and then to hold that position for a long time.

According to a statement from Toyota’s procurement manager on June 18<sup>th</sup> 2010 the company aims to lower its total costs by 30 % by 2013 through the development of 165 model independent modules [14]. Another measure is a radical redesign of the components as in [15], [16], see (Fig. 5). Toyota already released a motor with 30 % less parts and potential savings of similar proportions as early as 1996 [17]. Even today this achievement has gathered little attention. Only four different types of screws are required for a motor whereas 24 are used in the German premium automotive market.

**Radically redesign of components.**

**“Let’s take nuts and bolts, for example.  
What if we were to develop components that don’t  
require screws? That’s the kind of thinking we’re after.”**

Mitsuo Kinoshita, senior managing director & chief purchasing officer

**Our goal in the next years – to develop automobiles,  
which only “consists half of the parts”  
as well as save costs of 6,5 bn Euro or ca. 750 Euro  
per car in the next 3 years.**

Toyota – Ex-President Katsuaki Watanabe

**Figure 5** Radically redesign of components at Toyota [15], [16]

The challenge of green design shows Figure 6: Double the output with half the input.

**2 x 2 = 4**

**Green Design does not save the world !!**

**But:**

- ½ Time to Market**
- ½ Manpower**
- ½ Budget**

**Figure 6** Challenge of green design [18], [19]

### 3. Conclusions

The benefits of a value-oriented design are: team building and teamwork, better communication, a reduction of product and manufacturing costs, assembly time, number of parts, weight, development time and time to market as well as enhanced quality, a standardisation of parts, complete

documentation and a realisation of ecological requirements. The result of an automotive project shows:

**Less parts, less complexity, less manufacturing costs, less weight, less logistics,  
less CO<sub>2</sub> emission, less environmental impacts, more creativity and better quality!**

Its special benefit is the optimisation of the product development process and the creation of new innovative solutions. An analysis requires only a few weeks instead of many weeks or months of product development time. This makes value oriented design a powerful management and teamwork tool for the launch of new products and it closes the gap between design and procurement as well as integrates the suppliers into a strategic network.

Value oriented design is one solution to be considered for the next few years. The Concurrent Costing-/DFMA-tools enhance creativity including the fulfilment of ecological requirements. A business model and paradigms for a sustainable enterprise has to be developed. To a certain degree, electric cars will be a solution in a few years time. But we have to react right now in order to be successful in securing not only the future of businesses but also contribute to a sustainable ecological environment and improve innovative product development:

**Value-oriented design creates economical value, it is lean design  
Value-oriented design meets economical requirements, it is green design**

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# Regional competitiveness and development

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**The modern working conditions impose an implementation of dynamic management process that will be able to respond to the challenges of the global economic processes, which above all means the creation of products and services that will be more competitive in the global marketplace.**

**Each state or region, based on their own human, capital and natural resources is trying to create a favorable business climate that will enable the development of the companies in order they be able to compete in their industry and create conditions for sustainable living standard.**

**Creating of strong competent domestic enterprises opens the door for entry of big foreign companies in the country and thus contributes to a more regional as well as general economic development of the country.**

**In this process of creating of the regional competitiveness that brings a development, key roles have more factors of the public and private sector.**

**In this paper are analyzed factors that form the working strategy of the private company ING-LULI in Struga, Republic of Macedonia, the real possibilities of the company for development and growing in its industry branch, and at the same time its contribution to the regional development.**

## **Keywords:**

Regional competitiveness, Development, Global economy, Public and private sector, ING-LULI, Struga, Macedonia.

## **1. Introduction**

Contemporary world today with the development of technologies and techniques offers great chances to subjects of small and medium enterprises, being more competitive in a market economy, economic and initiative of national and international development. Prosecution of economic entities means the process of transformation from the existing situation in the new one.

Challenges of globalization with which face obviously small and medium economic subjects in R. of Macedonia are imperative for the establishment of strategic objectives and maintain competitive advantage in the market.

One of the main issues for the economy of the Republic of Macedonia is the definition for open market economy, which means liberalization and integration of markets, rapid economic development, improving business and investment climate, free products, with quality and popular, which guarantee solving current problems, especially now days when we are in time of slow recovery phase, but rather, increase its stable and recession, which will continue during 2011 and 2012 (Sources: From the World Bank report and its global economic prospects for the year 2011)[1].

Considering the fact that economic efficiency and regional competitiveness is a complex phenomenon and Regional Development, Ministry of Economy through the Program for development of entrepreneurship, competitiveness and innovation of the small and medium enterprises, program for development of clusters, industrial policy, international cooperation, promotion of foreign and local investment, are working actively in creating a more favorable climate of work and promotion in the economic competitiveness of firms also[2].

Contemporary trends as a result of the development of economic entities, individual equity, bend it increasingly at the center of tools, for increasing the sustained competitive of ability, becoming an important factor of entrepreneurship, as well as specific guarantees of the future of their business, limited by a number of products or services (Horvat, 2003). Taking in consideration that, small enterprises today are over 90% of companies in the EU, as a result of this, many national organizations for promotion of export, increasingly see necessary to support the small sector of the economy as the incentive to create new values through development programs, characterized by flexibility and innovation[3].

The main strategic goal is the realization of competitive advantage, because the strategy enables small enterprises, to exploit the weakness of competitive and affordable suburbs in the market, suitable for the development of business culture, which they constantly upgraded, with which increases productivity and quality. For private and public businesses to be successful, the management strategy focuses on information systems that are in the service of decision making, and when the company balances long-term risk with short-term commitments, achieves the improvement of activity of the organization and ignores all the opportunities, which are not related to its basic technology.

In continuation we will mention, strategy as central categories of small and medium economic subjects, theoretical data on competition, local and regional development, regional development program for regional development in Macedonia, respectively south – west regional development plan, vision, goals, priorities and activity of the company ING-LULI, Struga, Macedonia.

## **2. Strategy as a central category in the small and medium economic subjects**

Last decades, great changes of political, economical, technological, the role of state and free market competition, and the internationalization of businesses, have made the environment in which operate, businesses to be quite complex. Then for the Future of such a necessary environment have to use the strategy of a business organization. However, regardless of the environment in which business operates, specialized for a limited number, they will be subject of competitive pressures; this is why competitive strategy problems are especially important for growth of small and medium economic subjects. Through the strategy, business executives need to answer questions, where they are, where they should arrive and what to undertake to achieve certain goals. Conceptually, the strategy sets out the definitions of the market, competition, customer needs, technology, demographic changes and a large number of other factors that determine the strategic formulation of action.

SWOT analytical method creates the optimal combination between the possibilities and limitations of the environment. A strategic decision for development is the result of managerial ability and creativity, always seeking competitive advantage and successful positioning in the regional market.

## **3. Study on regional enterprises, competition and development, opportunities through the regional program, of the Republic of Macedonia.**

Regional Development Strategy of Republic of Macedonia, according to the program 2009 - 2019 (Official Journal of the Republic of Macedonia no. 119/09) is one of the main strategic documents for planning the development of R. Macedonia[4].

Strategic goals of the regional plan based on regional development program for the Republic of Macedonia 2009 - 2019 are:

- 1 Competitive region in the framework plan national and international, which will be characterized by rapid, dynamic and sustainable development.
- 2 Social cohesion, economic and spatial development between urban and rural municipalities within the region with its optimal, special and specific use.

Its purpose is to accelerate in the integration processes in the EU and NATO because, according to experts, the process is frozen in these institutions, causing uncertainty to potential foreign investors in Macedonia. According to the statistics we have a decline since 2009 (145 mil.EU) and 2010 (132.5 mil.EU)[5]. Therefore, the objectives and priorities identified in the overall strategy, in accordance with the basic use of the document, measures and instruments to encourage the development of regions, and their financing, the relevant institutions and mechanisms for implementation, are specified in

Action plan (2010 - 2012) for the implementation of regional development strategy, which in accordance with the law for balanced regional development have been approved for a period of three years, and is in final stages of preparation, supported financially by the state, donors and stakeholders at regional and local levels.

### 3.1 National strategy of developing the small and medium enterprises

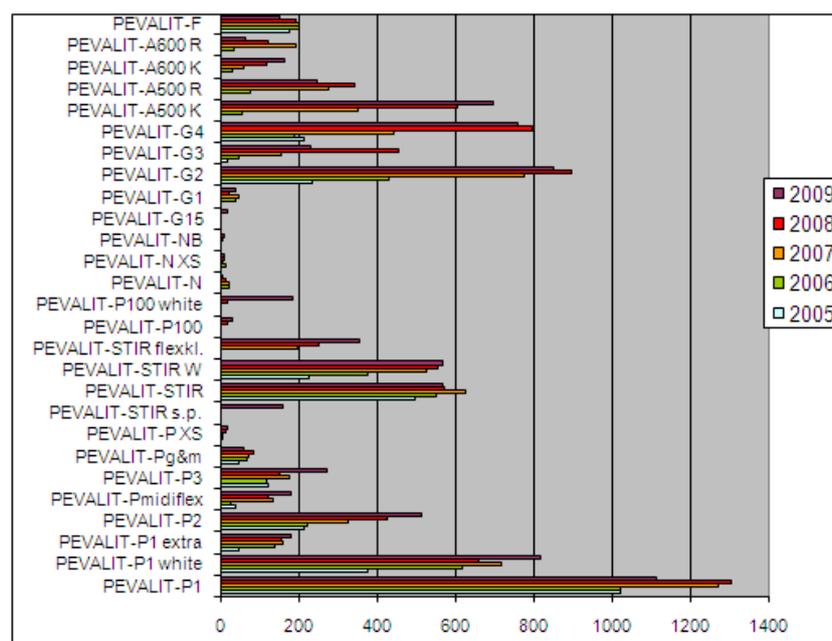
Today, the national strategy (continuous program of the government) of the development of small and medium enterprises (SME), provides basic orientation for the realization of the vision, goals and priorities set out in the field of entrepreneurship and small and medium enterprises for a long time period. Strategic goals are to increase the number of SME, increase the number of employment in SME, and increase the contribution of SME in the creation of gross domestic GDP (national strategy for development of small and medium enterprises, 2002 - 2013). So, for a period of three years in R. of Macedonia, European funds available, the competitiveness and growth of IPA, regional and rural development for small and medium firms. For 2011 are exploited, 98 million EU, for the year 2012 are exploited 105 million EU, and in 2013 will be used 117.2 million EU. (Sources issued by the Chamber of Commerce of the Republic of Macedonia)[6].

## 4. ING – LULI, Struga, Macedonia, Development possibilities

According to the terms of financing, establishment and management businesses, exist public and private sector. The difference between them is the private sector which is established and managed as a result of private initiative, the axis of which is private and public ownership to be established, managed and financed by the state or government agencies. The advantage of small firms is important in the framework of market economy that offers great opportunities for employment, reduction of unemployment, it has also an important role in economic development because they are a leading providers and force drivers of economical activities. In this paper as business case studies, like a presenter is taken the company to private ownership structure ING - LULI, Struga, Macedonia, founded by 12.07.1994.

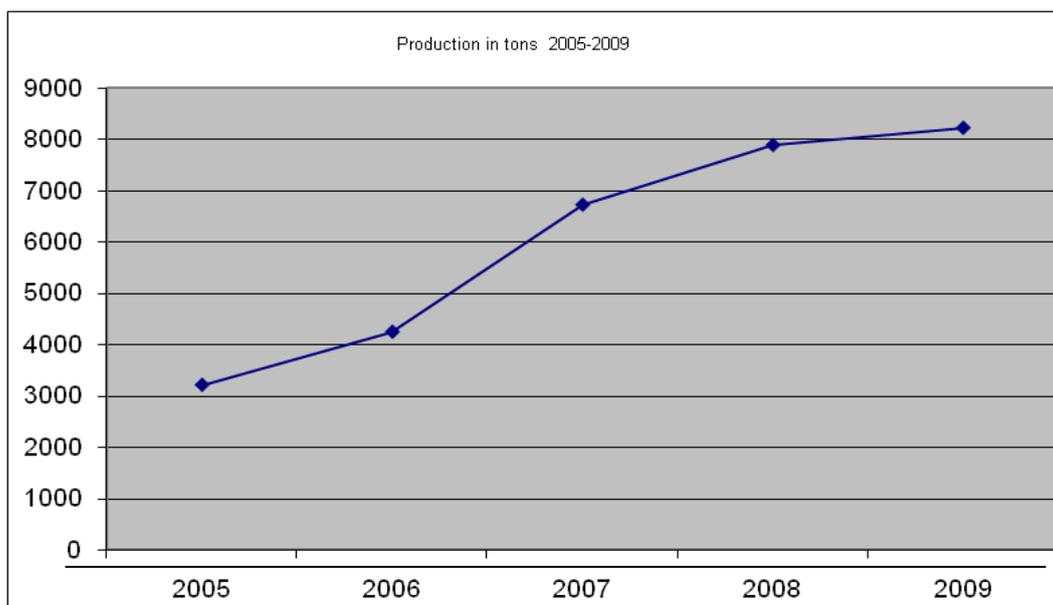
The activity of the company today possesses modern equipment for the production of: adhesives for construction and decorative plaster, with the highest quality products **Pevalit**, resulting in the internal market and outside of the Republic of Macedonia. Prices of the enterprise market are adequate to the same products that we offer competitive market. Undertaking from the beginning onwards the enterprise marked growth in development trends as shown in **table no.1**.

**Table 1** Business result in period of 2005 – 2009



Enterprise ING-LULI, its activity has started as a commercial enterprise, for retail and wholesale building materials supplied by the country and abroad. In 1998, begins to draft a program, for the production of adhesives for construction. With such products in the domestic market, emerged in June 1999, with capacity of our 10 tons in one shift, with high quality according to European norms, that affected in economic growth and mitigating the economy. Since 2000, the business environment for the distribution of goods, within and outside the country had increased continuously in production and general revenues of the enterprise.

There are enhanced programs of the **Pevalit products, graphics 1**, which includes all finite stages in construction. **Our tendency is**, that this range of products, to extend and complete with all products required today in construction, structural increase in the number of workers and expansion of commercial space[7].



**Figure 1** The trend of increasing

Graphics is understandable that the dynamics of production in tons has followed the dynamics of sales shown in the table 2.

**Table 2** The trend of growth in tons

year	2005	2006	2007	2008	2009	2010
tons	3212,8	4247,3	6722	7884,3	8219,3	9630

In 2005 with assistance and grant provided by the European Bank for development, part of our products by the Institute of Accredited "ZAG Ljubljana" (Institute for construction in Ljubljana), Slovenia, benefits the certificate, for standardized quality norms with the new European EN 12004. This certificate and secure means access is available in the market of Western Europe. We have a stable market in Macedonia, with continual sales, export continuously in the Kosovo market, included in 1 / 3 of our products, we work with partners to secure the market there, mostly because of quality products and services and respect for deadlines. Since 2005 we export to Switzerland and Germany, where there is gradual increase in production. However, our enterprise also has plans for future development. This is the result of gradual development and expansion of sustainability to today's market.

The best competition for a clear definition of the company is, achieving the vision to compete in the market, where the objective is, developing new products for existing markets (replacement of some components of the product with new ingredients), developing the products with certain types of qualities, developing new size in order to extend product life cycle of existing or to benefit, also to entice consumers with new product. To achieve success in the organization is required a study of macroeconomic and external environment micro that will lead to satisfying the needs of the

organization. How strategic goal will be achieved in competition with other companies, with similar products is necessary that the company find a way how to do this, namely to develop strategic analysis of external and internal environment, who are incoming information tools for enterprise decisions to business success. In a better way this identification will be shown by strategic analysis, ordered of importance monitoring of the external and internal environment to the company, procedures developed as follows tab.3.

**Table 3** Internal environment and external environment

Internal environment	
<p>Forces – advantages can be:</p> <ul style="list-style-type: none"> <li>• High Efficiency,</li> <li>• High quality and innovative product for buyers,</li> <li>• Utilization of modern technology for manufacturing,</li> <li>• Good contacts with buers, suppliers – customers,</li> <li>• Perfection in organizational processes,</li> <li>• Minimum cost leader, with maximum response to customers,</li> <li>• Higher motivation of workers,</li> <li>• Standard of conduct to suppliers,competitors,buyers,</li> <li>• Intensive investment in developing new products and technology</li> <li>• Strategy pricelists,</li> <li>• Positive image,</li> <li>• Increase the presence and productivity</li> </ul>	<p>Weaknesses can be:</p> <ul style="list-style-type: none"> <li>• Sensitive to removal of specialized staff for several directions,</li> <li>• Lack of training of workers,</li> <li>• Lack of circulation of information within the company intranet,</li> <li>• Lack of research and development for the renewal of products.</li> </ul>
External environment	
<p>Cases can be:</p> <ul style="list-style-type: none"> <li>• New segments of buyers,</li> <li>• Global trend,</li> <li>• Increasing demand for manufacturing</li> <li>• New automated technology,</li> <li>• Where we exercise our business sector and the increasing trend,</li> <li>• Encourage local and central government with its programs for small businesses,</li> <li>• The slowdown of our competitors in adopting new technologies,</li> <li>• Improved infrastructure</li> <li>• Tax reduction,</li> <li>• Sales through internet</li> </ul>	<p>Threats can be:</p> <ul style="list-style-type: none"> <li>• the fall of the requirements for manufacturing</li> <li>• introduction of new powerful competitors and appearance of new enterprises,</li> <li>• threats or replacement products</li> <li>• strategic change to a big and strong competitor</li> <li>• customer dissatisfaction regarding the distribution system</li> <li>• economic crisis</li> <li>• the possibility that technological developments automated walk faster than our ability</li> <li>• the existence of monopolies in the market</li> <li>• unstable political</li> <li>• Unfair competition</li> <li>• Higher taxes to products</li> <li>• long-term procedure for registration of new production</li> <li>• Opportunities for export to foreign countries with low clearance</li> <li>• functional strategy of competition</li> </ul>

Based on this analysis and based on analysis of macro and micro environment, define the possible directions of development of short-term and medium businesses in enterprises, ING-Luli, Struga, Macedonia

**Short-term are:**

- Reinvestment in addition to the capacity of products
- Expanding market (mapping)
- Marketing Strategy
- More investments in training staff - person qualified management and employees
- Better knowledge of English, so it can be used for computing benefits of this technology in business.

**Medium-terms are:**

- Reinvestment of technology, to save time and other resources, simultaneously increases productivity because, they are in step with the trends and benefits of computing, because it offers more opportunities for business, as the placement of goods and communication both local and abroad.
- Addition of games, that are required in standardized products in construction today.

The result of these spatial data means, sustainable development in the future market, opportunities for better access to Western market and beyond, compiled by project plan developed in this company. Activation strategic plan, defined before, which bring major changes in environment, means implementation of the strategy that brings, the best growth conditions in all phases of business of the enterprise.

## 5. Conclusion

Competitiveness and regional development in small business, has an important role in the marginalization of market economy that offer great opportunities, for employment and economic development, because the subjects are stimulating innovation in economic activities, thus enabling a quality of life for the community. Challenges facing small economic entities are imperative for establishing strategic objectives, and maintaining competitive advantage, which means superior or otherwise being in the market.

Strategy of the Republic of Macedonia under long-term plans for developing programs through entrepreneurship, competitiveness and innovation of the enterprises of small and medium enterprises, industrial policy, international cooperation, works to promote the competitiveness and development firms.

Surroundings are crucial to business success and existence; therefore they must do their best to known factors in the external and internal environment which affect their work.

The purpose of small businesses is to focus on management development strategy, this means that companies should be prepared for innovation - the driving force of national and world competition on a market economy, to maximize competitive ability through pricelist and functional strategy and minimize weaknesses competitive.

Enterprise ING-Luli, Struga, Macedonia holds leading role in the local market and overseas because the products are quality, sustainable and competitive prices and sufficient services to buyers and use a perfected technology, as an important competitive factor.

Development opportunities for growth and development in this Company are medium and short-term.

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# ePortfolio – identity and professional development

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**This paper reports work-in-progress for a project to create an electronic portfolio for the Technical University-Sofia students. The methodology of the present research follows the goal “to be identified the road and success factor for design and implementation of ePortfolio at the Technical University-Sofia applicable to SharePoint 2010 platform”. This research goal covers the following objectives: Define the latest concepts of electronic portfolios; Address ePortfolio standards; Define the ePortfolio requirements; ePortfolio implementation in SharePoint 2010.**

**In the academic context, an ePortfolio may assist learners with their personal development by providing a single, organised repository which affect teaching philosophy, pedagogies and curriculum. As a part of a strategic approach to learning and teaching, ePortfolio systems and tools provide a better dimension to learning focused on personnel identity, representing critical thinking, reflection and professional development. With the growing use of eLearning and social applications many teachers increase their understanding of ePortfolio-based learning and develop student-centred learning activities to enhance the quality and sustainability of learning outcomes. In the process of educational innovation, the ePortfolio focus on competence based education and is also frequently used as an aid for guiding the learning process.**

**This paper defined the ePortfolio features and its implementation in the SharePoint 2010 Platform for collaboration, communication and learning developed at the Technical University-Sofia R&D Laboratory on eLearning Technology and Standards. The ePortfolio was designed in a competency-based-approach and included mapping the competence profile of the learner throughout his life. It is a witness to the evolution of competence and support is essential to customize not only the evaluation but also learning. The pilot test of the ePortfolio solution was conducted with students from the English Language Faculty of Engineering during Semester 1, 2010 in a course on E-Learning. The pilot proved that ePortfolios have a potential to turn information and data into knowledge through two important practices: reflection and social construction allowing students to plan, document, assess, and improve upon their learning by significantly changing the manner in which their education is understood and managed.**

## **Keywords**

ePortfolio concept, ePortfolio types, ePortfolio standards, SharePoint, Web 2.0

## **1. ePortfolio Concept**

For years the term ePortfolio has been used in academic and corporal environment. Social studies however show that most people can't define or explain what an electronic portfolio is; furthermore they have no idea of all its purposes and aspects it involves and therefore do not realize what an incredibly

useful and powerful tool it is. Laying aside new-technology hype and enthusiasm, e-portfolios can best be viewed as a reactionary response to fundamental shifts in learning, teaching, technology, and learner needs in a world where learning is no longer perceived as confined to formal education.

Definitions for e-Portfolio include [1, 2, 3]:

- “A collection of authentic and diverse evidence, drawn from a larger archive, representing what a person or organization has learned over time, on which the person or organization has reflected, and designed for presentation to one or more audiences for a particular rhetorical purpose” (NLII).
- “An eportfolio is a web-based information management system that uses electronic media and services. The learner builds and maintains a digital repository of artifacts, which they can use to demonstrate competence and reflect on their learning.” (ePortfolio Portal)
- “Portfolios are collections of realia that have been assembled by a person and are retained and curated by them because the objects contained in the collection evidence or attest to claims that a person might make to themselves or to others about their life.” (The E-Learning Framework)

Most definitions include the notion of a digital resource (personal artefacts, instructor comments) demonstrating growth, allowing for flexible expression (i.e. customized folders and site areas to meet the skill requirements of a particular job), and permitting access to varied interested parties (parents, potential employers, fellow learners, and instructors).

The e-Portfolio can be viewed as the digital identity (imprint) of a person or an organisation constructed through reflective learning:

- An ePortfolio can be aggregated dynamically to other portfolio to create social networks or learning communities
- ePortfolio services allow ePortfolio owners to exploit their personal assets (competencies, knowledge, networks)
- Planning, reflexion, feedback, accreditation of prior learning
- ePortfolio services allow ePortfolio managers (educational institution, awarding bodies, employers, professional associations) to manage their organisational assets (talents, competencies, networks, subcontractors)
- Accreditation of prior learning, offer a job, annual review, competency development, managing learning quality

ePortfolio implementations can best be viewed as a continuum. ePortfolios are driven by the intended task: assessment, professional/personal development, learning portfolio, or group portfolio. The expressions of learning in an e-portfolio can range from simple blogs to enterprise-level implementations. The intended task of the portfolio is the ultimate determinant of value. For certain courses or programs, a blog may be all that is required. Regardless of the format selected, each ePortfolio effort should encourage learners to develop the skills to continue building their own personal portfolio as a life-long learning tool. The fact that a portfolio is electronic contributes in the following manner: The paperless portfolio - Dematerialises documentation; The workflow portfolio - Supports processes such as learning, assessment, recruitment; The knowledge portfolio - Provides the elementary bricks of KM systems; The socialite portfolio - Interconnects digital clones of knowledge workers.

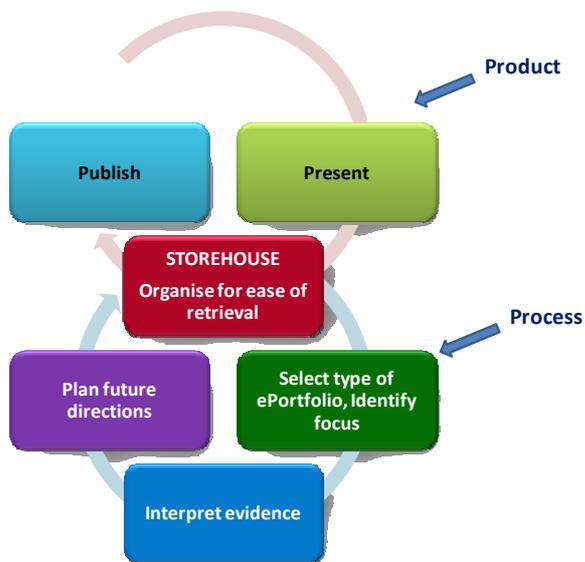
The latter advantages can be divided in two types- one part classifying the ePortfolio as a product, and the other half – as a process (fig.1). When an individual decided to start an ePortfolio, pick a type, collects evidence, interprets it and makes plans for his future development- that is a process. Simply put, the ePortfolio is a process, representing critical thinking, reflection and goal setting for ongoing professional development. However the published and presented ePortfolio is a product. Learners define the evidences for their e-portfolio through a self-reflection process through which they attribute their competences to learning products or outcomes, and reflect on how they acquired such competences. From the pedagogical point of view, this process helps learners better to understand how they learn and become self-directed learners. Learners, how-ever, can use ePortfolios for multiple purposes such as: learning, professional development, assessment, job applications and promotions, showcasing, developing personal plans, accreditation, collaborative learning, and receiving feedback. Likewise, ePortfolios can be used for tracking learners' development within a program and monitoring and evaluating their performance.

Processes involved in the ePortfolio cycle are: Collecting evidences; Reflect; Organize; Revise; Present; Assess; Socialize and receive feedback. Creating a reflection is a five-cycle process: Self-awareness >> Description >> Critical analysis >> Synthesis >> Evaluation.

## 2. Types of e-Portfolios

According to their purpose and other characteristics there are determined several types (Fig.2) of e-portfolios [4]:

*Assessment ePortfolios* are used to demonstrate achievement to some authority by relating evidence within the ePortfolio to performance standards defined by that authority. Rubrics are commonly used to score assessment portfolios. Departments may use assessment ePortfolios for accreditation purposes.



**Figure 1** Portfolio as a product and process



**Figure 2** Types of e-portfolios

*Presentation portfolios* are used to evidence learning or achievement to an audience in a persuasive way. Presentation portfolios often contain instructions about how their contents should be rendered. Presentation portfolios are often used to demonstrate professional qualifications. For example, a software engineer might create a presentation ePortfolio that incorporates and shows the relationships between professional certifications she has received, code she has written, and her employment history in order to convince a potential employer to hire her. Faculty members might use presentation ePortfolios to collect materials for tenure track review purposes.

*Learning ePortfolios* are used to document, guide, and advance learning over time. They often have a prominent reflective component and may be used to promote metacognition, to plan learning, or for the integration of diverse learning experiences. Learning ePortfolios are most often developed in formal curricular context

*Personal Development ePortfolios.* Personal development planning is defined as "a structured and supported process undertaken by an individual to reflect upon their own learning, performance and / or achievement and to plan for their personal, educational and career development." Thus, an ePortfolio for personal development planning contains records of learning, performance, and achievement which can be reflected on, and outcomes of that reflection, including plans for future development. This could include a learning ePortfolio, but goes beyond that, as it is often related to professional development and employment, so also possibly used as a presentation ePortfolio.

*Multiple Owner ePortfolios* are used to allow more than one individual to participate in the development of content and presentation. A multiple owner ePortfolio might combine elements of the above portfolio types, but most likely takes the form of a Presentation ePortfolio when used for such purposes as a website or group blog and a Learning ePortfolio when used by a group of learners to present evidence of their academic growth through the group collaboration. Multiple Owner ePortfolios are often used to represent the work and growth of an organization or organizational unit and, when so employed, may be referred to as program or institutional portfolios.

*Working ePortfolios* combine elements of all of the preceding types. They often include multiple views, each of which may be analogous to an assessment, presentation, learning, or development ePortfolio. A working portfolio is the larger archive from which the contents of one or more ePortfolios

may be selected. The whole of a working ePortfolio is generally accessible only to its subject, while views are made accessible to other individuals and groups.

### 3. The impact of ePortfolio on learning and personal development

When taking our research, we encountered a great number of different ways of looking at ePortfolio-learning, its goals and benefits. The ePortfolio is an environment with multiple uses. In the context of the workplace and lifelong learning, an ePortfolio is used for managing human capital assets, developing and utilizing social capital and ultimately for management of digital identity. The ePortfolio is a mean to develop social capital: friends, colleagues, and more general contacts to use for financial and human capital development, perhaps as references or collaborators. A diversity of web learning tools can shape learner identity to one that enables the learner to participate in a rapidly changing digital globalised world that demands construction and reconstruction of knowledge rather than pure consumption.

*A way to present yourself, telling your own story.* When a learner tells the story of a learning experience, or of his or her life, 'deep' learning takes place, and video, blogs, wikis and websites are considered to be powerful ways to facilitate this.

*A tool for assessment of student competences.* ePortfolios are also seen as a way to assess the attainment of standards. After the student submits evidence in a certain form, the assessor can determine and store a certain competence-level. Sometimes this can be judged based on the materials alone, sometimes the assessor also has observed the behavior of the student first-hand

*A tool and file-format to help transitions to other institutes.* An ePortfolio can also be seen as primarily a structured (XML) file that contains all information that is needed for the easy transition of a student or worker from one organization to another. In other words, an "ultra-CV".

*A way to facilitate coaching by providing insight into the learner.* When an ePortfolio contains a set of personal information such as interests, work experience, affiliations, qualifications, etcetera, along with the student's Personal Development Plan, current competency status, and all the learning products that have been created up to a certain point, there is no doubt that this is a valuable resource for a coach. In such an ePortfolio, the coach can access this information in real-time, and quickly form a picture of areas in which the student could use guidance.

*Helping personal development.* An ePortfolio can also be seen as a tool that facilitates personal development. Almost every book on 'success' emphasizes the need to be clear about your values, goals, talents and weaknesses. And not just know them, but write them down and regularly reflect on them: are you achieving your goals or are you missing the mark? And if the latter, what's missing? An ePortfolio can not only provide a place to store these goals and reflections on them, it can also make them available to your coach and to others in the community of the student. The premise (and paradox) is that personal growth is easier done together with others.

*A tool for networking and collaborative learning.* Using an ePortfolio, a student can easily put her/his learning results on-line for others to review and give feedback on. This facilitates collaborative learning and the formation of social networks of people with similar skills, experiences and interests.

### 4. The ePortfolio standards and interoperability - a rapid state of art

ePortfolio standards are needed to enable portability of ePortfolios across applications, to allow comparability of portfolio data across organizations and for the interoperability of applications with other systems. Interoperability that enables the distribution and migration of portfolios as integral wholes between venues requires the ability to describe, encode, and transmit the relationships between assets within the portfolio and its information architecture and visual design in a format that both human and computer audiences can understand.

The following list presents a series of application profiles (data formats) that have been studied [5]:

- Employability ePortfolio (NL) is based on IMS ePortfolio (which includes IMS Learner Information Profile — IMS LIP).
  - Compliant Solutions: eXact Folio (Giunti), Winvision.
- UK Leap (UK) is based on IMS LIP (which is more restrictive than IMS ePortfolio). Compliant
  - Solutions: PebblePad, ePet (University of Newcastle).
- HR-XML application profiles — there are a number of HR-XML application profiles dedicated to specific communities: iProfile (HR-XML CV profile), is implemented by SkillsMarket in UK, which

hosts more than 2 millions CVs for recruiting agencies; GermanCV (HR-XML CV profile) is used by job boards in Germany.

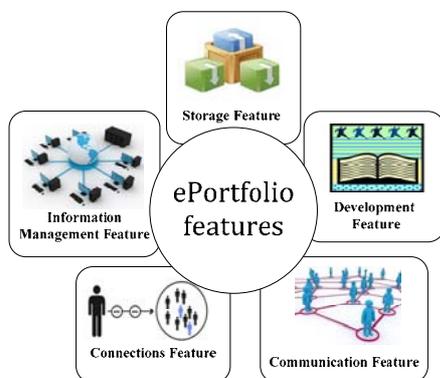
- HR-XML Europass CV (EU) is a binding of Europass (a European CV format) using HR-XML specifications as well as external competencies definition based on IEEE RDC. Compliant
  - Solutions: ePet (University of Newcastle), Eurocv.eu, Kite, CVUniversel / Universal CV.
- hresume microformat — It is used for LinkedIn public profiles (several million users).

If we take into account the difference between individual ePortfolios (that could be developed with any kind of tools) and ePortfolio Management Systems that institutions need to manage a number of ePortfolios for specific processes, then a number of additional emerging standards should be taken into account:

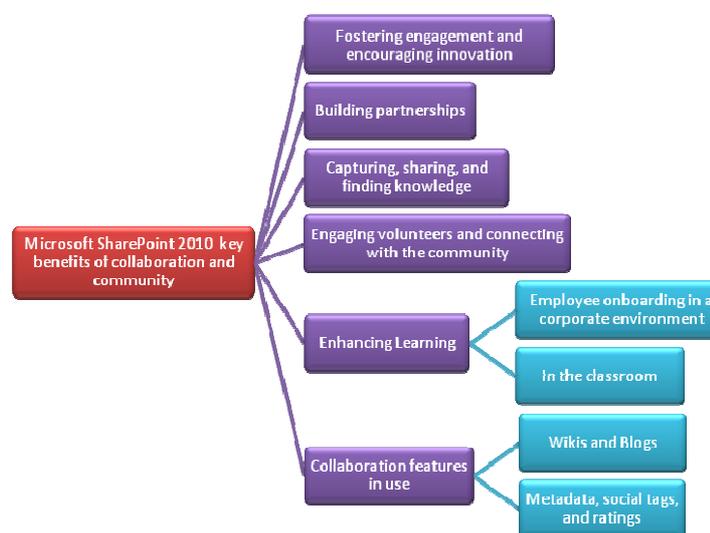
- Identity Management such as Liberty Alliance federation of identities and services, OpenID or CardSpace will play a central role in the seamless exchange of information across services used by ePortfolios.
- Interoperability frameworks such OpenSocial (used by Google, Plaxo, etc.) and Dataportability.org are emerging and open a new kind of door to the exploitation and sharing of personal in a professional perspective.

## 5. Building ePortfolio in SharePoint 2010

The TU-Sofia increasingly extends the classroom environment to the online environment, sites for communication, collaboration and resource sharing. Most of the subjects are still face-to-face although increasing number of students who use web 2.0 technologies. The process of developing and implementing a successful ePortfolio project - one that works and is adopted by users - involves many challenges that must be tackled [6,7]. An ePortfolio software environment has to be sticky to end users and sustainable as a new enterprise service for students, alumni, and lifelong users. Three key steps are necessary to complete the development of a new ePortfolio system. The initial step is to conceptualize and define the overall system operation as determined by a delineation of the functional and technical requirements. The second step is to design the software and develop an environment that intelligently affords those requirements specified in the first step. During this stage, both human and technological aspects have to be considered.



**Figure 3** The ePortfolio features



**Figure 4** Boosting collaboration with wikis, blogs, My Portfolio, ratings, and tags

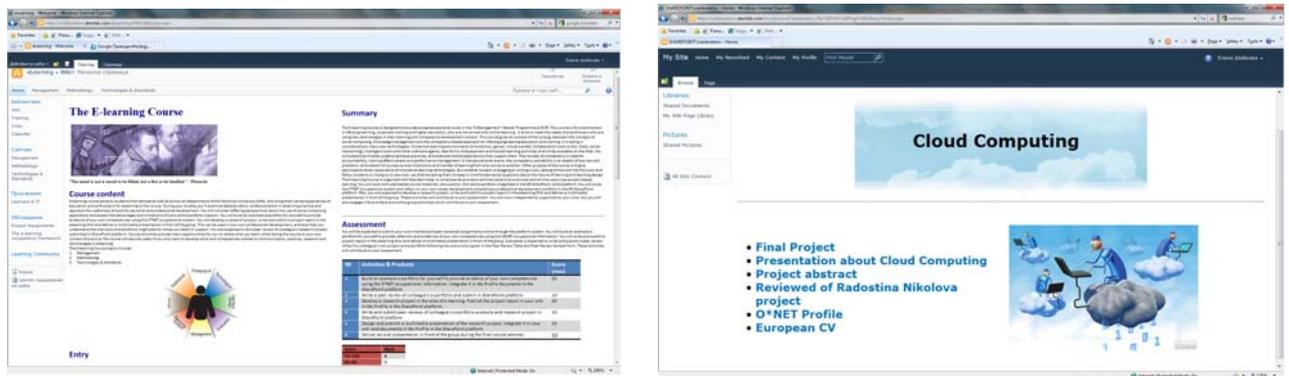
The human aspects are certainly the most problematic project issues to be addressed, since they directly affect both usability and user acceptance - issues that can make or break the success of an application. The third and last step is to implement and maintain the project, covering business plan, daily operation and software upgrade. The identified ePortfolio features are presented on fig. 3. Functional requirements are summarised in Table 1. The right column outlines the main SharePoint technology features needed for successful ePortfolio development.

**Table 1** ePortfolio requirements

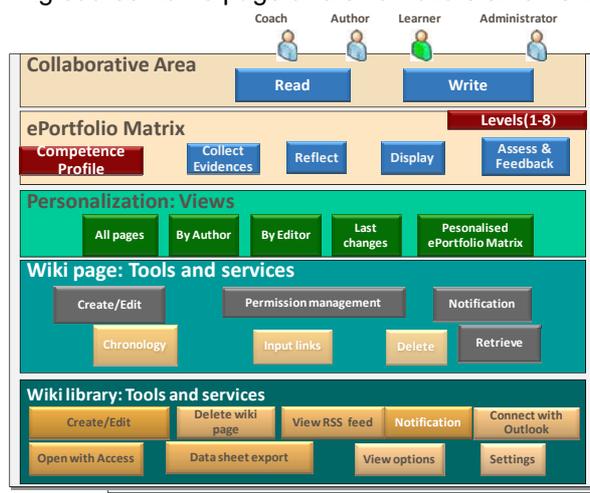
<i>Function</i>	<i>Description</i>	<i>SharePoint Tools &amp; Services</i>
<b>STORAGE</b>	An ePortfolio is a web-based repository for documents. It functions much like a file cabinet, with file drawers and file folders. Students store artifacts (academic records, resumes, letters of recommendation, mixed media files, along with special-interest, personal and professional development-related content, etc.), within its organizational categories.	Lists, libraries, and sites. Accessibility features.
<b>INFORMATION MANAGEMENT</b>	<p>The challenge today is to filter what is most useful out of the barrage of information thrust upon students. To meet this challenge, students will need technical and organizational knowledge, as well as an understanding of how people seek, obtain, evaluate, use, and categorize information. That is, students will need information management skills.</p> <p>Information management processes are inherent in the creation and maintenance of an ePortfolio. <i>Collection</i> — gather, save, and store information and artifacts. <i>Selection</i> — review and evaluate information and artifacts, identifying those which are useful and important. <i>Reflection</i> — become reflective practitioners by documenting and evaluating their own growth over time. Information Management is an integral part of ePortfolio creation and maintenance; it is also an essential skill for students to learn, as they attempt to qualitatively sort through the overabundance of information available today.</p>	<p>Lists, libraries, and sites. Managing and working with content. Tracking versions.</p> <p>Lists, libraries, and sites. Managing and working with content. Tracking versions. Managing access to content.</p>
<b>CONNECTIONS</b>	ePortfolios also provide a medium for students to navigate through the vast networks that make up a university or college. By linking departments and resources directly to the categories of an ePortfolio, students will, in the process of managing and storing information, become connected to resources that are currently available, and yet underutilized. These sources would, then, connect the student with local and corporate programs who provide opportunities in the community and in the real world. Giving students a tool to connect with the larger educational community will improve student awareness of what resources are available and why they are valuable.	Lists, libraries, and sites. Navigating to content. Managing and working with content. Working with content types. Managing access to content.
<b>COMMUNICATION</b>	<p>ePortfolios would have one main interface (private web page), from which students would navigate and manage information and, in addition, create what are called "presentation pages" (public web pages). By creating presentation pages for specific objectives, students learn how to communicate with various audiences, how to present documents for a purpose, and how to constructively reflect upon and write about artifacts. Students would control access to these presentation pages, restricting them to certain audiences, e.g., classmates, faculty, employers, graduate schools, friends, or family. In the end, students would have a number of presentation pages, built from the student's main interface, and designed for specific purposes and specific audiences.</p> <p>ePortfolios are very much a collaborative tool. They also allow students to solicit and receive feedback from faculty, advisors, and others about shared documents in their collection. In fact, ePortfolios are being linked directly to classroom learning systems. Such linking allows faculty, advisors, and others to communicate with students about the artifacts in their collection, whether they are papers, resumes, or various multimedia items. ePortfolios would also enable students to track graduation requirements more closely, allowing for more precise communication with advisors. ePortfolios involve more than collecting artifacts and reflecting upon them, they involve purposeful communication, as students present artifacts and receive feedback.</p>	<p>Lists, libraries, and sites. Working with content types. Managing access to content.</p> <p>Lists, libraries, and sites. Working with content types. Navigating to content. Managing access to content.</p>
<b>DEVELOPMENT</b>	<p>The history of student affairs is one of an enduring and distinctive idea: "the consistent and persistent emphasis on and commitment to the development of the whole person.</p> <p>Specific developmental skills are cross-referenced with the ePortfolio categories, e.g., communication skills could be cross-referenced to specific courses, jobs, and so on. By utilizing and customizing the competency matrix, students would be able to comprehend knowledge and skills, such as leadership and social responsibility,</p>	<p>Managing and working with content. Tracking versions.</p> <p>Lists, libraries, and sites. Working with content types. Navigating</p>

Function	Description	SharePoint Tools & Services
	relative to coursework, personal interests, and career possibilities. A competency matrix provides students a context in which to understand how to acquire and employ the knowledge and skills they accumulate over the course of their college career. A matrix also allows students a way to see the big picture in terms of their educational requirements, to visualize a trajectory of their development, and to articulate competencies and experiences to employers and graduate schools in a more concrete manner. Applying developmental theory within the functionality of ePortfolios can deepen the commitment of student affairs to the enhancement of the whole student.	to content. Managing access to content.

The learning ePortfolio tool was built into SharePoint collaborative and learning platform - which itself is a comprehensive environment for collaborative work, communication and learning (fig.4, fig. 5, fig. 6). The ePortfolio was designed in a competency-based-approach and includes mapping the competence profile of the learner throughout his life. It is a witness to the evolution of competence and support is essential to customize not only the evaluation but also learning. Portfolio-based learning was increasingly being implemented and piloted in a range of educational and professional learning contexts in order to monitor students' professional development. The place of ePortfolio is very important as a potential actor in the learning system. The pilot test of the ePortfolio solution was conducted with students from the TU-Sofia English Language Faculty of Engineering during Semester 1, 2010 in a course on E-Learning



**Figure 5** The eLearning course home page and ePortfolio elements in SharePoint 2010 platform



**Figure 6** Wiki Learning ePortfolio in SharePoint

The pilot proved that ePortfolios has a potential to turn information and data into knowledge through two important practices: reflection and social construction allowing students to plan, document, assess, and improve upon their learning by significantly changing the manner in which their education is understood and managed.

## 5. Conclusion

The electronic portfolio helps in the construction of knowledge, and promotes a critical and reflexive process in the students' identity and professional development. In some ways the use of ePortfolios points to an innovation in the education system. In many places, ePortfolios are used to achieve a greater level of individualisation in education. Increasingly, each student is looked upon as the owner of his or her own individual education. ePortfolios are a very functional means of keeping track of this "individual" educational process. The usage of ePortfolios makes a learner's identity concrete not only for evaluation by educators, but also for learners to understand themselves and to make their way into the wider world. When viewed through the lens of learner identity, the organizational principles of ePortfolios take on an added significance. It is probably beyond the realm of possibility that the online teacher, by aligning the basic raw material of learner identity with the firmly practical notion of ePortfolio development, we hope to highlight the fact that the educator is connected to final outcomes of online education in serious and meaningful ways.

A common theme of student ePortfolios is their potential to turn information and data into knowledge through two important practices: reflection and social construction. How? By giving students the tools and the context necessary to construct and reflect upon their identity over time.

## 6. Acknowledgements

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# **Valorisation of air transport infrastructure in South East Europe**

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**The EU and the countries of South East European region signed an ECAA agreement to provide a framework for the development of air services between EU and South East Europe. Development of air transport infrastructure of South-East Europe is prominent segment of connecting countries within the region and integration of the region itself in becoming one of the economic centres of Europe. Memorandum of Understanding, signed in year 2004, among regional participants from South-East Europe defines the basis for development of Core Network of South-East Europe as a part of which eleven Core Network airports were defined. After additional analysis of other six South East European international airports, which weren't originally part of Core Network, on the basis of their traffic volumes and regional importance, in year 2009 they became a part of Core Network. The geographical location of South East European airports, positioned close to national borders, and considerably small size of national markets implicates importance of airport integration in transport multimodal network. This paper will consider the levels of achievements in traffic results of airports of the Southeast Europe including organizational and infrastructure analyses of 17 Core Network airports. The paper also reviews the status of air transport sector in South East Europe in the context of intraregional air transport integration as well as integration in European air transport network.**

## **Keywords**

Airport, Air transport infrastructure, Core Network, South East Europe

## **1. Introduction**

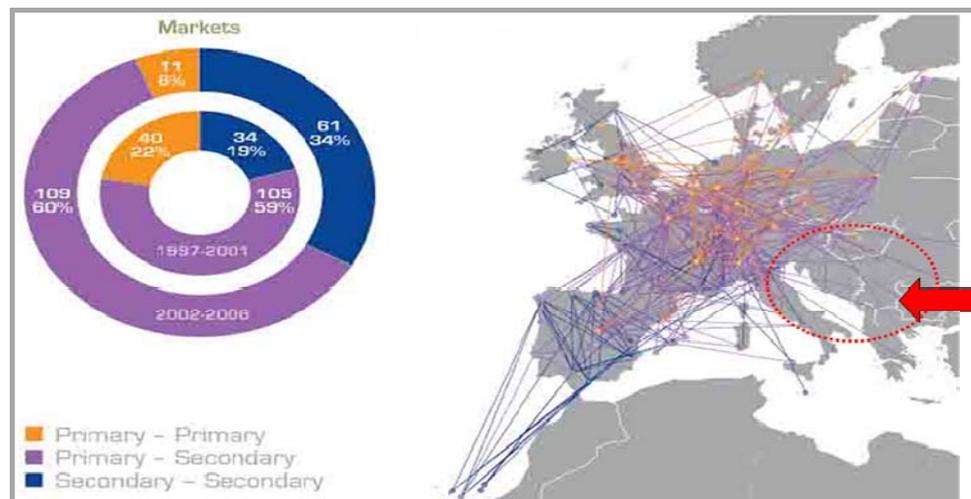
The break-up of Yugoslavia and associated confrontations caused geopolitical and economic changes in the region which influenced the reduction of air transport sector in South East Europe (further referred to as 'SEE') to a shadow of its former self. Overall traffic carried on the SEE territory by regional airlines in year 2001 represents approximately 50% of passenger kilometre (PKM) carried by Yugoslavian JAT in 1989 [1]. The creation of autonomous countries led to the creation of new national flag carriers. In year 2010 cumulative traffic volume of SEE airlines (JAT, Montenegro Airlines, Adria Airways, Croatia Airlines, Air Bosna, Air Srpska, Albanian Airlines) was three times lower than neighbouring Austrian Airlines traffic volume which reflects enormous change considering a pre war period (1989) when Yugoslavian JAT alone carried double passengers than Austrian Airlines. Comparing the CN airport performance in pre and post war period, only 3 CN airports in year 2001 traverse the traffic figures from year 1987 [2].

In recent years European airports have faced capacity crunch problems and despite 41% of capacity increase (5 new airports and 79 new runways) 11% of demand is still not accommodated [3]. This is the segment in which future role of airports in South East European region, still partly underdeveloped and with its potentials insufficiently exploited, is recognised. Accordingly, South East European Observatory's (SEETO) role is recognised in the process of upgrading the existing infrastructure to the European Union countries level. Setting up the Core Network in year 2004 among other transport modes included 11 Core Network (further referred to as 'CN') airports as a part of air transport infrastructure. Considering its traffic performance and regional importance in 2009, additional six

international airports became a part of Core Network. Regarding regional importance of retrospectively introduced six Core Network airports and recent changes in airport organisational structures and infrastructural developments, additional detailed analysis on airport infrastructure in South East Europe was perceived.

## 2. State of the air transport industry in South East Europe

Today, SEE region, concerning air transport, is a modest, undeveloped region, which represents only 1.3% of passenger transportation in the world schedule traffic and 1% of the number of international airports in the world [1]. Intercontinental transport was very significant in JAT's operations in year 1989 and today apart from middle range routes to Middle East and North Africa, does not exist from the CN airports. The densest routes are international, mainly to and from European Union, due to relatively small SEE countries areas which implicate lack of domestic traffic with exceptions in Croatia and partially Serbia. That fact highlights the importance of cross border international traffic on regional and European level. After signing the ECAA agreement liberalisation of air service occurred and the route network has grown rapidly. New established routes are connecting European destinations with SEE region serving neighbouring hub airports as feeders while main regional airport which could compare to European hubs has not yet been established. Main airports offering connecting flights are Belgrade and Zagreb although with 2.7 and 2.1 million passengers in 2010 remain small by European standards.



**Figure 1** Segmentation of air transport routes in Europe [4]

Apart of the recent global economical crisis that effected almost everybody in the world the economical progress achieved in the region in last ten to fifteen years is significant. After war boosted economy has tackled people to travel by both business and leisure reasons and such situation has created various new trip generators. Tourism development positively affected on economical situation in SEE countries and is taking more and more important role in stimulating air transport in the region. Concerning airline industry, recent economic crisis caused global airline industry net loss of 11 billion Euros in 2008 and 4 billion Euros in 2009. Drop of passenger carried and particularly the cargo traffic (-13%), witnessed the drop in demand during the year 2009 as a result of heavy turbulences on the global market. Airlines in SEE are not doing any better where Croatia Airlines recorded 13,7 million Euros loss in 2009. Even though BH airlines had 11.9 % increase of passengers' number in 2009 due to load factor hefty decrease losses were recorded. Montenegro Airlines flew 527,000 passengers in 2009, up to 4.6 % from the year earlier, but even though financial loss of minus 3 million Euros remained. MAT Macedonian Airlines is no longer flying and Kosovo Airlines does not exist anymore [5].

**Table 1** Indicators of air transport in South East Europe (2009)

Country	Passengers (000)			Cargo (kg)	Number of CN airports	Number of Airlines
	International	Domestic	Total			
Albania	1.394.688	-	1.394.688	1.863.265	1	3
B&H	532.867	221	533.915	1.923.936	2	2
Croatia	4.000.413	933.488	4.968.381	11.872.722	7	4
Former Yugoslav Republic of Macedonia	634.591	-	634.591	2.125.462	2	1
Montenegro	982.656	-	982.656	1.482.512	2	1
Serbia	2.401.185	51	2.401.236	7.080.645	2	3
Kosovo (under UNSCR 1244/99)	1.191.978	-	1.191.978	1.301.974	1	-
<b>Total</b>	<b>11.138.378</b>	<b>933.760</b>	<b>12.107.445</b>	<b>27.650.516</b>	<b>17</b>	<b>14</b>

### 3. Analysis of air transport infrastructure in South East Europe

In last decade SEE region recorded significant growth in airport traffic volumes, in some SEE countries exciding even 10%, as well as constant changes in traffic volume figures varying from - 49% in Former Yugoslav Republic of Macedonia (2001) to 109.24% in Kosovo (under UNSCR 1244/99) (2002). Such developments in traffic volumes are partly caused by the Low Coast carriers' entrance on SEE market in 2003 which is visible in traffic increase from 5.7 million in 2002 to 8 million in 2004. In last decade (2000-2009) annual growth rate of passenger traffic volumes was 7.3% and in cargo 48.14 %.

**Table 2** Core Network airports passenger volumes growth by regional participants (%) [6]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average
<b>Albania</b>	N/A	N/A	N/A	N/A	N/A	15,43	22,04	14,58	10,07	-13,87	<b>9,65</b>
<b>Bosnia and Herzegovina</b>	-9,97	-4,18	17,61	9,63	8,41	5,17	9,03	2,75	4,61	-3,01	<b>4,00</b>
<b>Croatia</b>	6,97	6,40	42,12	12,51	18,77	12,22	11,57	5,49	-5,72	-2,53	<b>10,78</b>
<b>Former Yugoslav Republic of Macedonia</b>	-49,43	3,52	-4,07	-3,34	9,14	3,03	13,34	3,72	-8,69	-8,44	<b>-4,12</b>
<b>Montenegro</b>	N/A	N/A	N/A	9,77	4,90	15,59	24,11	7,26	-11,42	15,40	<b>9,94</b>
<b>Serbia</b>	16,95	8,30	14,13	11,52	-0,25	2,57	20,42	5,09%	-10,16	8,14	<b>7,67</b>
<b>Kosovo (under UNSCR 1244/99)</b>	1,69	109,24	-1,07	9,07	2,15	-5,12	12,18	14,18	5,43	N/A	<b>16,42</b>

In spite of mentioned high air transport growth rates in the region the gap between the growing needs and demands of the travelling public, existing transport facilities and offered possibilities and capacities is vast. Recent investments in some of CN airports upgraded the level of service and increased terminal capacity but on most CN airport further investments in infrastructure and equipment are needed.

### 3.1. Analysis of Second category Core Network airports infrastructure

According to the TEN-T categorization second category airports are referred as Community connecting points. The categorisation includes all airports or airport systems with an annual traffic volume of:

- between 1.000.000 minus 10% and 4.499.999 passenger movements, or
- between 50.000 and 149.999 tonnes freight throughput, or
- between 500.000 and 899.999 passenger movements, of which at least 30% are non-national, or
- between 300.000 and 899.999 passenger movements and located off the European mainland at a distance of over 500 km from the nearest international connecting point [7].

**Table 3** Sample Second Category Core Network airports infrastructure indicators

	Operational hours	IATA Level	No Runways	Runway lengths	No Pax Terminals	Pax Terminal Area (m2)	Apron Area
Tirana	24h	NA	1	2750	1	13.000	55.500
Sarajevo	06:00 - 22:00	2	1	2600	1	46.000	8.000
Dubrovnik	4:00 - 21:00	1	1	3300	1	N/A	110.500
Split	06:00 - 22:00	2	1	2550	1	10.800	50.000
Zagreb	24h	1	1	3252	1	15.000	168.000
Skopje	05:30 - 22:30	2	1	2450	1	4.000	64.170
Podgorica	04:00 - 22:00	1	1	2500	1	5.500	33.220
Tivat	07:00 - 16:00	1	1	3252	1	4.050	40.000
Belgrade	05:00 - 23:00	1	1	3400	2	51.000	163.350
Pristina	24h	NA	1	2500	1	3.938	46.020

Applying TEN-T categorisation on Core Network airports can be noted that 10 airports based on their traffic performance (Tirana, Sarajevo, Zagreb, Dubrovnik, Split, Skopje, Podgorica, Tivat, Belgrade and Pristina) are in *second category* as Community connecting points. Second category CN airports are equipped with one runway longer than 2400 meters enabling operations of narrow and wide body jets such as B767-300 and A310-300, while airport Belgrade, Dubrovnik, Zagreb and Tivat runway systems are able to accept even wide body passenger aircrafts (B474-400, A380, A340-500). Apart from runway, other airport capacity limitations in taxiway systems, apron, gates and passenger terminal areas are probable and even though second category airport runways are capable to accommodate largest passenger aircrafts limiting factors preclude its usage. In a view of airport expansion and modernisation, preliminary process focuses on identification of priority capacity limitation facilities.

Recent decade was characterised with CN airports facilities expansions, modernisations and extensions. As a part of airports Belgrade development strategies in order to gain additional traffic volumes Terminal 2 was constructed in 2006. Today airport Belgrade is the only second category CN airport which operates on two passenger terminals comprising passenger terminal area of 51.000 m<sup>2</sup> and capacity of 5.6 million passengers annually. Prior the airport Belgrade extension, modernisation and reconstruction of airports Sarajevo (2001), Tivat (2003) and Split (2005) were made. Airport Skopje is currently implementing the project which comprises the construction of a new 40.000 m<sup>2</sup> terminal building with 6 passenger boarding bridges. By the end of construction the new airport will be able to handle a capacity of 6 million passengers per year [24]. Podgorica is second Montenegrin airport where reconstruction of terminal building in 2006 and construction of new administrative building in 2009 took place as a part of 30 million Euros worth project of Montenegrin airports modernisation and expansion supported by EIB(EIB – European Investment Bank) and EBRD(EBRD – European Bank for Reconstruction and Development) [8].

Apart from terminal and runway facilities, existence of minimum navigation aids such as runway and taxiway lighting, precision approach path indicator (PAPI), VOR(VHF Omni - directional Range), NDB(Non Directional Bacon) or DME(Distance Measuring Equipment) and ILS(Instrument Landing System) CAT(Category) I are a standard requirements for the airlines to start scheduled services from

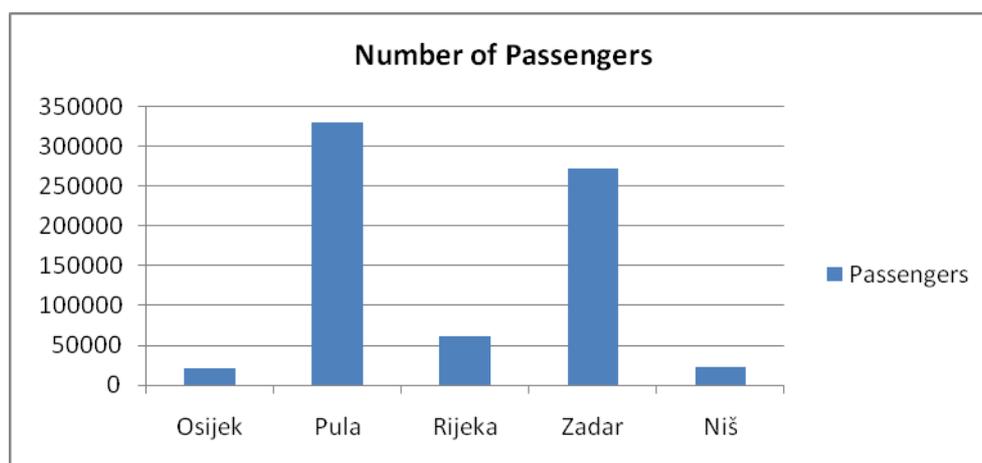
the airport. Airports Pristina and Sarajevo are subservient to bad weather conditions which reduce visibility for aircraft pilots and preclude scheduled air traffic. Most CN airports are equipped with minimum navigation aids and ILS CAT I what enables precision instrument approach and landing with a decision height not lower than 61 m above touchdown zone elevation and with either a visibility not less than 800 meters or a runway visual range not less than 550 meters. Airports Zagreb and Belgrade are equipped with precision instrument approach and landing system ILS CAT IIIb where decision height is lower than 15 meters above touchdown zone elevation, or no decision height and runway visual range less than 200 meters but no less than 75 meters.

### 3.2. Analysis of Third category Core Network airports infrastructure

Third TEN-T airports categorisation defines airports as regional connecting points and accessibility points and includes all airports or airport systems with a total annual traffic volume:

- of between 500 000 and 899 999 passenger movements, of which less than 30 % are non-national, or
- with an annual traffic volume of between 250 000 minus 10% and 499 999 passenger movements, or
- with an annual traffic volume of between 10 000 and 49 999 tonnes freight throughput.

Beside passenger and cargo volume requirements, additional criteria for airport inclusion such as location of airport on island or landlocked area of the Community with commercial services operated by aircraft with a maximum take-off weight in excess of 10 tonnes, was retrieved. A definition of landlocked area includes radius of over 100 km from the nearest international or Community connecting point. Accordingly it is noted that seven CN airports are in third category of which only Pula and Zadar meet the traffic volume criteria while the rest meet location criteria.



**Figure 2** Passenger traffic volumes on Third Category CN airports [6]

As second category CN airports, third category airports runway systems were formally used in military services and therefore its average length is 2500 meters. Lower level of third category airports importance for national governments is noted in relatively small amount of its recent reconstructions and developments.

**Table 4** Sample third category Core Network airport infrastructure indicators

	Operational hours	IATA Level	No Runways	Runway lengths	No Pax Terminal	Pax Terminal Area (m2)	Apron Area (m2)
Banja luka	NA	NA	1	2400	1	800	21.600
Osijek	07:00-14:00	1	1	2500	1	1.536	27.000
Rijeka	04:00-20:00	1	1	2500	1	7.800	33.600

	Operational hours	IATA Level	No Runways	Runway lengths	No Pax Terminal	Pax Terminal Area (m2)	Apron Area (m2)
<b>Pula</b>	W8-16; S8-20	1	1	2946	1	5.400	64.200
<b>Zadar</b>	06:00-22:00	1	2	2500	2	4.044	32.420
<b>Ohrid</b>	NA	NA	1	2550	1	2.500	38.700
<b>Niš</b>	Request 24h	1	1	2500	1	2.000	27.500

Even though airport Pula has highest passenger traffic of third category airports, last airport expansion and modernisation was made in 1989 when new terminal building was constructed enabling the airport to cope with passengers throughput of one million passengers. Airport Osijek has the smallest passenger traffic of all third category CN airports and its further development is related to the potential cargo traffic growth for which the airport has cargo storage of 2.400 m<sup>2</sup>. Ohrid airport runway system, Zadar airport terminal building and Niš airport apron reconstruction were recent expansion and modernisation projects in mentioned category [9].

#### 4. Future air transport infrastructure developments in South East Europe

Considering the valorisation of current airport infrastructure in South East Europe it is visible that future infrastructure developments are foreseen. The sector is characterised with concessions in which contracts for future 20 years and its infrastructure developments are defined. Some of airports like Tirana already finished contracted construction works and expansions and it doesn't have any huge developments on the way. Airport Podgorica was completely refurbished a few years back and today is able to accommodate one million passengers annually. Some of Core Network airports such as Airports Banja Luka, Pula, Osijek and Rijeka do not have in its short term development plans ambiguous expansions and constructions due to small traffic volumes and no potential for its increase in near future. Airports Belgrade with future investments of 118 million Euro, Zagreb with 270 million Euros and Pristina with 140 million Euros are contrariety and its development plans for expansions and modernisations will be shortly in the process. The management of Belgrade airport and the Government of Serbia plan to invest 118 million Euros into the expansion of the terminal building, a second runway and an office block for the airport's management. The expansion of Terminal 2 would upgrade the airports capacity to over five million passengers per year.

According to accepted proposal, investments needed to extend and modernise airport Zagreb in predicted amount of 270 million Euro are double higher than the ones needed for airport Belgrade [9]. The multi million Euro project will be carried out within the next ten years and it will be carried in three stages with the final goal of increasing airport capacity from current 1.5 million to 4 million annually. Final airport capacity would be 5 to ultimate 5.5 million passengers while terminal building would consist of 9-10 air bridges, 15 gates and apron would be able to accommodate 20 aircrafts [10]. It is the most enthusiastic project in the region but due to financial crisis the realisation of the project is uncertain at the present time. One of the investments solutions, beside cohesions funds, is private sector investment through a concession agreement similar to one, which was done in airport Pristina [11].

Comparing development plans of airports Belgrade, Zagreb and Pristina which have highest development potentials, certain similarities of terminal buildings capacity projections (4 - 5.5 million passengers) are visible while only airport Belgrade plans to construct new runway and it can be stated that airport Belgrade with two runways might have a sort of advantage in taking over a position of a regional hub. Airport Skopje, with TAVs 200 million Euros foreseen investments and current capacity extension to 6 million passengers yearly, is also in competition for taking over the title of a regional hub.



**Figure 3** Future layout of airport Zagreb

Summarising all stated future investments it can be noted that airport Skopje is planning to make largest airport capacity expansion to 6 million passengers annually, Belgrade and Sarajevo are planning to construct additional runway while Zagreb is planning to make new modern terminal with highest investment need. Regarding airport infrastructure in correlation with current and future traffic volumes airports Belgrade and Zagreb, if they manage to accomplish their development plans, have highest potential to become regional hubs.

## 5. Conclusions

More and more European airports are facing congestion problems as the gap between airport capacity and the demand for airport services is widening. Core Network airports are situated in relatively undeveloped region and with its current sufficient capacity and its future development plans are seen as a potential solution to the 'capacity crunch'. A better use of existing airport capacity and support of new infrastructure, development of new technologies and integration and collaboration with other transport modes promoting multimodality is a key to success, while the lack of multimodal connections with other transport systems (rail in particular) goes to further undermine the efficiency and potential of Core Network airports. In the transport infrastructure and the multimodal connections upgrading process, South East Transport Observatory is an important mean and its role has been recognised. Even though many CN airports have sufficient infrastructure capacity, lack of correspondent passenger throughput enable airports to cover its investments into new infrastructure which is the reason for applying other investments possibilities such as concessions. With the right policy framework and a privatization of state owned airlines and airports, the private sector should be able to stem most of the investment needs for fleet renewal and infrastructure expansion. After possible initial costs associated with sector restructuring, the net effects of air traffic growth are thus likely to increase the fiscal space of governments, rather than reduce it, while economical improvement of the region and improved intraregional connectivity would have positive effect on overall regional development.

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# Financing of sustainable development – the case of Serbia

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Current world economy crisis change a major recognition about definition of free market and liberalization. According to estimation of WTO, in 2009, world trade volume would be lesser by 9% at least, in relation with previous year. Up to now, trend of international trade indicate continuing and accelerate growth. However, World Bank' projections reports decreasing of prices of many products (i.e. oil, raw material, non ferrous metal, products of black metallurgy) and various types of services in current year related with previous.

Recent forecasts predicted that value of world trading of products and services will significantly lesser than in last period. This tendency already hardly affected countries which have extremely high so-called export ratios and it will have negative consequences for countries where earnings from service' export hold very high position in FX income. This study predicts that dozen countries with extremely high indebted, should face with huge problems because of abovementioned problem. A number of other countries, due to decreasing of value of export products and services, will be included in the category of highly indebted. It wills, of course, multiple impacts on the competitiveness of countries in transition, where Serbia belongs. As country with very high extern debt, Serbia has, in its recent history, one of the most in the exchange of goods and services - 11.51 billion dollars

This work is aimed at identifying the most important factors of financing sustainable growth in terms of global financial crisis and overcoming the most often obstacles.

## Keywords

*Sustainable growth, global economic crisis, financing, liberalization*

## 1. Introduction

In the past 15 years, developing countries, their growth and share of global trade has shifted the direction of the trade flows and the political power equilibrium. The economic and financial crisis, which has taken a heavy toll on poorer countries, has added new pressing challenges and brought to the attention of the international community the need to rethink the overall structure of global governance. Beyond the political and economic sphere, the forces shaping world trade can also be identified in the increasing role of non-state actors, the growing pull of social demands and the technological changes that influence the way business is conducted and the way people interact. The link between these forces raises both hopes and concerns on how they impact on economic growth, poverty reduction and the sustainable development, as well. According to estimation of WTO, in 2009, world trade volume would be lesser by 9% at least, in relation with previous year (3). Up to now, trend of international trade indicate continuing and accelerate growth. However, World Bank' projections reports decreasing of prices of many products (i.e. oil, raw material, non ferrous metal, products of black metallurgy) and various types of services in current year related with previous.

Ever since the western Balkans' emergence from the violence of Yugoslavia's demise, the region has exhibited a growing democratic maturity. Elections have successfully been held in the region, and most states have seen peaceful changes of government. Some of these governments are unstable,

but then so are many coalitions elsewhere in Europe. The democratic transition in South Eastern Europe is today clearly irreversible.

Despite years of progress, however, the work of the region's good neighbours is not over yet. Numerous bilateral conflicts still exist and peaceful relations between these societies are far from guaranteed. Slovenia is the only ex-Yugoslav state to have joined the EU so far, and the membership prospects of the others remain clouded. The fight against organized crime is in most of these countries another formidable challenge, and one which has direct implications for the rest of Europe.

## 2. Serbia and sustainable development

At the end of 2006, countries of South East Europe signed unique multilateral free trade agreement and they expand existing CEFTA, under revised conditions for countries which has not yet become members of World Trade Organization (Serbia, Bosnia Herzegovina and Montenegro). The new multilateral agreement regulates investment, non-tariff barriers, intellectual ownership, protection criteria's, solving litigation and arbitration.

As key point of the Agreement, the rules of diagonal accumulation of origin of merchandise is created this implies that products from free trade area bring mark, made in CEFTA "in case of export to other countries?

Ratification of CEFTA has strong marketing aspect for Western Balkan countries; by reason of guarantee to foreign investors that invest in region is good decision (2). Key problems of this agreement are non-custom barriers.

Therefore, improvement of business and investment environment is imperative for South Europe's countries, as well as for Serbia. Considering macroeconomic stability is almost accomplish (although reform processes in all countries are not fully complete yet), infrastructure is on satisfactory level, political and institutional stability for region's countries is still significant factor which effects level of investment in these countries. Considering that development of countries in region is based on foreign direct investments, there is a need to observe its real influence on economic growth of every individual country. Moreover, Serbia needs to promote attractive investment politics for the region which will in turn stimulate and expand foreign investment (4).

## 3. Doing business in Serbia

Serbia is ranked 89 out of 183 economies and 83 overall for Starting a Business in 2011. That includes that Serbia has improved her business and investment environment, despite very difficult economic occasions.

**Table 1** Performances of Serbian economy

REGION	Eastern Europe & Central Asia
INCOME CATEGORY	Upper middle income
POPULATION	7,319,712
GNI PER CAPITA (US\$)	5,990.00
DOING BUSINESS 2011 RANK	89
DOING BUSINESS 2010 RANK	90
CHANGE IN RANK	↑ 1

Source: Doing business in... Serbia

**Table 2** Investment ranking of Serbia

TOPIC RANKINGS	DB 2011 Rank	DB 2010 Rank	Change in Rank
Starting a Business	83	75	↓ -8
Dealing with Construction Permits	176	174	↓ -2
Registering Property	100	105	↑ 5
Getting Credit	15	14	↓ -1
Protecting Investors	74	73	↓ -1
Paying Taxes	138	134	↓ -4
Trading Across Borders	74	71	↓ -3
Enforcing Contracts	94	94	No change
Closing a Business	86	101	↑ 15

Source: Doing business in...Serbia

Economic environment in Serbia, by many criteria's, is much more attractive then before for setting up of new CEFTA, and its possibilities which arise due to extension of markets for more then 30 million citizens (after acceptation Bulgaria and Romania in EU).

Serbia will be very attractive location for investments in next few years, because of stronger integration processes in field of trade liberalization will make the small and uninteresting markets to become one large and „investor friendly“destination. Also, adjustment of institutional regulative and laws in field of investments, as well as stronger protection for investors in region are already giving tangible results.

Due to this task, there are many programs and subsidies lunched in Serbia to stimulate foreign direct investment, as a key factor for achieved sustainable development in long terms.

Companies in Serbia will now be eligible to receive higher subsidies from the National Employment Agency for hiring workers ranging from 100,000 to 400,000 dinars (roughly €1,000-4,000) per new worker (5). The main criterion for determining the level of subsidies is the development level of the municipality. When discussing grants that the Ministry of Economy gives to investors who employ new workers a total of 151 projects worth 691.5 million euros had received financing and that various companies had been granted 84.9 million euros worth of grants from the program. Due to these grants, 22,719 have been employed, while the average value of subsidies per newly employed worker amounts to EUR 3,413. Investors do not get subsidies on the basis of a promise that they will hire workers. Instead, they must submit a bank guarantee that will be charged, along with the interest, if they do not fulfill their obligations.

Serbia has signed a bilateral protocol on the liberalization of markets for goods and services between Serbia and the EU within the framework of Serbia's accession campaign to the World Trade Organization (WTO).

The protocol is crucial for concluding bilateral talks with other WTO members, which is a sign that Serbia's accession process is entering its final stage. Serbia began the WTO accession process, which requires the full alignment of the country's entire economic system with the rules of this organization, in February 2005. WTO membership brings a variety of benefits, the most important of which are predictability and a more stable environment for foreign investors.

## 4. Conclusions

Just two of the seven western Balkan countries – Croatia and Macedonia – are official EU candidate countries. The international outlook for south east Europe is also very different from a decade ago. After NATO intervened in the Yugoslav conflict, the Stability Pact for South Eastern Europe was founded to provide crisis management. The uneasy truce was at first only possible thanks to intervention by the U.S. and the European Union. Now, countries across the region have a clear European perspective and multilateral contacts between national governments are well established.

Despite years of progress, however, the work of the region's good neighbours is not over yet. Numerous bilateral conflicts still exist and peaceful relations between these societies are far from guaranteed. The fight against organised crime is in most of these countries another formidable challenge, and one which has direct implications for the rest of Europe

Probably the greatest concern for south east Europe, and Serbia, too, is the economy. Important foundations have been laid to improve the country's economic situation, and growth rates have risen substantially. But the pace and sustainability of this expansion are cause for anxiety, especially in the current financial crisis. Development in Serbia has been uneven, and what direct foreign investment there is it has been spread unequally. The income gap between rural areas and the capital cities is still sometimes very wide, and parts of the country suffer from high unemployment and serious shortages of investment capital. International loans to increase investment will inevitably become even harder to obtain now that the financial impact of the global banking crisis is worldwide. Continued regional development requires stability and yet more economic reforms, combined with a stronger focus on the social consequences of the current situation.

All these economic difficulties should not, however, obscure the progress achieved so far, nor should the vital contribution of the international community be overlooked. Development has relied on coordinated international support, particularly from the EU, and this will continue to be of critical importance. The Central European Free Trade Association has now established a market of 55m consumers, and the current initiative for an Energy Community of South Eastern Europe is a training ground for future integration into the internal European energy market. It should be seen as a form of pre-emptive sectorial integration into the EU.

Obviously, significant issues remain outstanding for Kosovo. Recently discoveries about war crime done by Kosovo's officials put Kosovo in very unlikely position. Even if attempts to attract inward investment to Kosovo are successful, it will be impossible to create enough jobs for the whole working age population. Some 70% of Kosovo's population are less than 30 years old, so its unemployed youth will many of them be forced to leave the country. Until a solution is found, Kosovo risks becoming a black hole on the Balkan map, unable to take part in cooperative ventures with the rest of the region. That would help neither Kosovo nor the other Balkan countries.

The future Serbia within the EU is therefore still in the balance. On the one hand, Serbia will have to wait on developments in Brussels and other EU capitals. On the other, the most essential decisions lie within the country's own grasp. These countries still have further to travel in the right direction and they have to be able to stick with the Copenhagen-criteria for EU membership. Perhaps the next year or two may mark a turning point on some of the outstanding issues to be resolved before country can expect to join the EU. In a world preoccupied by economic recession and the global banking crisis, the Balkans remains part of Europe, and will loom ever larger on its list of unfinished business.

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# New venture creation stimulated by higher education institutions through innovation networks

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This paper aims to analyse whether the new venture creation is stimulated by practices developed by higher education institutions through innovation networks. Thus, the study examined the relation between the propensity of creation new firms and six factors determinants, namely: the best forms used by HEIs for fostering new venture creation, prior entrepreneurial experience in creation of firm; prior experience in sector, type of higher education institution, levels of education and area of education. We included three control variables associated individual level characteristics, namely: age, sex and perceived family business support. To gather data, a questionnaire was completed by nascent entrepreneurs born within HEIs, and 255 answers have been collected. The empirical research uses binary logistic regression analysis and is based on a University sample of nascent entrepreneurs and Institute Polytechnic sample of nascent entrepreneurs in Portugal. Results show a positive relationship between prior entrepreneurial experiences increases the probability of to entrepreneurial intentions for creation a new firm, as well as the prior experience in sector. The propensity of creation new firms differs in the tow higher education institution. The results obtained about the best forms used by HEIs for fostering new venture creation, show that cooperation and research and development developed in HEI in result of relationships with other agents in the innovation network emerge as the main form through which HEIs stimulate new venture creation. In general the empirical research found strong evidence of the importance of HEI to fostering the new venture creation when inserted in innovation networks. The main contribution of the present study is to propose a model which embraces internal and external factors, to determine the propensity of creation new venture aiming to increase the comprehension of entrepreneurial process and identifying the main factors in this process.

## Keywords

Higher Education Institutions, Innovation Networks, Nascent Entrepreneurs, New Venture Creation of Firms,

## 1. Introduction

Within the framework of intense globalization and increasing competition of all economic activity, new venture creation contributes to the introduction in the business sector of new technologies, new products/services and new forms of organization, and has been found to be one of the fundamental factors of economic growth, job creation, market efficiency, renewal of economic structure and spread of innovation, as well as one cause for improved global competitiveness ([1], [2], [3], [4], [5], [6]). In

parallel, innovation networks have been recognized as an important enabler and catalyser of firm creation since, besides allowing the reduction of uncertainty through cooperation among agents, they also facilitate the production and sharing of knowledge and of other scarce resources, of costs and risks, and, among other benefits, allow efficiency gains due to different forms of work allocation ([7], [8], [9], [10]). In advancing and energizing innovation networks, higher education institutions (HEI) play an important role since they act as hubs where the various contributions offered by the network are ignited and disseminated, not only locally and regionally but also nationally and globally through different means as, for instance, the production of this humble paper ([9], [11], [10]).

Currently, in the European Union, with escalating unemployment rates and lethargic economic growth, to stimulate a *certain kind* of entrepreneurship that may lead to venture creation is a measure favoured by many governments as a possible contributor to the minimization of economic and social problems. This is also the case in the Portuguese context where these problems are particularly serious. Considering the recognized importance of innovation networks in firm creation and of the role HEI play in stimulating these innovation networks; considering also that this phenomenon has been little studied in Portugal, this research intends to analyse a specific set of factors that the literature has established as contributing to venture creation and answer the following broad question: Considering the role that Higher Education Institutions play within innovation networks in promoting venture creation, which variables are most likely to influence nascent entrepreneurs to start a company?

The paper is structured as follows: the first section reviews the literature on venture creation associated with innovation networks. Next, we present the research design and the method that led to the construction of the conceptual model guiding the research. The following section describes the model and hypotheses. In section five, the results are presented and discussed. Finally, the sixth section presents the final conclusions and offers suggestions for future research on the topic.

## 2. Literature review

Innovation networks are systems composed by diverse subjects/entities whose interactions, dynamism, trust and relationships enable knowledge and innovation transfer. For the last two decades, the phenomenon of entrepreneurship has emerged in connection with network research ([12], [13]) as its very significance – inter-personal and inter-organizational relationships – is seen as the means by which actors gain access to a variety of resources (including knowledge) helped by other actors ([12], [14]). HEIs are, by nature, an important source of knowledge. When competitiveness was based on routine tasks, HEIs played an important social, political and cultural role, but their role in economic terms was less evident and mainly consisted in the training of future venture collaborators ([11]). As competitiveness befell dependent on knowledge, ideas and creativity, HEIs became crucial for economic development, the concept of entrepreneurial universities emerged ([15], [16], [17], [18], [19], [11]) and they gradually became central actors in a knowledge-based economy. The expectation is for universities to be active in promoting innovation and technological change ([20]).

In this context, entrepreneurial universities are themselves actors in an innovation network made up of diverse actors where government and public policies also have a relevant role. If, to be able to more effectively disseminate their knowledge to other actors, HEIs would better be inserted in innovation networks, how can they stimulate the proliferation of knowledge and venture creation within them? Venture creation relates to any newly and legally set up company that is at a launching or initial stage and is less than 12 months old from the date of the declaration of beginning of activity.

The process of developing an innovation network is related to the very characteristics of the entrepreneurs at the initial stage of creation. When, for example, an entrepreneur develops his business plan within an innovation network, it is expected this will be of higher quality since he will be able to incorporate the benefits of the network in the plan: the closer the contacts between the various network actors, the higher the quality of information ([12]).

The entrepreneurial process, according to [21], consists of distinctive activities, such as identification of opportunities, mobilization of resources and creation of an organization. It follows that HEIs will be understood as actors *par excellence* to integrate an innovation network, since they possess teaching staff and various units of research that can help venture start-ups and young entrepreneurs to identify opportunities, mobilize resources and create an organization ([22], [9], [23], [24], [25]). In fact, they make key contributions by generating new ideas and knowledge and embedding them not only in the basic disciplines that are their traditional core, but in new programs as well. With the increase of demand for knowledge and practical applications these new programs tend to be more applied in nature and adapted to the world of work. A crucial distinction between applied programs and basic

disciplines is their orientation towards making a contribution to society beyond the walls of the HEI. To be sustainable over time, applied programs require a demand and interest outside the HEI. On the one hand, their development and evolution are typically formed by society's needs and interests; on the other, the evolution and development of basic disciplines tend to be moulded and influenced by the disciplines themselves (evolution of knowledge) ([11], [13]).

However, not even the addition of applied research and professional education generates sufficient spillovers from the source of knowledge – the HEI – to commercialize the increased generation of innovations in regional and national economies: to invest in traditional subjects and applied programs is not enough. In an effort to penetrate the knowledge filter and ease the spillover of generated knowledge and ideas from the HEI into the society, a third area has been developed representing the necessary means for transferring knowledge and technology created in the HEI, namely: technology units, incubators and research centres. These units have mechanisms that aim to facilitate the spillover of internal knowledge to the outside ([13], [26], [27], [28]).

As referred above, knowledge spillovers are the way of transferring knowledge directly or indirectly from one party to another ([29], [30], [31]). They are generated by institutions that have innovative activities and are valid because these activities provide knowledge that is new and relevant to the receiving institutions ([29], [30], [31]). Therefore, HEIs will transfer the knowledge they create through an innovation network, but will also receive knowledge and innovation generated by the various actors making up that network.

### **3. Research Design**

To answer the broad question articulated in section 1, we started by reviewing the literature on current approaches on firm creation through models of innovation networks to support the basic idea of the importance of such networks in the process of firm creation since they allow weaknesses to be overcome and positive aspects to be strengthened, and consequently influence the process of firm creation. Our main intention with this paper is to study a specific set of factors within HEI and their contribution to firm creation within innovation networks, and therefore we will not join the debate on whether or not innovation networks do support this process by consequently exposing their possible flaws: we assume that they do play a positive role and that this positive role by far exceeds any negative facet.

The literature review enabled to design a questionnaire sent to 834 participants in entrepreneurship events promoted by state-owned HEIs in Portugal. The questionnaire results were submitted to factor analysis and the ensuing factors enabled the construction of a conceptual model (Figure 1), which was then subjected to logistic regression. Next we present and discuss these results.

#### **3.1 Sample and data collection**

The data used were gathered from a questionnaire administered to nascent entrepreneurs linked to HEIs in the state-owned sector in Portugal. The questionnaire contemplated potential entrepreneurs, i.e. people who were interested in starting a new business, who hoped to be the owners of a new business or of part of it, and/or who had been active in trying to start up a new business in the last 12 months ([32]). In this study, the population is made of all potential entrepreneurs from universities and polytechnics in the state-owned sector, that is, of individuals who participated, of their own free will, in events aiming at venture creation and/or at the development of entrepreneurial initiatives, namely: (i) entrepreneurship competitions (Empreenda'09, PoliEmpreende 6th Edition and START 2009) and (ii) technologically-based entrepreneurship courses (CEBT and CEBCT). The questionnaire was sent to 834 participants and successfully completed by 255, which represents a return rate of 31% and produces a sample error of 5,2% according to the calculation method suggested by [33].

#### **3.2 Factor analysis**

The majority of respondents are male, belong to the sub-system of polytechnic education and are part of the age group between 20 and 30. In the case of the university education, the age-group of the majority of the respondents is between 20 and 35. According to [32], the age of nascent entrepreneurs is related to expectations of return on investment, together with their academic qualifications, aversion to risk and the characteristics of the region where they live. It can be summarized that the respondents, whatever the sub-system of higher education they belong to, have in most cases a first

undergraduate degree, mostly Economics/Business or Engineering (around 91% of respondents). Another finding within the general aspects of the research is that respondents stated to be willing to pay for specific entrepreneurship training but, in their opinion, this should be included free of charge in their academic studies.

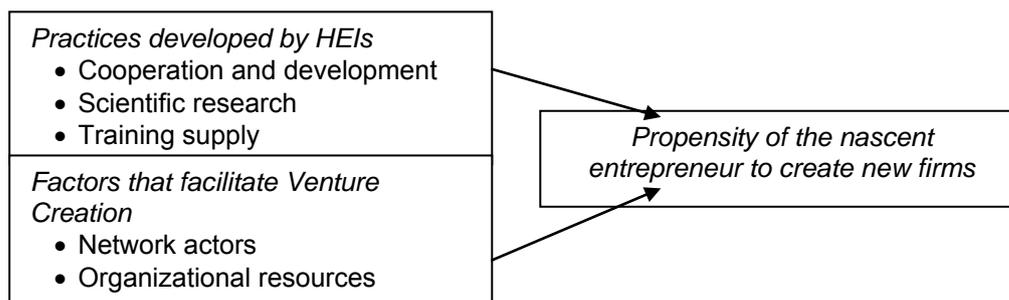
The data obtained from the questionnaire were subjected to factor analysis in order for us to reduce observed variables and get a potentially lower number of unobserved variables called factors. Considering our aim to *identify the practices developed by HEI to stimulate venture creation* we used factor analysis with principal component analysis and varimax rotation with the Kaiser– Meyer – Olkin KMO (0,80) method Bartlett Test of sphericity =631,879 and significance < 0,001 providing support for convergent validity. From the data analysis three factors emerged: *Factor 1 - Cooperation & development* (composed by Partnerships with HEIs; Post-graduate courses; Masters; Organizations; Partnerships with businesses); *Factor 2 - Scientific research* (composed by Conferences and Seminars; Dissemination through articles; Publication of pedagogical material) and *Factor 3 - Training* (composed by Entrepreneurship courses; Entrepreneurship competitions; Subjects included in degree courses). We find that cooperation and development, which cover various forms of cooperation with other organizations and consultancy, are believed to be the best practices developed by HEIs, as they reach a wide public and are an excellent way for HEIs to encourage entrepreneurial activities.

Concerning the objective of *identifying what facilitates venture creation*, the data obtained from the factor analysis allowed the identification of two factors: *Factor 1 - Network actors* (composed by Training provided by professionals in the business sector; Participation/proximity of the school to organizations related to entrepreneurship); *Factor 2 - Organizational resources* (composed by Services provided to the Community; Information, orientation and accompaniment provided by bodies existing in the school; Training given by teaching staff). Principal component analysis and varimax rotation with the Kaiser– Meyer – Olkin KMO (0,54) method were used, Bartlett Test of Sphericity = 93,994 and significance < 0,001, providing support for convergent validity.

Based on these results and on the literature review, we propose a conceptual model and a set of hypotheses as described in the chapter that follows.

#### 4. Model and hypotheses

The proposed model is presented in Figure 1. It considers that the dependent variable – the propensity for new venture creation – is explained by a set of explanatory (independent) variables under the above mentioned two groups of factors: (i) “practices developed by HEIs” include: cooperation and development, scientific research, training supply; and (ii) “factors that facilitate venture creation” include: network actors and organizational resources.



**Figure 1** Proposed Model

From the literature review and the conceptual model proposed, a set of hypotheses has been formed and will be tested empirically. Concerning the practices developed by HEIs that influence venture creation, the present research considers three factors: (1) the *cooperation and practices developed* by HEI in terms of partnerships with agents and business and courses that involve the participation of these partners; (2) *scientific research* comprising conferences, seminars, publications and other forms of dissemination; and (3) *training supply* provided by HEIs. Therefore, the following hypotheses are presented:

*Hypothesis 1: The capacity the HEI has to cooperate and build relationships with other agents is positively related with the propensity of the nascent entrepreneur to create new firms.*

*Hypothesis 2: The capacity the HEI has to develop scientific research is positively related with the propensity of the nascent entrepreneur to create new firms.*

*Hypothesis 3: The training supply provided by HEIs is positively related with the propensity of the nascent entrepreneur to create new firms.*

It should be noted however that, in a knowledge and information society, the people best prepared to create and grow ventures based on new technology, and therefore with high added value, able to compete internationally and create well-paid employment, are those who are technically better prepared and motivated ([10]). Both factors will contribute to increased entrepreneurial capacity and this, in turn, will influence future economic development ([34], [20]). Our aim is then to identify and analyze the *organizational resources of the HEIs and networks used by HEIs* to encourage venture creation. The following hypotheses are intended to investigate whether the second group of factors in the model influence the propensity of a nascent entrepreneur to create firms are presented:

*Hypothesis 4: HEI networks with other agents influence positively the propensity of the nascent entrepreneur to create new firms.*

*Hypothesis 5: The organizational resources of the HEIs influence positively the propensity of the nascent entrepreneur to create new firms.*

## 5. Logistic Regression Model

From the theoretical literature review and the proposed conceptual model it is clear that new venture creation is a complex phenomenon influenced by a wide range of factors. Being essential to our research to explore the relationships between these factors and the propensity for new venture creation, specifically the statistical relationship between one dependent variable and more than one explanatory variables, we decided to use the Logistic Regression Model (Logit Model). This model has been one of the most frequently used in empirical studies ([33]) thus constituting an appropriate analytical technique in terms of the proposed conceptual model since this includes one categorical dependent variable (binary or dichotomic), several independent variables, also categorical, and control variables, as follows:

$$NVC = \beta_0 + \beta_1 F_1 + \beta_2 F_2 + \beta_3 F_3 + \beta_4 F_4 + \beta_5 F_5 + \beta_6 F_6 + \beta_7 F_7 + \beta_8 F_8 + \beta_9 LE\_1 + \beta_{10} LE\_2 + \beta_{11} LE\_3 + \beta_{12} LE\_4 + \beta_{13} LE\_5 + \beta_{14} AE\_8 + \beta_{15} AE\_1 + \beta_{16} AE\_2 + \epsilon_i$$

Where: NVC = New venture creation;  $\epsilon_i$  = error term  $\beta$  = Coefficients  $F_1$  = cooperation and develop;  $F_2$  = Scientific Research;  $F_3$  = Training supply;  $F_4$  = Network actors;  $F_5$  = Organizational resources;  $F_6$  = Prior entrepreneurial experience;  $F_7$  = Prior experience in sector;  $F_8$  = type of HEIs;  $LE\_i$  = Level of education;  $AE\_i$  = Area of education.

1) Dependent and Independent Variables: In this study the propensity to create new ventures is measured from the information gathered about potential entrepreneurs' intentions to create a new venture or to develop a new project within an existing venture. Thus the propensity of the potential entrepreneur to create a new venture is considered as the dependent variable (CNV). This dimension is a dichotomic variable based on binary data. It takes the value 0 for potential entrepreneurs who do not have the intention to create a new venture and the value 1 for those who have the intention to do so. Concerning independent variables, these are represented by the factors that stimulate venture creation ( $F_i$ ). This research only took into account whether the factor functioned as a driver for new venture creation. The independent variables were subjected to factor analysis and are represented by the best practices that stimulate venture creation and by the factors within HEIs that facilitate venture creation.

2) Control Variables: We included the following controls for the potential entrepreneur: (i) prior experience; (ii) the type of HEI attended; and (iii) the subject level and area of education. "Prior experience" represents both experience as an entrepreneur and sector experience. Previous professional experience can provide useful skills that will be extremely important in the process of creating a business ([35]) and the survival and success of new organizations largely depend on their founders' previous experience ([36], [37], [38], [39], [40], [41]). The control variables *prior entrepreneurial experience* and *prior experience in the sector* are also dichotomic variables based on binary data: they take the value 1 if the respondent has prior experience and value 0 if he does not. [42] claims that the knowledge and skills entrepreneurs possess are not only the result of their previous professional experiences but of education too. Therefore the type of HEI attended is also considered a critical control variable and we distinguish it according to whether the subject attended a university or a polytechnic institute. The variable *type of HEIs* is again dichotomic based on binary data: it takes the value 1 for university and value 0 for polytechnic institute. Other critical control

variables are directly linked to the level and area of education of the nascent entrepreneur. In order to measure levels of education, five variables were created: (1) primary; (2) secondary; (3) undergraduate; (4) master and (5) doctoral level. As to area of education three variables were created: (1) economics and management; (2) engineering and (3) other areas of education.

According to the Wald statistics we detect that all the estimates of the regression parameters are statistically significant up to 5%, except for the relationships established with competitors. The regression results for the model show that not all regression parameter estimates are statistically significant at a level of 5%. Regarding adjustment quality of the model, the results show that the predictive capability of the model is 82,7%, which is a consequence from the comparison between the values of the variable "response values" predicted by the model and those observed. The Chi-square statistic test has a value of 77,281 with proof value less than the significance level of 0,001. The log-likelihood statistics, with a value of 191,797, corroborates the global significance of the model.

*Hypothesis<sub>1</sub>* relates the propensity of the nascent entrepreneur to create new firms with the capacity of the HEI to cooperate and build relationships with other agents and to develop courses that involve the participation of these partners. This hypothesis is presented as being significant at a level below 0,05 and with a positive effect. In this way, the nascent entrepreneurs linked to HEIs that have cooperation and develop these practices are more prone to create a new venture than others. This finding is corroborated by results obtained by [25], [14], and [41]. *Hypothesis<sub>2</sub>* associates the capacity of the HEI to develop scientific research with the propensity of the nascent entrepreneurs to create new firms. Results show that this capacity does have a positive and significant effect in the propensity of the nascent entrepreneurs to create new firms (0,672) thus strengthening the conclusions of studies carried out by [26], [14], and [25]. *Hypothesis<sub>3</sub>* is aimed at studying empirically if the training provided by HEIs relates positively with the propensity of nascent entrepreneurs to create new firms. However, results show that the training supply provided by HEIs does not have statistical significance in the model, so there is no conclusion to be drawn from the effect of this factor. *Hypothesis<sub>4</sub>* associates the capacity of the HEI to develop contacts between the various network actors with the propensity of the nascent entrepreneurs to create new firms. Results show that this capacity has a positive and significant effect in the propensity of nascent entrepreneurs to create new ventures (0,687), which supports the conclusions of studies carried out by [12], [23], and [14]. Concerning *Hypothesis<sub>5</sub>*, the results do not have statistical significance in the model. Therefore nothing can be concluded as to the influence of organizational resources of the HEI on the propensity of nascent entrepreneurs to create new firms.

By adding the control variables we intended to test the robustness and consistency of the explanatory variables of the final model compared to the initial model. With this inclusion and analyzing the explanatory variables of the final model compared to those of the initial model, we found they have the same behaviour, concerning both the exact estimate of parameters and the level of significance. It is therefore possible to confirm the consistency of the variables and the robustness of the model.

## 6. Conclusions

This study is a guide to allow higher education institutions to identify and analyze the possible relationships between the nature of HEI actions and new venture creation within innovation networks. As the literature demonstrates, venture creation is influenced by a vast and complex number of factors, which only partially are dealt with in this study as per the model in Figure 1. However, a set of internal and external factors of HEIs stood out as being able to influence venture creation within innovation networks. By analyzing the contribution of each one of these factors to the phenomenon of venture creation triggered by HEIs, it was found that the variables associated with HEIs and innovation networks are connected to the relationships HEIs form with existing organizations, with the knowledge they have available, with the training they provide, and with the forms and activities that stimulate venture creation and which they use.

As to *identifying the practices developed by HEIs to stimulate new venture creation*, according to the literature, cooperation and development are considered the best ways for HEIs to encourage entrepreneurial activities. However the respondents in our study also favour scientific research, a situation that will probably have to do with the demands of the market to guarantee the creation and development of new businesses by nascent entrepreneurs. Regarding the objective of *identifying what facilitates venture creation* the nascent entrepreneurs surveyed selected as the most important the factor "network actors". As the very name indicates, this factor covers whatever incentivizes and dynamizes the diverse elements integrating the innovation network, promoting knowledge sharing and support to nascent entrepreneurs at the various stages of venture creation. Concerning *prior*

*experience*, we can conclude that a prior entrepreneurial experience influences positively the propensity of the nascent entrepreneur to create new firms. From the answers given by the respondents, we can verify that the nascent entrepreneurs with previous entrepreneurial experience have an advantage in developing activities related to creating new firms compared to other entrepreneurs. We can also verify that a prior sector experience influences positively the propensity of the nascent entrepreneur to create new firms because they have an advantage in developing projects and in creating firms, compared to others. Therefore we can conclude that previous experience in the sector has a significant and positive effect on nascent entrepreneurs' propensity to create firms. This study is not, of course, without limitations. The main limitation is certainly that the subjects are only drawn from participants in selected competitions and training courses. Considering how important it is for Portugal to get broader and deeper understanding of the factors that HEI can improve in order to increase venture creation, future research could broaden this scope and could also study the various ventures formed identifying which institutions stimulated their creation.

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# Technology Transfer and Government Policy in the Wind Energy Industry

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**We analyze how innovation in the U.S. wind energy industry has been impacted by changes in federal government wind energy R&D funding and by technology information flows from wind turbine manufacturers in Europe.**

**The U.S. is the birthplace of the modern wind industry, with policy initiatives following the 1973 oil crisis resulting in the California “wind rush” and the development of wind farms in the 1980s. However, the industry soon became dominated by European firms, with Danish manufacturers responsible for half of the turbines in the U.S. by 1986. During the late 1980s and 1990s, U.S. manufacturers continued to lose ground to European competitors, particularly from Denmark, Germany and the Netherlands. However, several “green energy” policy initiatives revitalized the U.S. industry from 1999 on. Since 2005, the number of new wind energy installations in the U.S. has grown by 50 percent a year, and the increasing demand for wind energy has spurred domestic production of wind turbines.**

**We find that reductions in government wind energy R&D funding have resulted in greater technology transfers in wind energy innovation from Europe to the U.S., but that a larger impact on technology transfers comes from rising oil prices.**

## Keywords

Innovation, patents, wind energy

## 1. Introduction

The U.S. is the birthplace of the modern wind industry, with policy initiatives following the 1973 oil crisis resulting in the California “wind rush” and the development of wind farms in the 1980s. However, the industry soon became dominated by European firms, with Danish manufacturers responsible for half of the turbines in the U.S. by 1986. During the late 1980s and 1990s, U.S. manufacturers continued to lose ground to European competitors, particularly from Denmark, Germany and the Netherlands. However, several “green energy” policy initiatives revitalized the U.S. industry from 1999 on.

During the last few years, the number of new wind energy installations in the U.S. has grown rapidly, and the increasing demand for wind energy has spurred domestic production of wind turbines. By 2008, the U.S. had passed Germany to become the world’s largest producer of energy from wind and with the world’s largest installed capacity of wind power [1]. The U.S. wind industry broke industry records by installing close to 10,000 megawatts of new wind power capacity in 2009 [2], but China became the largest manufacturer of wind turbines [3].

U.S. President Barack Obama put great emphasis on creating incentives to invest in clean energy in his January 27 2010 State of The Union address stating that “providing incentives for energy-efficiency and clean energy are the right thing to do for our future – because the nation that leads the clean energy economy will be the nation that leads the global economy” [4]. In April 2010, the Obama administration gave approval for the country’s first offshore wind farm, to be built off the coast of Cape Cod, Massachusetts.

In this paper, we analyze how innovation in the U.S. wind energy industry has been impacted by U.S. government funding for wind energy R&D and by technology information flows from wind turbine manufacturers in Europe. The extent to which manufacturers in the U.S. wind power industry “learn” from inventors and competitors in other countries has relevance to the manufacturers themselves (in terms of their own R&D efforts) and to policy makers (in terms of the optimal level and form of government incentives). For example, [5] investigate the effect of international knowledge flows on the development of innovations that deal with reducing or stabilizing greenhouse gas emissions. They use a World Induced Technical Change Hybrid (WITCH) model to simulate a transmission channel across research sectors and find that including international knowledge spillovers results in lower levels of optimal R&D investments, particularly in high income countries.

## 2. Literature Review

The focus of our paper lies in the intersection of two research areas: (1) Innovation in the wind energy industry and (2) knowledge flows.

### 2.1 Innovation in the Wind Energy Industry

Because it is relatively young, few researchers have looked at innovation issues in the modern wind power industry. [6] study the effect that public R&D has on cost reducing wind turbine innovation in Denmark, Germany and the U.K. during the 1990s. [7] model how different government policies affect the diffusion and innovation of wind power, with estimations using data for Denmark, Germany, Spain and the U.K. from 1986-2000. The learning curve models used by both [6] and [7] involve learning-by-doing and learning-by-searching, but do not account for knowledge spillovers between countries. [8] find that the major piece of national legislation dealing with wind energy incentives in the U.S. – the Federal Renewable Electricity Production Tax Credit (PTC) – is a significant stimulus to wind power capacity. They also find that the off-again/on-again nature of the PTC has led to erratic growth in capacity investment, with installations peaking in years when the PTC is set to expire. Using U.S. patent data for 1970-1994, [9] finds that energy-saving innovations are affected by both energy prices and the stock of energy-related knowledge. The energy areas [9] looks at include coal and solar, but not wind energy. [10] extends this analysis to investigate the issue of the quality of the knowledge stock of such energy-related patents. He finds diminishing returns to the usefulness of energy patents and a higher likelihood that government energy patents filed after 1981 will be cited by others than for those government patents filed earlier.

### 2.2 Knowledge Flows

Within the literature on the diffusion of technology, the subsection dealing with international knowledge spillovers falls into two categories: (1) those obtained through foreign direct investment (FDI) or international trade and (2) those obtained directly from the R&D performed in foreign countries. There is much agreement that trade and FDI have a positive impact on technical diffusion. [11] and [12] find that international trade plays a significant role in technological spillovers in developed countries, while [13] and [14] get similar results for developing countries. Positive spillover effects have also been found for FDI flows [15-17]. There is also general agreement that R&D has a positive impact on the international diffusion of technology, with patent data frequently used to measure spillovers. For example, patent citations are used by [18] to measure spillovers from the U.S. and Japan to South Korea and Taiwan, by [19] to measure spillovers in the U.S., German and Japanese automobile industries, and by [15] to measure spillovers arising as a result of Japanese multinationals undertaking direct investment in the U.S. It is also important to recognize that the diffusion of technology may work differently for different countries. For example, [20] find that the technology embodied in imports is the primary method through which knowledge is transferred from the U.S. and the U.K., that non-trade channels are the primary conduit of technology diffusion from Germany and Japan, and that both trade and non-trade channels are relevant to technology diffusion from Canada and France.

### 3. Methodology

#### 3.1 Data

We obtain data on public R&D spending on wind energy and the price of oil in the U.S. and Germany from 1985 to 2005 from the International Energy Agency's online database (<http://www.iea.org/stats/rd.asp>).

We obtain patent data from the U.S. Patent and Trademark Office's online patent database (<http://www.uspto.gov>).

The application and approval process for U.S. patents involves a search of existing domestic and international patents, which are known as "prior art." Patents must list the relevant prior art as citations or references, along with their country of origin. Included in the patent's information is the country of origin of the inventor or co-inventor, as well as the country of origin of the patent's owner (assignee). Thus, for example, a patent listing Clipper Windpower as its assignee might have an individual in Denmark as its inventor and include references to U.S. and German patents as prior art.

The international flow of knowledge could show up in the U.S. patent system as (i) wind energy-related innovations made by an inventor in another country and patented in the U.S. and (ii) innovations made by an inventor in another country which are patented in that country and subsequently cited as "prior art" by wind energy-related innovations patented in the U.S.

We thus measure the knowledge spillovers from either Germany or Denmark to the U.S. wind energy industry by counting the number of granted U.S. patents which explicitly refer to wind energy, wind turbines, or wind power and which

1. have an inventor from the relevant country (Germany or Denmark) *or*
2. cite a patent from that country

We restrict our analysis to spillovers from Germany and Denmark because of the lack of consistent wind energy patenting and citations arising from other countries during the time period of our study.

As it can take several years for a patent application to be either granted or denied, we use 2005 as the cutoff date. Unfortunately, the patent review process varies. Several researchers have found that the patent examination process takes longer for more important/more complex innovations [21-24], while others have found a longer examination time as the result of procedural options chosen by the applicant, possibly as a deliberate strategy [25-26]. To test if there is a significant effect from patents filed in 2005 that have not yet been granted, we ran a specification of the base model with a 2005 dummy variable. Because this dummy is not significant, we do not include it in the specification of the model below.

Though there is an extensive literature using patent data to measure spillovers it is not a perfect measure. A major concern is the extent to which patents and citations accurately reflect spillovers of knowledge. Patents exhibit spatial relationships: [27] find that citations to patents are more likely to come from the same state and the metropolitan statistical area, while [28] find that a firm's patents are more likely to cite other patents from that firm, and inventors are more likely to cite others from the same country.

[27-30], amongst others, find patent citations to be a valid, albeit "noisy," measure of technology spillovers, and conclude that "aggregate citation flows can be used as proxies for knowledge-spillover intensity...between countries" [30], p. 218.

In their analysis of the geographic localization of patents and citations, [27] discuss three classifications that are relevant when using patent citations to measure spillovers. Adapting this to reflect our choice of counting patents with a foreign inventor as well as patents with foreign citations, the relevant classifications are: (1) spillovers accompanied by foreign citations/inventions; (2) foreign citations/inventions that occur where there was no spillover; and (3) spillovers that occur without foreign citations/inventions.

Our study focuses on the first classification. The second classification above is the most problematic in this field. [27] posit that most of the citations occurring when there is no spillover involves citations of patents that the inventor was not aware of and that were added by the patent examiner. They argue that such citations would not exhibit a geographic bias, and that a large number of such citations "introduces 'noise' into citations as a measure of spillovers, and biases the results away from finding significant localization" [27], p. 584.

The third classification reflects spillovers that would not be counted in our analysis. These types of spillovers would imply that our citation/inventor data undercount the volume of spillovers. [27] argue that spillovers that do not generate a citation are more likely to be a result of extremely basic rather

than applied research, as the former is more likely to be disseminated via non-patent means, such as journals.

Another problem with relying on patent data is an apparent change in the propensities to patent in the U.S. [31] attribute part of the surge in patenting in the U.S. since the mid 1980s as a reaction to the strengthening of patent protection, highlighted by the formation of the Court of Appeals for the Federal Circuit in 1982. As the starting year for our knowledge flow data is 1985, our expectation is that changes in patent protection in the early 1980s would certainly contribute to a larger propensity to patent during the time period of our study (compared to earlier decades), but not to a *change* in the propensity to patent *during* that period.

In contrast to [31], [32] find that the increase in patenting since the mid 1980s is due to an increase in research productivity as a result of a shift in focus away from basic to applied research. Over time, patents have also increasingly been granted for minor innovations, compared to the more substantial scale of innovation representative of patents in earlier decades. [33] blame this in part on changes started by the U.S. Congress in 1990, which converted the USPTO from being funded by tax revenues and nominal patent application and maintenance fees to being funded by its own fees. These changes in the type of research undertaken by firms and an increase in the “patentability” of innovations could result in a greater number of patents with foreign citations/inventors over time and would thus bias our results. As shown in the Model section, we address this by including a time trend variable in our analysis.

Another issue to consider is how the propensity to patent varies across firms. [34] find that, controlling for the level of innovation output, smaller firms are less likely to apply for a patent. As shown in the Model section, we address this by deflating the variables by the total number of wind energy patents.

### 3.2 Model

We begin by modeling knowledge spillovers from the foreign country to the U.S. as a Cobb–Douglas style production function. Following [36], [31] and [37], the expected number of patents obtained by a firm in any given year can be hypothesized as an exponential function:

$$(1) \quad E[\text{PATENTS}_{kt}|X_{kt}] = \lambda_{kt} = \exp(X_{kt}\beta)$$

where  $X_{kt}$  consists of the independent variables listed above. This estimation can be handled by a Poisson fixed-effects regression since *SPILLOVERS* is a non-negative integer:

$$(2) \quad \text{SPILLOVERS}_{kt} = \alpha + \beta_1 (\text{PERCENT WORLD CAPACITY}_{kt}) + \beta_2 (\text{PERCENT WORLD CAPACITY US}_t) + \beta_3 (\text{CHANGE US FEDERAL R\&D}_t) + \beta_4 (\text{POSITIVE CHANGE US FEDERAL R\&D}_t) + \beta_5 (\text{RISING REAL OIL PRICES}_t)$$

where

$\text{SPILLOVERS}_{kt}$  is the number of granted wind energy patents that were applied for in the U.S. in year  $t$ , which cite a patent from country  $k$  or which have an inventor from country  $k$ .

$\text{PERCENT WORLD CAPACITY}_{kt}$  is the natural log of the wind energy capacity installed in country  $k$  in year  $t$ , divided by wind energy capacity installed worldwide in year  $t$ . This is a proxy for how important wind energy is in country  $k$ .

$\text{PERCENT WORLD CAPACITY US}_t$  is the natural log of the wind energy capacity installed in the U.S. year  $t$ , divided by wind energy capacity installed worldwide in year  $t$ . This is a proxy for the changing US interest in wind technology.

$\text{CHANGE US FEDERAL R\&D}_t$  is the natural log of the absolute value of a year over year change in U.S. Federal spending on wind energy R&D in year  $t$ . U.S. Federal R&D spending shows the level of support for wind technology from the U.S. Federal Government.

$\text{POSITIVE CHANGE US FEDERAL R\&D}_t$  is the natural log of the absolute value of a year over year change in U.S. Federal spending on wind energy R&D in year  $t$  if the change in federal spending is positive. This allows us to follow both the negative and positive changes in Federal R&D.

$\text{RISING REAL OIL PRICES}_t$  is a dummy variable that is 1 if the price of oil is rising in year  $t$ . This tracks the change in price of a substitute for wind energy.

In Table 1 we provide the summary statistics for the independent variables.

**Table 1** Summary Statistics

Variable	Mean	Std. Dev.
PERCENT WORLD CAPACITY <sub>kt</sub>	-2.12	1.60
PERCENT WORLD CAPACITY US <sub>t</sub>	-1.18	1.62
CHANGE US FEDERAL R&D <sub>t</sub>	1.61	1.50
POSITIVE CHANGE US FEDERAL R&D <sub>t</sub>	.67	1.13
RISING REAL OIL PRICES <sub>t</sub>	0.54	0.50

Two issues that we need to address with the model are heteroskedasticity and the possibility of a unit root. Tests for heteroskedasticity can not be rejected; we address this by using robust (White corrected) standard errors. Using a Fisher-type unit-root test, the null hypothesis of “all panels contain unit roots” is rejected with  $p < .01$  for all variables, but with drift. We control for drift by including a trend variable in the model. In addition, Table 1 suggests there is overdispersion for some independent variables. Using robust standard errors with the Poisson regression should provide consistent estimators.

## 4. Results

Table 2 shows the results from the Poisson regressions.

**Table 2** Basic Model Results

Variable	Fixed Effect Poisson Model
PERCENT WORLD CAPACITY <sub>kt</sub>	.023 (0.62)
PERCENT WORLD CAPACITY US <sub>t</sub>	.074* (2.28)
CHANGE US FEDERAL R&D <sub>t</sub>	.167*** (3.55)
POSITIVE CHANGE US FEDERAL R&D <sub>t</sub>	-.117* (-2.42)
RISING REAL OIL PRICES <sub>t</sub>	.392*** (3.95)
Year	.163*** (19.96)
N	70
T stats below coefficient found using robust standard errors	
* $p < .05$ ; ** $p < .01$ ; *** $p < .001$	

The coefficient on *PERCENT WORLD CAPACITY US<sub>t</sub>* shows that an increase in the relative importance of wind power in the U.S. results in greater knowledge spillovers to the U.S. However increases in the same variable for other countries does not. Decreases in U.S. Federal R&D result in increases in spillovers from other countries. Increases in U.S. Federal R&D (the joint test of *CHANGE US FEDERAL R&D<sub>t</sub>* and *POSITIVE CHANGE US FEDERAL R&D<sub>t</sub>*) do not give a statistically significant effect. Finally, *RISING REAL OIL PRICES<sub>t</sub>* generate positive knowledge spillovers to the U.S.

From previous studies, such as [8], it has been shown that the changes in U.S. tax incentives have resulted in increased installation of wind energy generation. This increase in needed generation has resulted in an increase for information being cited from the countries that have been leading in wind energy technology though the 1990s and early 2000s. However, decreases in U.S. government spending on R&D for wind power actually increase the spillovers measured by citations from other counties. This could be a result of government funding more basic research with the limited

engineering capacity for wind R&D. Finally, the strongest incentive for spillovers is changes in the price of substitute energy costs. Rising energy costs result in more capacity installation, but also lead to a need for better technology faster. The combination shows that incentives for private sector investment in wind energy result in greater cross country spillovers than government funded R&D alone.

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# Code of ethics as a tool for Innovations in ethical Practice in the Organization

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Today most experts from the international business, agree that what is essential for the business in 21st century actually for the global economical survival in business, is the need from looking for more innovative ways for building an international business ethical code, and not ethical codes which will origin from every individual culture, which on other hand is supported by it selves' other norms and practices.

For the ethical code to have a meaning, it must be clearly stated the basic principles and expectations; have to deal with the potential ethical dilemmas that the employees are faced with; and must be applied. It must be accepted and adopt by the staff because that is the condition for its use. That means that, the managers must take into account not only the content of the code but the process of determination of its content. But, for a code to be applicable wider internationally, managers should incorporate more innovative ways for communication during the process of creation of the code, for to facilitate specific ethical challenges.

## Key words

Code of ethic, Communication, Organization.

## 1. Introduction

Ethics, values, rules of conducting! It is heard and talk about this every day. What do they mean and how the organizations can be sure that they have developed and implemented them right? It comes to the point where the question is: Is the term „organizational ethics”, by itself maybe contradictory?

In a time like today's, the challenge to provide ethical behavior in the organizations, maybe seems to hard. But, it is a challenge that shouldn't be ignored by the organizations, even if they have a feeling that the ethical code is not worth the paper on which is written, or even if the one who is on power wants totally to ignore the need of adoption. To provide a ethical code that could be applicable wider, among the organizations that are communicating internationally, is even more difficult.

The results of the interview conducted by Meredith Livingston, the author of the text "Ask the Ethicist", showed that 90% of the managers think that: " The ethical enigmas, are not coming in the some packet with the work!". The logic says that most of the managers would say that they collide with ethical dilemmas which come from their every daily duties that have been given to them, the regulations that need to harmonize their operations, and the many scandals in the organizations that we so often hear over the media. But, the managers "do not see" the ethical problems, that do not disappear. This only makes the whole situation worrisome. If a manager says that he never faced an ethical issue in his working, than he doesn't live in the real world.

It is a good start for start building or rebuild the ethical culture in the organizations is the formal adopting of an ethical code. For most managers, this means writing and implementing ethical recommendations, also a presenting of the existing values in the organization, or organizations that are doing their businesses internationally.

The literature of the business ethics is separated on few points of view, which talk about the motivation, and also for the reasons, why the business would have an ethical dimension. According to Harrison (Harrison J. 2001), there are two major schools of opinions. In the first one, belong the ones which assume that the companies, actually the organizations are institutions which drive profit and that is why the business ethics for them is just another way to win customers. The second one is supported by the corporate conscience and initiate motivation for acceptance of the business ethics. According to Paul (Paul S. 2001), the business ethics is considered for subjective by its nature and depends of the time and the culture.

It was established the claim that by passing of time, the business ethics included different cultural values and norms which lead it outside the frameworks of different national and regional boundaries. One of the major surveys performed in 1983 from Hofstede (Hofstede G., 1983), where were taken into account the national values, it showed that there are big differences in the ethical values among different nations, and also in the business ethics. The globalization, combined with the standardization made the businesses financially successful, but in the same time an efforts were made to create standardized guidelines for business ethics, outside of the national boundaries.

But, as far as business is considered, the ethical code is generally considered as an act which teaches from ethical aspect, what is good or bad in the workplace, and helps the decision made to aim the goal. The ethical codes are rules which helps to operate the ethical values when deciding. They are a sign of ethical philosophy of the company. The ethical codes are systematic set of relatively precise formulated moral norms of one certain moral, determinate by a written act, prepared by a people who are representatives of some group. Actually, that are statements for the norms and certificates of the organization and they express how the people on high levels in the company want others to think.

It is not a censorship. In the code are clearly marked the norms and the values of the groups. This kind of form provides the moral which creates, to enter fast in the peoples consciousness. The codes are important mechanism that can be used by the organizations as a tool that will signal the ethical direction in the organization. The intent of the organizations in adopting ethical codes is to encourage a certain manner of thinking and a model that will lead to the desired behavior.

## 2. Ethical code as a tool for innovations

In the researches performed by Ethics Resource Center in Washington, USA, the codes are seen as best mechanism which provides the ethical behavior. So, in 1987, the Centre performed a research in 2000 organizations in the USA, and a subject of research were their ethical programs and problems. The results from the research showed that most frequently used form for strengthening of the ethical behavior are the company's codes (79% of respondents), lectures (63%), seminars (53%), the case studies (46%), the film forwarded by a discussions (41%). So, according to Frank Navran from the same Ethics Resource Center, Washington, USA, in the article published in 2002, states that the interest of the organization for creating a code in the most cases is because of the need to strength the mechanisms for „soft control”, whereby often wants to conclude the following:

- Organization security;
- Public opinion;
- Respecting of the law;
- Regulation of the behaviour.

For the ethical code to have a meaning, it must be clearly stated the basic principles and expectations; have to deal with the potential ethical dilemmas that the employees are faced with; and must be applied. It must be accepted and adopt by the staff because that is the condition for its use. That means that, the managers must take into account not only the content of the code but the process of determination of its content.

To be efficient, the ethical code should develop and expanded in open, participative surrounding, including as much as possible employees. The building and the implementation of an ethical code is important for all of the organizations no matter their size. Besides that with the ethical code is projected the idea for honesty and openness in relation to business that the organization is concerned, the code can be used as a tool to encourage the employees to properly solve the problems found in the working place. But, for a code to be applicable wider internationally, managers should incorporate more innovative ways for communication during the process of creation of the cod, for to facilitate specific ethical challenges.

## 3. Internationalization of the business ethical code

Most experts from the international business, agree that what is essential for the business in 21st century actually for the goal economical survival in business, is the need from building an international business ethical code, and not ethical codes which will origin from every individual culture, which on other hand is supported by it selves' other norms and practices.

In the past decade many companies as Borg-Warner Corporation, Whirlpool, Johnson&Johnson have developed ethical codes published in their brochures, annual reports and programs for introducing the code. The study of the Ethics Resource Center, Washington, USA from 1979, indicates that more than 70% from the major corporations have ethical codes. The companies that want to have an influence of the ethical standards, as a first step in the process, introducing ethical codes. The Center estimates that more than 90% of the companies that are taking further steps to institutionalize the ethics announced their own ethical codes. The codes are often transmitted over written materials, using the advice of superiors, discussions for employments or at workshops and seminars.

The analysis, that was performed by the author of this paper was made on 22 ethical codes, among them were independent broadcasting authorities in Europe in the area of broadcasting, large global companies, local organizations, also codes of public administration and companies that are dealing with different business in Republic of Macedonia, provided to distinguish the following mutual general characteristics of the ethical codes, that makes them applicable wider internationally.

Ethical codes:

- They clarify the opinions of the managers for what it constitutes unethical behavior;
- Helps the employees to think for the ethical issues before they face with a real situation;
- Allow to the employees to refuse performing of unethical actions;
- Define the boundaries of acceptable or non acceptable behavior;
- Provide a mechanisms for conveying the philosophy of the managers in the area of the ethical behavior;
- Help to introduce the employees with the ethical behavior and the proper training.

All of these ethical codes had a list of principles of international ethics that were followed, including:

- **Integration** – Business ethics most take into account all the aspects of the organizational culture and to reflect the key systems for managing. The organizations start with integration of the ethics by setting goals and establishing of practices. When they promote the workers on higher levels within the company, the ethical principles should be stimulated over ethical programs.
- **Implementation** – The ethical behavior it is not just an idea. It refers to implementation of a plan for changing of certain parts from the working of the organization. Some examples show that those are efforts for modifying the personal valuable process, to make a promotion of the proven practices from the environment, and calls for help from the experts , when that is necessary.
- **Internationalization** – Increased internationalization, is a need which characterized all successful businesses of the 21st century. Internationalization is achieved by forming intentional partnerships, commercial blocks, implementation of GATT and other agreements for free trade. So, it is needed a clarification and confirmation of the organizational definition for the integrity, which transcends the national boundaries.

Also, all of the codes that were analyzed were composed from those four parts:

- Creed or a statement for the organizational philosophy or values;
- Guidelines for making decisions;
- Specific rules that prohibit certain actions or require certain behavior; and
- Definitions and illustrations;

For a code to be applicable wider internationally, it should be appropriate distributed among all the parties that will be affected by it, so they to know the standards and to understand the meaning of the code for their work. The conversations for the ethical codes should encourage an open atmosphere where all the employees from all the organizations that are expected to be affected by the code and are planning to accept it, to be encouraged to ask and to give suggestions about the code. There are organizations that support the idea working units to develop their own specific codes which refer to specific dilemmas that are faced in their working. These organizations consider that the participative methods are increasing the opportunity the codes to play the central role in conducting of the ethical behavior in the framework of their organizations. On the other hand, there are such an organizations that do not attach such significance of their own ethical codes. One of the ways for raising the awareness and acceptance of the ethical code from the employees is the organization of an ethical

training. However, no cooperative effort of the organization to influence of the ethical behavior will not succeed if it is not supported by the top management and by the culture of the organization. One of the manners for implementation of the support is forming of a structural mechanisms for the implementation of the ethic. There are many mechanisms that can be applied by the organization, created in aim the management can be informed about the ethic. Among the other things, those mechanisms are: monitoring of the ethical behavior of employees, transfer notices regarding the ethical policies, ombudsmen for ethical issues, reporting about ethical violations, etc.

## 4. Conclusion

Certainly, there is not an ideal or universal approach to the organizational ethics. Some organizations start with a creation of a creed that later is transformed to a code, and other are adopting a decision for creation of a code. The creation of a moral climate originates from the top management. The raising of the ethical awareness in the organization is not a simple process. It is necessary to communicate, many meetings, many hours spent, and a certain amount of money to create a good code which will communicate with all the employees and organizations to which it will refer to.

Although the existence of a business ethical code will not solve all the ethical problems, it is very useful for the organizations and for the society as a whole. Clear ethical code and clear ethical standards, are providing to the organization strict directions that provide handling with different situations in the interior relationships in the organizations by themselves, but also in the relationships out of them. Often, the interior ethical dilemmas are not black or white types of situations. They are complex problems, that require well defined politics which provide fair and moral management.

For the employees, the clear statement for the ethical politics that leads the organization, is very helpful for them to align their personal values with the values of the organization, and in that manner to create a strong relationship on the working place, with the colleagues and the superiors. The ethical code provides a tool to the employee as an individual from the possible abuses by the managers without scruples, i.e. the managers who don't care. Also, a well-defined code, it helps the worker as an individual, in the operation and management, in the conducting of a surveillance over those that are aligned, built teamwork associated with pride in performing everyday tasks that ultimately contributes to increased satisfaction from the work and productivity. Hence, the managers of the future will benefit from the moral and ethical standards that are introduced today. In the external relations with suppliers, customers, shareholders, the solid ethical code, is the best way to contribute in ensuring of the avoidance of making decisions, which in extreme cases could lead to government intervention and prosecution.

The ethical behavior in the organizations is a complex problem expressed by individual and situational dimensions. The efficient implementation of the ethical behavior requires from the organization to adopt ethics. Also, for a code to be applicable wider internationally, managers should incorporate more innovative ways for communication during the process of creation of the code, for to facilitate specific ethical challenges. However, organizations should be interested in those who produce behavior that it is required by the organization in the current period, because maybe next year will be necessary to include other, values different from the already established.

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# Use of Intelligent Agents and Rule Based Expert Systems in everyday Logistics Operations

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In a World where technology is becoming increasingly integrated into so many aspects of our lives and society, operations planners are confronted with more data and information than ever before. To effectively make use of this data, a decision maker must be able to consider many different perspectives, and be able to analyze information to extremely detailed and specific levels. With emerging business concepts such as agile operations handling, it is more important than ever to ensure that an organization has the ability to react, and even be proactive, to changing demands and disruptions. In the modern-world evolution towards agile and responsive organizations, new approaches and methods will be required to assist decision makers in logistics operations planning. Having the right information at the right time will be, and always has been, essential.

The search for the right information to in order to perform critical decision-making can be a never-ending process. Sometimes acquiring the right information can be an expensive task, but there are also many cases where the best information is freely available from one of our society's largest and most valuable data resources - the World Wide Web. The problem with data mining the WWW is that the information contained there is typically unstructured, scattered, and meaningless if not combined together. The field of Computer Science has evolved significantly in recent years as new technologies have emerged, notably the "semantic web." These enhancements to the WWW are represented by a group of methods and technologies that allow machines to understand the meaning – or the "semantics" - of the presented data. Using this semantic meaning, the WWW can be used as an endless source for data from which information could be derived.

Simply obtaining the right data, or possessing the right information, may not always be enough to engage in decision-making. If operation planners do not have access to the right tools, this pool of useful information may easily become an ocean of useless data. Rule driven Intelligent Agents and Expert Systems can be used to process this data, help solve problems, identify alternatives, and provide advice based on the data that is fed to them. The goal of this resultant system is to develop a knowledge-base matching or exceeding the equivalent knowledge of a "human expert" in a particular field, with continuous improvement and learning capability based on a feedback loop of data inputs.

This paper studies how the data provided by internal (or intercompany) systems and on the Semantic Web can be processed by these Intelligent Agents and Experts Systems, and later be used as an input in the decision-making processes that are part of everyday Logistics Operations. Additionally as an example, industry related conceptual model is analyzed and compared against the current process models, with specific focus on advantages and benefits.

## Keywords

Expert Systems, Innovative processes and models, Intelligent Agents, Logistics Operations, Process automation

# 1. Introduction

Deployment of the latest technology alone may not always result in creating new economic value and market growth of the enterprise. Value and wealth are created when companies combine technology with new ways of doing business; i.e. when some innovative technology triggers change in the way a business process is executed. Typically technology is used to automate certain stages of common business processes, and automation and optimization of tasks and processes can already be seen in various commercial, governmental and nongovernmental organizations. Common processes such as forecasting, supply chain management, Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and Human Resources (HR), are the most typical areas of focus in modern enterprise automation [1].

The Council of Logistics Management provides the following definition: "Logistics is that part of the Supply Chain Process that plans, implements and controls the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption in order to meet customers' requirements." The definition itself indicates that within these processes exists constant interaction and communication between the actors, and that there are many entities involved. The Internet along with its related technologies enabled these systems to become interconnected through well known standards for exchanging data, and in this way digitalizing the business processes. The data that is part of these processes can be combined in new ways to automate an increasing array of broader activities, from inventory management to customer service. Accumulated pools of data captured in a number of systems within large organizations or pulled together from many points of origin on the Web are the raw material for new information-based business opportunities. [2] Moreover, the aggregation of data through the digitization of processes and activities may create by-products, which companies can include as an input in their current internal business processes, or exploit them further for additional profit.

Even if all systems in one enterprise are fully integrated, and all tasks that can be automated are fully enhanced, the information that is used by the actors during the decision making processes comes only from internal sources. Collaboration and integration with systems that reside outside of the enterprise boundaries is limited and in most cases actions from some human actor must be taken for the task to be completed. The human actor in these cases acts as an aggregator, whose duties are to collect data from external sources and feed them in the "machines" that are part of the process flow. These "machines" process the data and use it in the decision making processes. We do not need any BPM (Business Process Management) [3] tool to identify the bottleneck in this scenario.

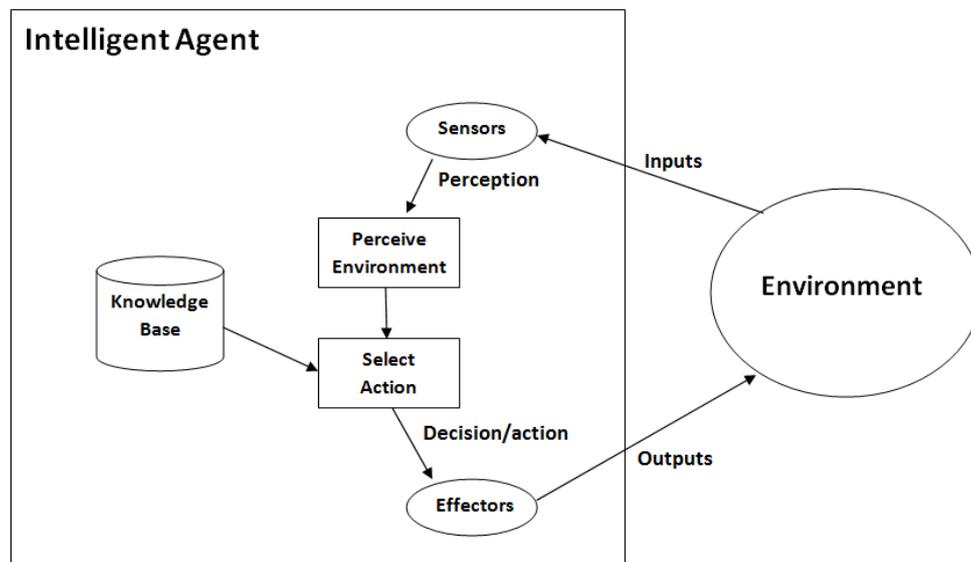
When you have things automated is when your business is running in its most efficient manner. Automation generally allows an organization to increase its operational efficiency. The goal of automation is to integrate human intervention only where it is absolutely necessary. This is already commonly achieved in a substantial amount of internal processes, for example in scheduling for production, or in manufacturing management systems. In these two examples, the human factor is replaced by intelligent systems that are trained and capable of decision making, using facts and rules that are stored in their knowledge base. The purpose of applying intelligent systems to solve scheduling problems is to make the scheduling system easier to design and implement, more robust and less prone to errors, easier to use, faster, cheaper, etc. These artificial intelligent systems have the knowledge of their human counterpart, or even from several human experts, but are capable of generating decisions in significantly shorter time frames.

While Decision Support Systems (DSS) can be very useful when they are implemented in a controlled environment (such as production and manufacturing management system), their usability is limited for interconnected systems and services which do not follow strict rules and patterns, and for systems within highly dynamic environments. The Internet and the World Wide Web (WWW) – with an almost endless source for information – clearly belong within this category. To automate data capture from highly dynamic sources, the systems that will work as aggregators must be both flexible, and capable of learning and later acting accordingly.

## 2. Intelligent Agents

Intelligent agents are autonomous software applications that are capable of reasoning, making decisions, and initiating activities based on some input of data they perceive and analyze from the environment they operate in. These software agents can also communicate with other agents, including humans. Intelligent software agents can act on several levels of autonomy based on the constraints that are assigned to them; these constraints can be driven by the environment they exist in

or simply by business rules and politics. Because services are best modelled as being autonomous and heterogeneous, they can be naturally associated with agents. These intelligent applications make it possible to capture the interactions among the services, and enable the creation of new services as subtle compositions of others.[4]



**Figure 1:** Architecture of Intelligent agent

Based on the predefined rules and patterns, agents can balance cooperation with self-interest. They also have the property of persistence, which is necessary to carry out business transactions, handle exceptions, and to build a history of interactions, which is necessary to establish trust. These properties, rules, and patterns that in practice administer agent's behaviour, are all subject to change as directed by the environment (more precisely, by the information). This characteristic enables intelligent agents to be adaptive to the environment they operate in, and to the results that have the biggest weight on their reasoning.

There are several types of Intelligent Agents, [5] including simple reflex agents, model-based reflex agents, goal-based agents, utility-based, and learning agents. Regardless of the classification, all agents are created with the same philosophy:

1. Perceive and gather the data from the environment or interacting services/agents;
2. Process the data using the predefined rules and the acquired knowledge base;
3. Update/adjust the knowledge base and decision making rules as needed;
4. Make decisions based on the results;
5. Return the results in the operating environment by initiating the needed activity;

The main difference between the different classes of intelligent agents is the way that they process the gathered information, and the principles on which they make decisions. Reflex agents follow simple rules (eg. *if condition then action*), and they react only when the condition is fully satisfied. Model-based and Goal-based intelligent agents store information about the desired state, instead of strict rules, so that during the decision making process the agent chooses the best possible solution to satisfy the goal or the defined model. Similar agents are utility-based agents, which enable every possible state to be marked according to how desirable it is. Later, during the decision making process the results are compared with the desired values and in that fashion the most desired state is selected.

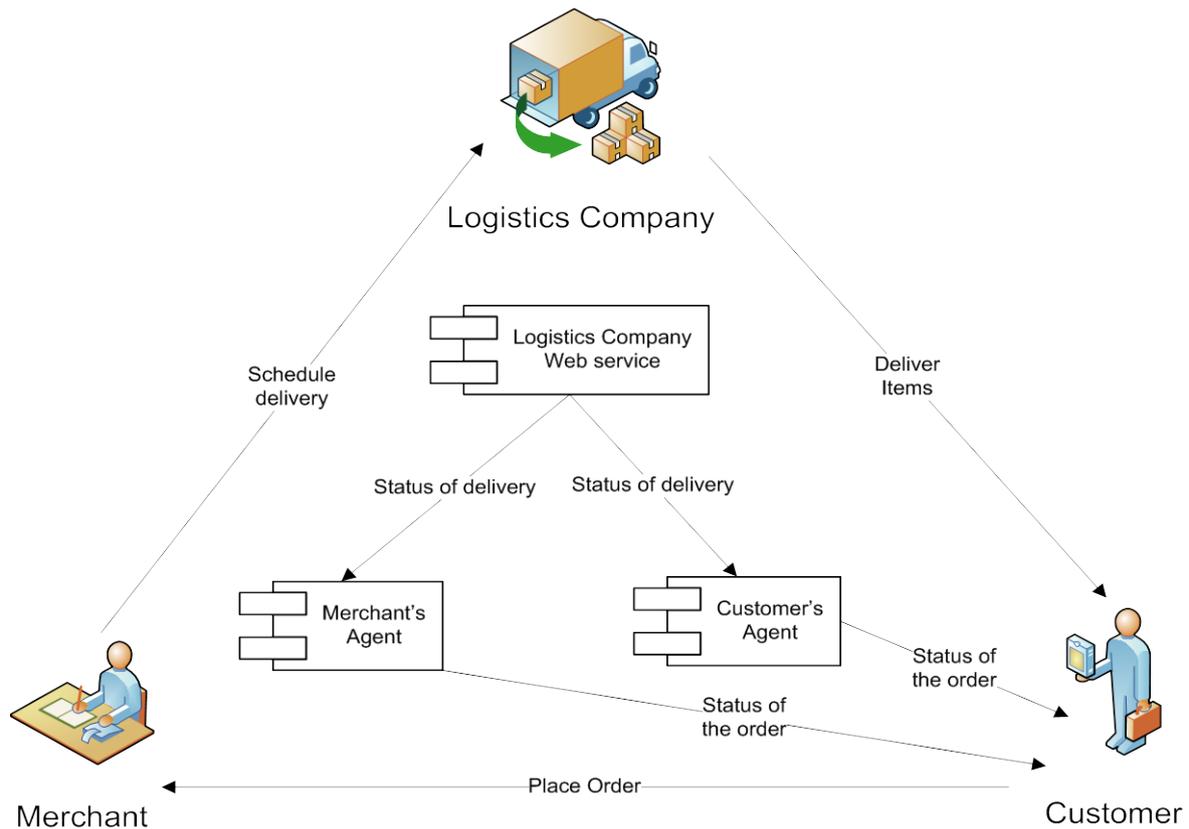
### 3. Expert Systems

An integral part of the intelligent agent's architecture is its knowledge base. The way in which the knowledge is represented in most cases is the most decisive factor regarding whether the Agent will complete the assigned task successfully or not. The structure of the knowledge in the database also has substantial effect over the algorithms and procedures that are used during the decision making process.

Expert systems [6] are rule based software applications that use a knowledge base for problem solving and decision making in situations where normally consulting from one or several human experts is needed. The knowledge base is created with facts and rules that are defined by human Subject Matter Experts (SME) in the specific problem domain. Specific knowledge representation structures and knowledge engineering techniques are used depending on the application of the Expert system. Another integral part of every expert system is the decision making procedure where the definitions of rule-execution, and control of the facts which are part of the knowledge base, are stated. These definitions drive the decision making procedure; their weights and thresholds are usually subject to change while the expert system is trained, or when performances of the system are reviewed.

#### 4. Integration of services

When we talked about agents, we mentioned that one of their characteristics is their ability to interconnect with other agents, services, or human actors. Given that the new emerging technologies such as web services and the semantic web enable development of new and existing services, it is only natural that we might want to put services together to create more sophisticated and valuable composite services. Service composition is about putting together services to create new functionality that will add additional business value to the company. Although in most cases, the composite service is used internally to automate some business process step, often the composed functionality would itself be exposed as a new service with a standard interface.

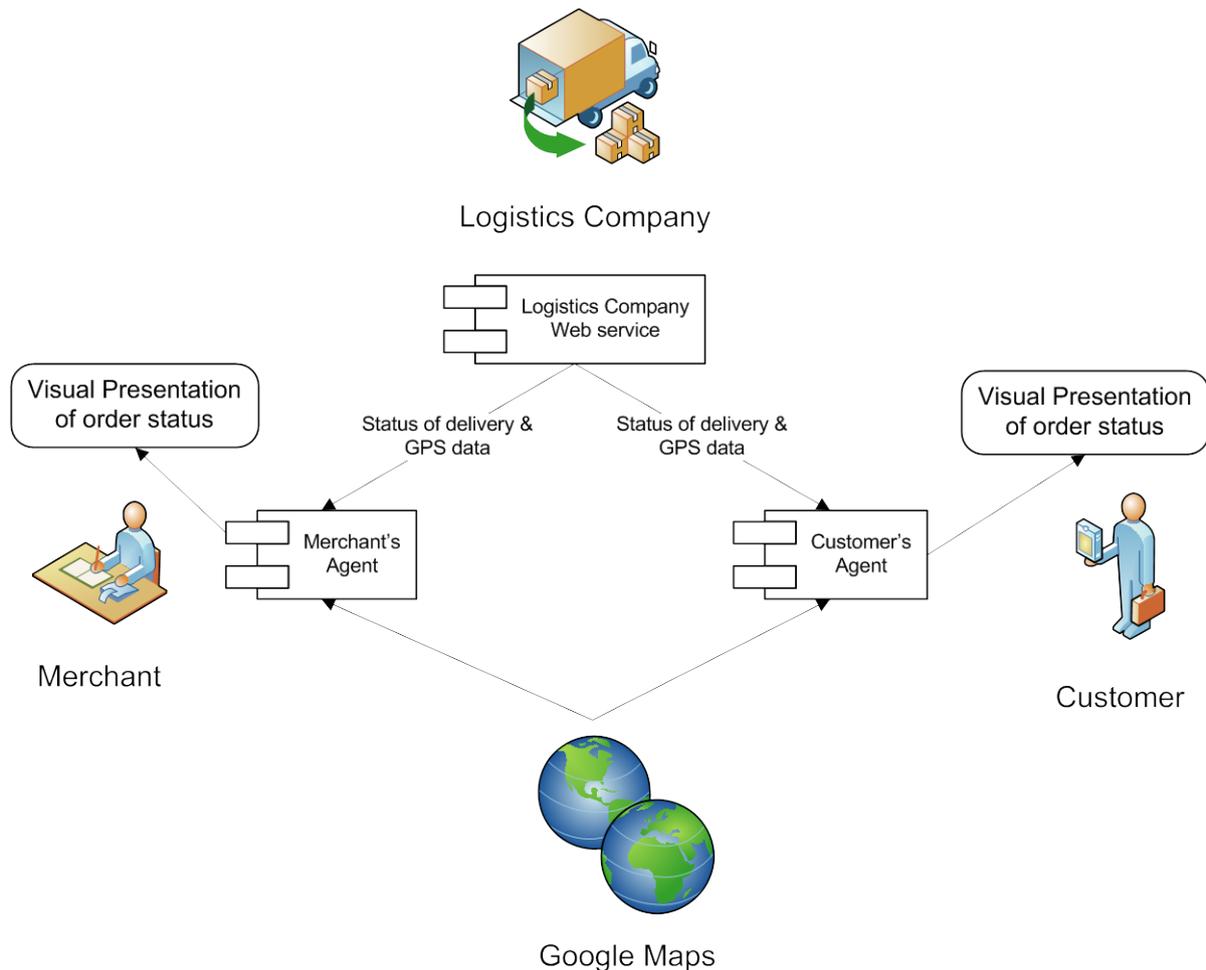


**Figure 2:** Integration of services (Merchant, Customer, Logistics Company)

Let us consider some challenges faced while composing services. As an example we will take a scenario that includes three actors: The Merchant whose business sells a particular good, the Customer who purchases these goods from the Merchant, and the Logistics Company responsible for delivering the purchased items from the Merchant to the Customer. Imagine that the Merchant would like to enable the customer to be able to track the shipping of the sold items. If the Merchant and the Logistics Company have their own isolated, mutually un-integrated systems, the best that the Merchant can do is to point the Customer to the Logistics Company Web site, and the Customer can then go there to check on the delivery status. If the Merchant could compose its own production

notification system with the Web services of the Logistics Company, the result would be a customized delivery notification service by which the Customer (or even better the customer's agents) could find the status of a purchase and the delivery in real time.

The previous example can be further enhanced using web services that are already available (and in most cases free of charge) on the Web. If the Global Positioning System (GPS) system of the Logistics Company uses Web services to enable the Merchant and the Customer to get information about the location of the vehicle that is delivering their goods, then the Agents on both Customer and Merchant side can integrate this data with Google Maps and visually get the location of their delivery.



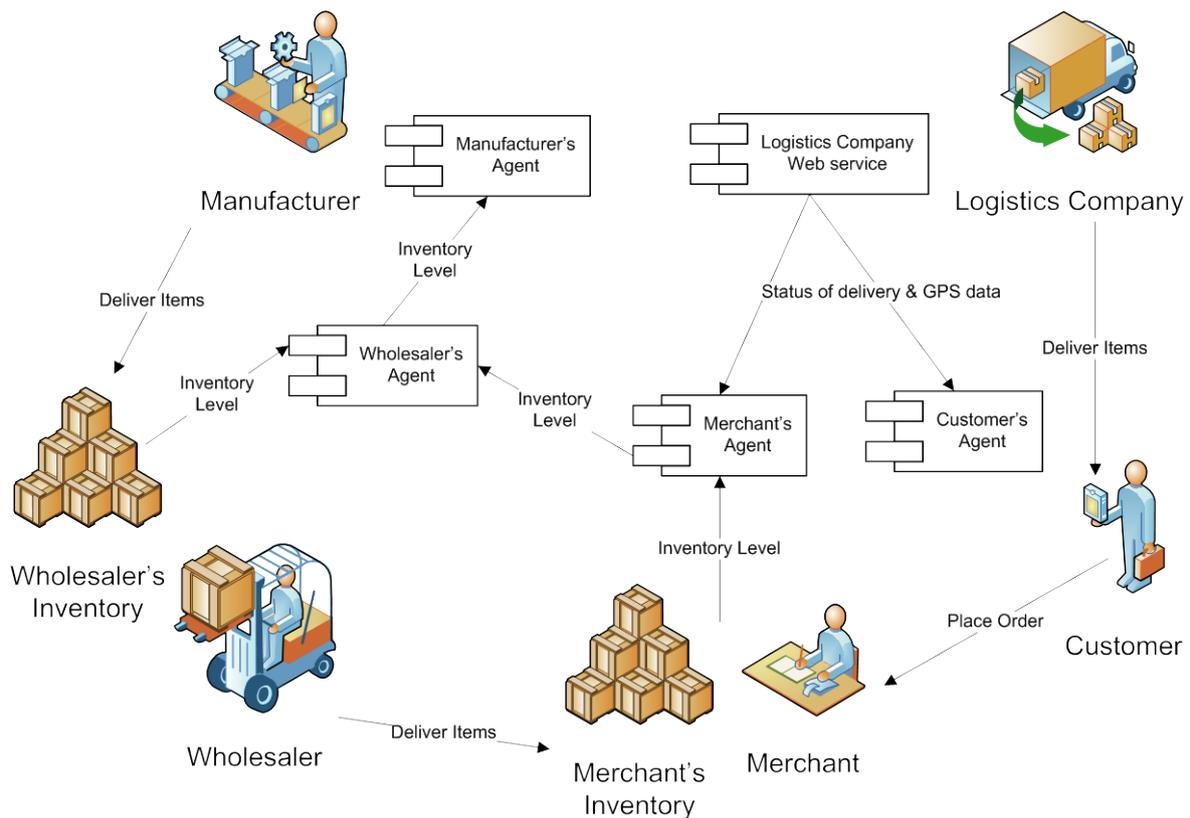
**Figure 3:** Enhancement of services for better Customer experience

This enhancement provides a better User Experience to both the Customer and to the Merchant, and the best part is that the data utilized is fully generated by machines or software applications. The location of the vehicle is generated by the GPS device that is installed; data that is received by the internal GPS system in the Logistics Company is processed by Software Agent; this output is transferred to the web service (without human interference); finally both Agents on Customers and Merchant side execute the tasks they are assigned to do and compose the services to generate the improved visual experience for both Customer and Merchant.

To complete the Supply Chain, the next step will be to include two more Actors in the scenario: the Wholesaler, and the Manufacturer. Without automated integration of the systems, the Wholesaler will only be notified for supply (purchase orders) by the Merchant when the Merchant hits critically-low stock level, or worse, is out of stock. This practice may lead to purchase order bottle-necks in cases multiple merchants with high simultaneous demand (eg. seasonal items), and may even lead to the Wholesaler having insufficient resources in goods supply or delivery windows to satisfy all of their Merchants.

A remedy to this potential lies in the integration between the Inventory Management application on Merchant side, and a Web service that enables the Wholesaler to track information about the

Merchant's stock level of the relevant goods. The Wholesaler's agent could integrate the retrieved Merchant stock level data with the information generated by the internal agent who analyzes the quantity that is usually purchased by the Merchant. The new composed service could generate notifications when the stock level in the Merchant's warehouse nears to his usual purchase quantity. This allows the Wholesaler to maintain the optimal stock levels for the Items that are needed by its customers. Further, the same type of integration could be leveraged further back in the value chain, between the warehouse on the Wholesaler side and the Production Planning department in the Manufacturer's offices. The Manufacturer's agent gathers the data from the services that expose inventory levels in Wholesalers warehouses, and combines this with information about current stock levels of raw materials. The new service gives information that is very useful both for Production Planning and for the Procurement department whose responsibilities are to keep the stock levels of raw materials on optimal level.



**Figure 4:** More actors are included to close the Supply Chain

## 5. Conclusion

There is still substantial headroom for automation in many repetitive tasks that are part of common business processes. In most cases these tasks are not yet mediated by computers at all, particularly in sectors and regions where IT is not fully embraced and it is adopted at a slower pace. The proposed enhancements that include extensive usage of Intelligent Agents will interlink these "offline" sectors and would result in reduced risk, reduced uncertainty, reduced costs, increased operational efficiency, and would allow managers and customers to engage in higher value-adding activities. Automation is a good investment if it not only lowers costs but also helps users to get what they want more quickly and easily.

E-business and intersystem integration and collaboration is ever-evolving in today's rapidly changing business landscape. Time is becoming an essential unit of performance measurement, and the internet-economy is characterized by the speed of execution. As demand changes, and orders are placed, it is necessary to quickly specify when, at what cost, and in which quantity the order will be delivered; response time is of utmost importance. Moreover, considering the high volume of individual and specific demands, with many product variations, mass customization is required for such

production systems that will enable the customer to be included in the early stages of product development. These characteristics combined imply a tremendous level of reactivity. At last, because of logistics reasons associated with these above-mentioned constraints, the customer is becoming the most influential figure in the scenario, and is progressively being included in decision-making across the entire value chain – from retail and transport, to wholesale and manufacturing.

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# The influence of innovations of working processes on the operational efficiency

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The authors of this work have made a research regarding innovations, which is based on introducing a time reader at a service workshop as a part of After-Sales Department of a vehicles importer in the Republic of Macedonia. The researches were made in the period of 2008-2010, where the implications of introducing the innovation process, on increased efficiency, productivity of direct executors and increased customer satisfaction have been examined.

## Keywords:

After-sale, clocking, costumer satisfaction, efficiency, implementation, innovations, norms, service, time reader, working time.

## 1. Introduction

Recent researches have confirmed the fact that increased number of managers is aware of the importance of the innovation and smaller number of managers is unsatisfied with the management of innovation in their companies (organizations). Moreover, the innovation performances considerably vary among different departments and divisions of the same department, suggesting that the structural as well as the organizational factors influence the effect of the innovation over the performance. The management researches confirm that the innovation organizations, that is, those which are capable to use the innovation in order to improve their processes or to differentiate their services, are improving their competitiveness, measured in terms of market share, profitability and development. Usually, innovation management, in fact is difficult and risky: most of the new technologies fail to be transferred into services and most of the new services do not mean a commercial success. In other words, the innovation can maintain the competitiveness, but it requires different set of management, knowledge and skills of the business administration. [1]

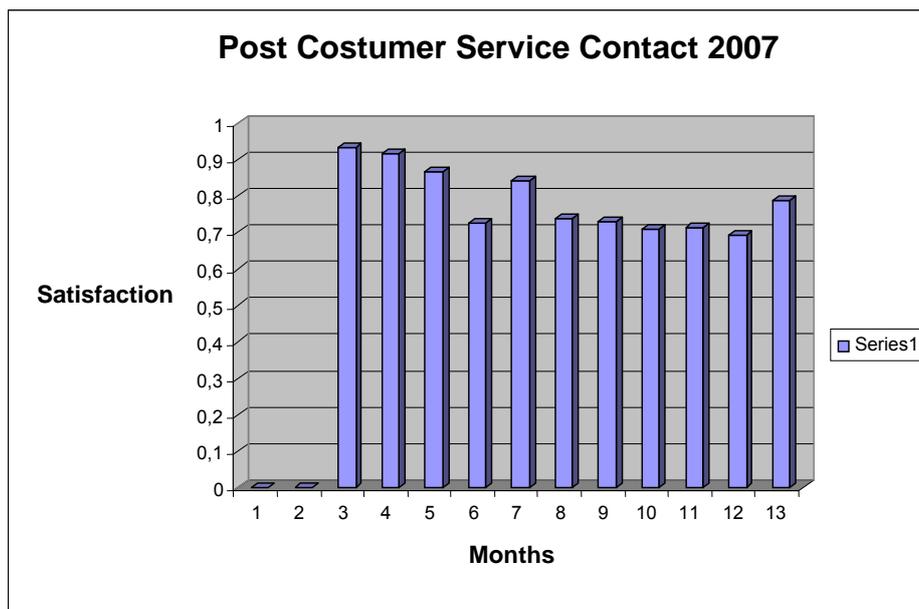
In order to answer the research requirements, an After-Sales Service Department of one of the baggiest vehicles import and maintenance centers in the Republic of Macedonia has been chosen as a target. After examining the current situation, by methodology of measuring and innovation proposal, its implementation and, at the end the given conclusion and results of introduced innovation, it will be achieved that the Import Centre will maintain and improve a high level of service at the After-Sales Department. [2]

## 2. Temporary situation, investigation and innovation:

In the operation of the After-Sales Service Department of an import centre which is chosen as a location for research and until 2008 when the research started, the evaluation and payment of the direct executors (employees at the vehicle service) was in accordance with the system of fixed salaries, namely, according to the agreement made at the beginning of the employment, without paying any attention to the professional competents, experience, the performance and responsibility.

This way of evaluation has been functioning until it has been noted that the lack of responsibility and unrealistic evaluation of the employees lead to decreased profitability, transferring of responsibility, decreasing of the customers satisfaction and consequently, to their decision not to return for undertaking another service.

All the above mentioned is supported by customers satisfaction survey performed during 2007. [3]



**Figure 1** Bar 13 - Average satisfaction 2007

The bar number 13 shows an average customers satisfaction percentage equal to 78.8%, which is far from satisfactory percentage of a top quality import centre. For that purpose, the possibility of introducing an innovation in giving a service with an intention of improving the customer satisfaction and increasing the profitability of the Department has been considered.

## 2.1 Methodology

As the company working environment plays an important role in increasing the customer satisfaction, prior to giving the proposal for innovation a survey has been conducted in order to assess the current state. The survey was conducted via questionnaire composed of 14 questions about the satisfaction of the Service Department employees and their satisfaction from the management. [4]

Upon completion of the survey, the results showed that a part of the direct executors were not satisfied with the unrealistic evaluation, and therefore a proposal for innovation in a sort of motivation system for the employees in After-Sales Service Department was given.

On the basis of the requirements of the company's executive management, as well as on the basis of long term analyses and consultation of the professional literature, a proposal for motivation, bonuses and evaluation of the employees' performance were given.

Having in mind that all employees are not the same and not all of them have the same contribution in the profitability of the Service Department, they should be divided in groups as follows: [5]

**Table 1**

AM: Leading Mechanic	AE: Leading Electrician
BM: Mechanic	BE: Electrician
CM: Junior Mechanic	CE: Junior Electrician
DM: Beginner	DE: Beginner

Transferring from group to group is restricted by the following:

DM, DE: Beginner who has to spend 1 (one) year in order to apply for CM, CE. (In order to be transferred, he has to take an examination in front of the Department Commission).

CM, CE: Junior Mechanic who has to spend 3 (three) years in order to apply for BM, BE. (In order to be transferred, he has to take an examination in front of the Department Commission).

BM, BE: Mechanic who has to spend 5 (five) years in order to apply for AM, AE. (In order to be transferred, he has to take an examination in front of the Department Commission).

Depending on the group the employee belongs to, he receives the responsibilities and bonuses for the completed job. The analysis made has shown that each employee in order to earn the salary (salary proposal follows further below in the text) there is a need of the following:

**First:** To be physically present at work. The evidence is provided from the clocking device, which means that each employee must fulfill the determined monthly working hours that vary from 168 to 180 hours depending on the working days in the month.

**Second:** Each employee must fulfill the determined norm which has been foreseen in accordance with the group he belongs to. The norms have been made according to the analysis made during the past years, which is as follows: [6]

**Table 2**

AM: Leading Mechanic (30 hours)	AE: Leading Electrician (40 hours)
BM: Mechanic (120 hours)	BE: Electrician (60 hours)
CM: Junior Mechanic (100 hours)	CE: Junior Electrician (80 hours)
DM: Beginner (80 hours)	DE: Beginner (30 hours)

**Third:** All that is above the foreseen is paid as bonus in percentage as follows: [7]

**Table 3**

AM: Leading Mechanic	20%	AE: Leading Electrician	20%
BM: Mechanic	10%	BE: Electrician	20%
CM: Junior Mechanic	15%	CE: Junior Electrician	15%
DM: Beginner	5%	DE: Beginner	15%

Additionally, if not provided in the company food allowance and transport allowance (depending of the distance from the working area) should be paid to the above mentioned salaries. The proposal shows that the starting salary should be higher than the salaries of all employees in the general services (guards, maintenance, hygiene, cleaning, h...).

The leading repairman is double paid than the beginner.

These salaries vary in accordance with the degree of education and the knowledge which has to be confirmed by the professional commission of the Department.

In order to get those salaries there is a need of additional activities as:

- Tidy up the working space;
- Compliance to dress code;
- Compliance to job description;
- Team work;
- Showing initiative for increase of the productivity.

In accordance with the above-mentioned, there is a need of analysis for administrative and management staff who are employed in the Department, as follows:

**Table 4**

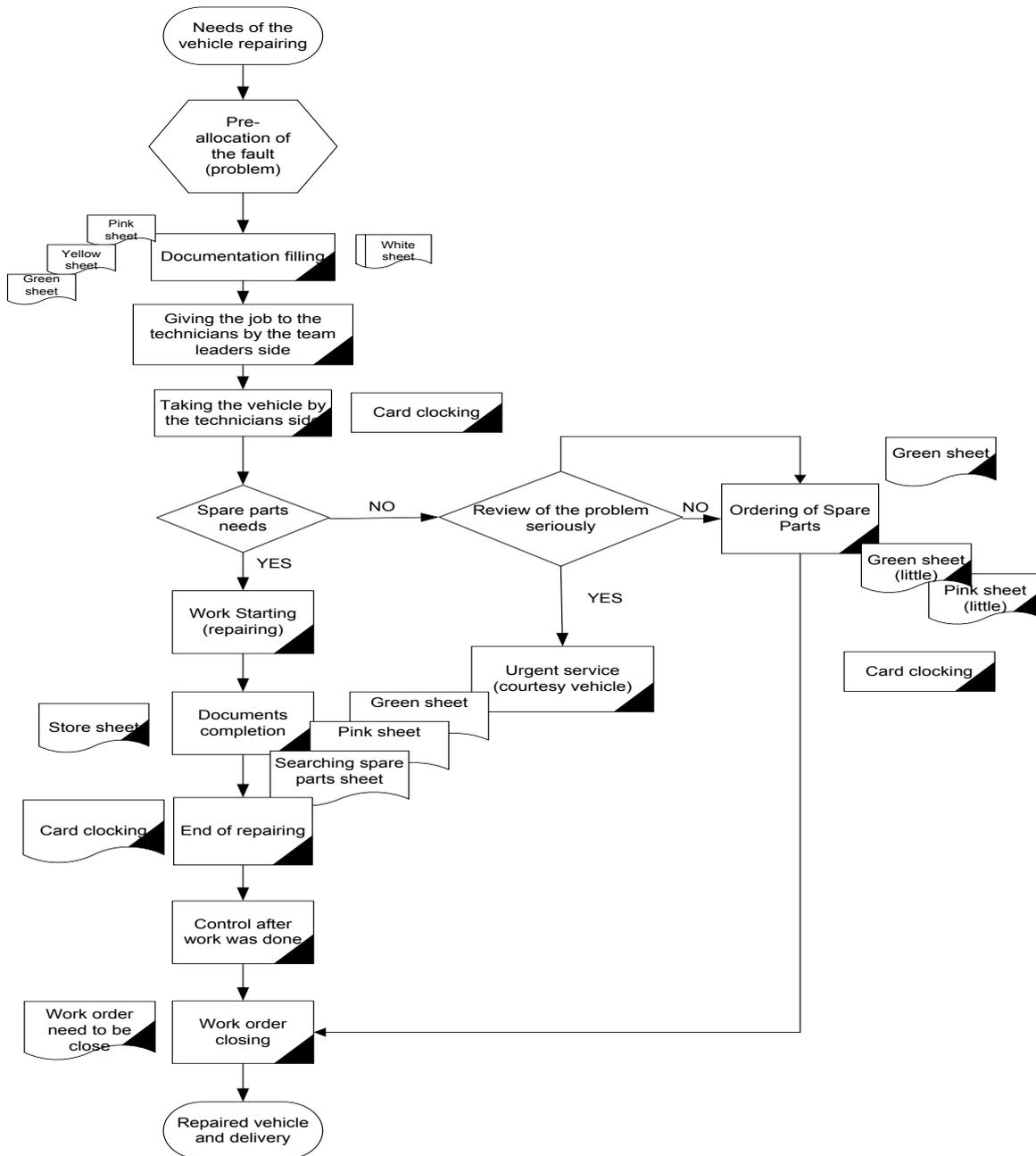
<u>AS Manager :</u>	X 2 from the salary of the best paid mechanic
<u>AS Deputy manager:</u>	-10% from the manager's salary
<u>Technical adviser:</u>	X 1.5 from the salary of the best paid repairman
<u>Service adviser :</u>	X 1.5 from the salary of the best paid repairman
<u>Service adviser:</u>	Equal with the leading repairman

The salaries of the above mention positions should be a bench mark and goal to be achieved. In order to achieve them there is a need of working experience and corresponding professionalism which is to be confirmed by a Department's professional commission. The amount of the starting salaries is determined by After-Sales Manager and he proposes their increasing depending on the engagement of the employees.

Measuring of the performance, that is, the time needed for performing the service operations is suggested to be measured by time reader which has to be connected with the existing Dealer Management System (DMS). [8]

## 2.2 Implementation

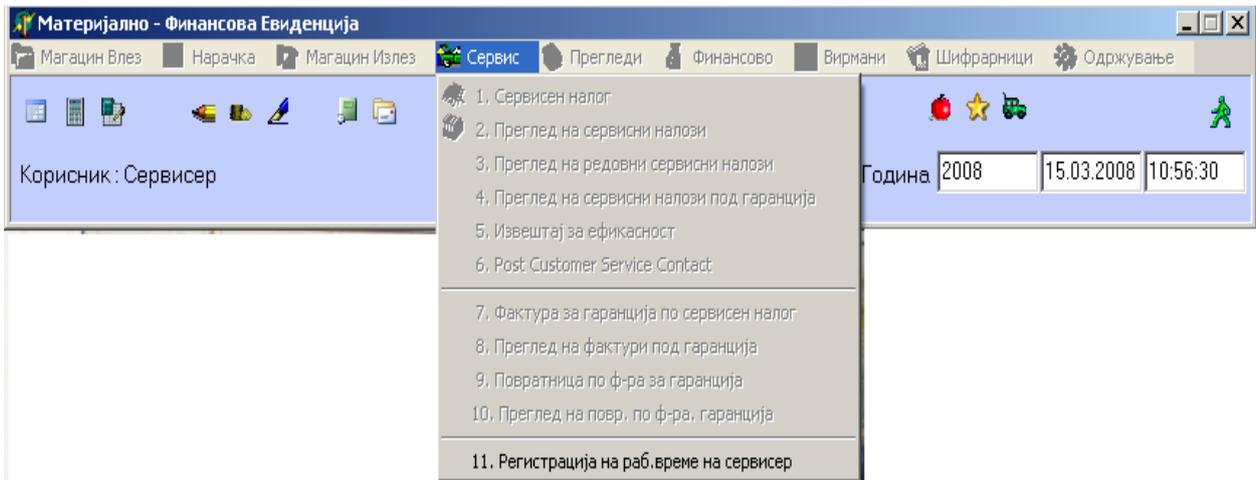
As it was previously mentioned, one of goals for increasing the employees' productivity is the innovation – introducing of working hours reader. For that purpose a servicing process diagram has been created with inserting the innovation: [6]



**Figure 2** Servicing processes diagram block

The time reader does not have a direct influence on the productivity but it has an influence on the employees' punctuality and quality of performance. Each employee knows what he has accomplished and, if the tasks have been assigned previously as a motivation, he will have a higher motive for completion of tasks on a higher level, with high quality.

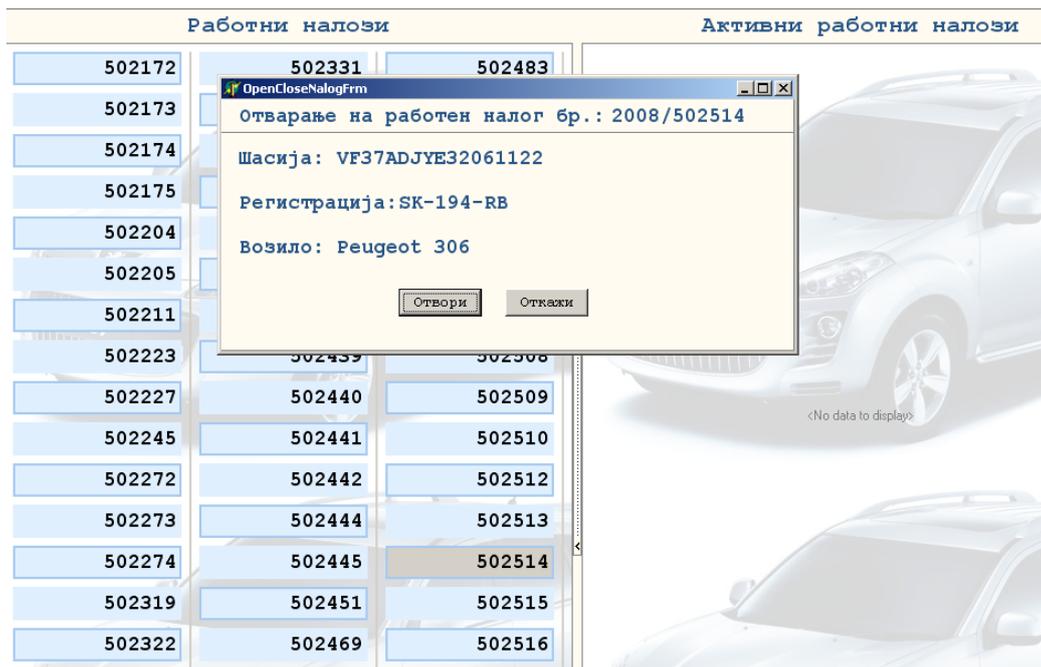
The program which is used shows the registration of the card at the beginning of the work, as follows:



**Figure 3** Fist page of the application

On the start of the program, working order supposes to be selected, that is, a working order is being activated.

While opening the working order a separate screen appears. It displays its number, chassis number of the vehicle that is to be repaired, register plates of the same vehicle as well as the vehicle model.



**Figure 4** Choice of the working order

When the working order is open, it displays the last worker who was active and this screen displays the working order number, the name and surname of the employee, start of the operation, that is, the date and time when the worker starts his work. The chassis number, register plates and the vehicle's model are also displayed.

Последен корисник Стамболиски Васил

Раб. налог	Сервисер	Почеток	Шасија	Таблица	Возило
502340	Спасовски Вачко	11.03.08 10:12	VF32BKFM7D000001	-	Peugeot 206 SEDAN
502339	Спасовски Вачко	11.03.08 10:13	VF32BKFM7D000043	-	Peugeot 206 SEDAN
502338	Спасовски Вачко	11.03.08 10:14	VF32BKFM7D000056	-	Peugeot 206 SEDAN
502336	Спасовски Вачко	11.03.08 10:15	VF32BKFM7D000023	-	Peugeot 206 SEDAN
502484	Филиповски Зоран	14.03.08 15:08	VF32CPMNC17763078	SK-273-PE	Peugeot Boxer
502504	Јаневски Гоце	15.02.08 10:41	VF37ARFX230354973	SK-306-RC	Peugeot 306
502511	Стојановски Горан	15.03.08 10:47	VF36D9HZC21065300	SR-159-BM	Peugeot 407
502514	Стамболиски Васил	15.03.08 10:52	VF37ADJYE32061122	SK-194-RB	Peugeot 306

Figure 5 Active working order

Upon completion of the operation, on the same screen there is an additional smaller screen with which you close the working order. It also displays the working order number, chassis number, register plates number as well as the vehicle's model.

Стамболиски Васил

Работни налози		Активни работни налози	
500003	500021	500041	502514
500004			
500005			
500006			
500007			
500008			
500009			
500010			
500011	500030	500050	
500012	500031	500051	
500013	500032	500054	
500014	500033	500055	
500016	500035	500056	
500017	500036	500058	
500018	500037	500059	
500019	500038	500060	
500020	500040	500061	

Затварање на работен налог бр. :2008/502514

Шасија: VF37ADJYE32061122

Регистрација: SK-194-RB

Возило: Peugeot 306

Figure 6 Closing a working order

The work measuring device shows how and in which way the activity has been done, upon which we can determine if the work is performed in accordance with the norms proscribed by the company. Thus, upon completion of the activities i.e. repair of certain vehicle, the time is measured from the opening of the working order until its closure, at which point it could be determined whether the time the worker needed for completion of particular activity is in accordance with the foreseen operation norms. If there is a great deviation then analyses on deviation is made in order to determine the same. They can be of a different nature: no spare parts on stock, lift-jack does not work, there is no adequate tool, lack of employees engagement and etc. Depending on the type of deviation, corrective measures are undertaken in order to decrease the deviation percentage and to achieve the goal. It shows whether the performance of the employee was effective and efficient.

### 3. Implications and Conclusions

Upon the opening of the program for financial and material data it could be noticed how long certain employee was engaged during the work and accordingly to be awarded. Below, the figure shows the engagement of an employee in After-sales department. An example of an employee is given in the following figure: [9]

Број док.	Датум	Име на сервисер	Ангажованост	Норматив	Производителност	Износ	Гаранција
500075	29.01.2008	Ниландовска Ане	17.70333	0	0	0.00	
500075	29.01.2008	Ниландовска Ане	17.70333	2.9	16.3074	2,300.00	
501029	29.01.2008	Ниландовска Ане	0.4	0.5	1.25	500.00	
501043	29.01.2008	Ниландовска Ане	20.36333	1.0	0.5782	1,600.00	
501072	30.01.2008	Ниландовска Ане	2.2	0.0	0	600.00	
501086	30.01.2008	Ниландовска Ане	2.00333	0	0	0.00	
501087	30.01.2008	Ниландовска Ане	0.06666	0.25	20.8407	250.00	
501104	30.01.2008	Ниландовска Ане	0.06666	0	0	0.00	
501113	31.01.2008	Ниландовска Ане	0.70666	0	0	0.00	
501117	31.01.2008	Ниландовска Ане	3.13333	6	191.4930	5,000.00	
501155	01.02.2008	Ниландовска Ане	3.85	5.3	769.1409	5,300.00	
501155	01.02.2008	Ниландовска Ане	3.85	0	0	0.00	
501204	04.02.2008	Ниландовска Ане	0	0	0	0.00	
501209	04.02.2008	Ниландовска Ане	0	0	0	0.00	
501214	04.02.2008	Ниландовска Ане	0	0.2	0	200.00	
501247	05.02.2008	Ниландовска Ане	0.03333	11.4	129.0566	11,400.00	
501256	05.02.2008	Ниландовска Ане	0.33333	1.2	300.0000	1,200.00	
501264	07.02.2008	Ниландовска Ане	1.03333	1	65.2174	1,000.00	
501345	07.02.2008	Ниландовска Ане	0	0	0	0.00	
501362	07.02.2008	Ниландовска Ане	1.43333	0.3	20.3300	300.00	
501374	08.02.2008	Ниландовска Ане	0.43333	0	0	0.00	
501375	08.02.2008	Ниландовска Ане	1.91666	2.2	145.025	2,200.00	
501376	08.02.2008	Ниландовска Ане	1.91666	0	0	0.00	
501406	09.02.2008	Ниландовска Ане	0.0	0.25	41.6066	250.00	
501410	09.02.2008	Ниландовска Ане	0.16666	0	0	0.00	
501415	09.02.2008	Ниландовска Ане	0.33333	0	0	0.00	
501416	09.02.2008	Ниландовска Ане	0.36666	0.3	91.8180	300.00	
501442	11.02.2008	Ниландовска Ане	25.41666	7.9	21.9119	7,900.00	
501443	11.02.2008	Ниландовска Ане	0.06666	0.25	25.062	250.00	
501462	11.02.2008	Ниландовска Ане	0	0	0	0.00	
501468	11.02.2008	Ниландовска Ане	1.71666	0	0	0.00	
501484	12.02.2008	Ниландовска Ане	0	0	0	0.00	
501532	13.02.2008	Ниландовска Ане	3.06333	2.73	53.7040	2,730.00	
501536	13.02.2008	Ниландовска Ане	0	0	0	0.00	
501563	14.02.2008	Ниландовска Ане	1.3	0	0	0.00	
501587	15.02.2008	Ниландовска Ане	0	0	0	0.00	
501589	15.02.2008	Ниландовска Ане	0.3	0	0	0.00	
501605	15.02.2008	Ниландовска Ане	0	0.6	0	600.00	
501639	18.02.2008	Ниландовска Ане	0.35	0	0	0.00	
501643	18.02.2008	Ниландовска Ане	0.50333	0	0	0.00	
501645	18.02.2008	Ниландовска Ане	1.0	7.0	407.5	7,000.00	
501655	18.02.2008	Ниландовска Ане	0	0	0	0.00	
Вкупно:			119			19,830.00	

Figure 7 Efficiency report

Upon implementation of the innovation the increase of the profitability of the Department is inevitable, firstly with reference to the financial input as well as with reference to the increased number of entrances in the Service Department. We came to the same conclusion upon completion of the customer satisfaction survey in 2008, 2009 and 2010 which showed 90% of satisfied customers and which has to be again set as a future goal to be reached.

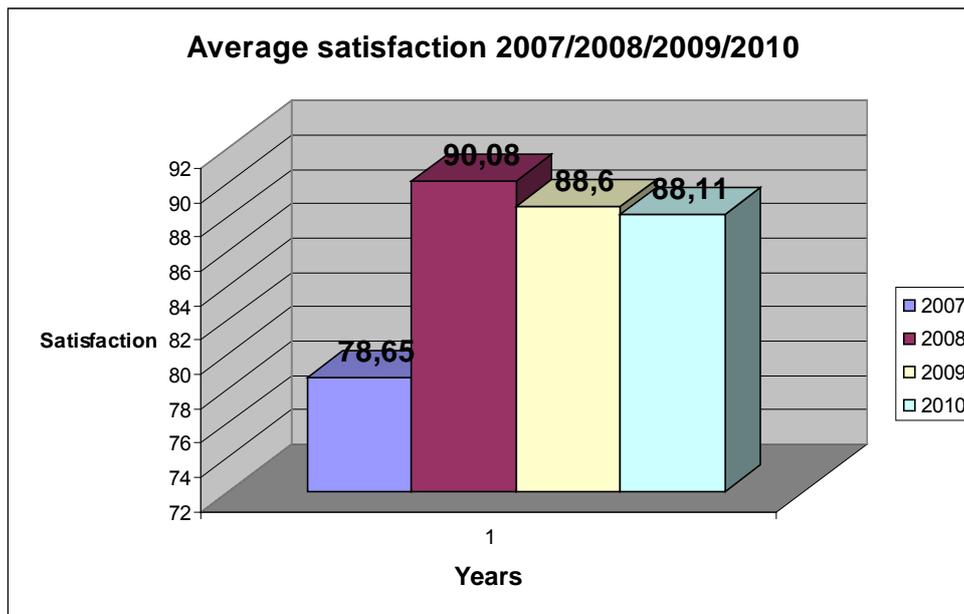


Figure 8 Average customer satisfaction

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# Innovative Employee Reward Methods Use and Its Linkage with Employee Motivation and Performance

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The presence of motivational methods and systems in companies defines its success. The perception of what motivates and should motivate employees towards achieving organizational and their own needs has been changed over the years and the era of technological change, economic crisis and new achievements. Recognition of employee's work and indentifying an innovative idea, followed by an innovative reward method can make a huge difference in the workspace and improve employee performance within the company. Does management encourage every single employee to contribute their ideas and implement the best ones? Many companies continue to offer employees the basic package that has been around for years like base salary, traditional benefits like health, welfare and retirement or maybe a profit-sharing plan. There are absolutely alternatives to consider. This is where manager's creativity takes place. Many of the traditional reward methods are tied to performance, but employers should also consider non-performance based methods. Another category of ideas is to consider motivating employees and maximise performance through implementing relationship-building programs. The lack of existence of innovative employee reward methods is identified in our research, which took place in 39 Macedonian organizations (218 employees). During the research we identified very few reward methods and many of them tie directly to employee performance. Considering the lack of the existence of innovative reward methods in our companies the basic step every employer should concentrate on, should be defining the right factors of motivation that are connected with other indicators and not just performance, as well as making this factors a part of an innovative employee reward method that will be accepted by employees and supported by the top management of companies.

## Key words:

reward, reward methods, employee motivation, performance, innovative reward methods

## 1. Introduction

Reward programs followed by adequate recognition programs, are quickly becoming a staple in the way organizations attract, retain and motivate employees [1]. Today's dynamic workforce is looking for everyday recognition. According to a Gallup Poll in 2007, employees who receive regular recognition:

- Are more productive;
- Rate higher on customer satisfaction surveys;
- Increase co-worker's engagement;
- Have better safety records;
- Are less likely to leave the organization.

Reward has been defined as one of the leading factors that drive motivation. Many studies through the years have been made using reward programs as a basic factor of their research.

## 2. Linking motivation and performance

Motivation, as a driving tool that leads towards performance, has been a challenging issue through the years of technological change. The perception of what motivates employees has been changed. The needs employees had, well defined in the motivation based theories, are still the basic needs organizations use and try to fulfil in order to achieve better employee performance. Summary of motivation based theories is given below as shown in Table 1.

**Table 1.** Summary of theories based on motivation

<b>Maslow</b>	<b>ERG</b>	<b>Herzberg</b>	<b>McClelland</b>
<p><b><u>Self-Actualization</u></b></p> <ul style="list-style-type: none"> <li>• Highest need level.</li> <li>• Involves an individual's desire to realize full potential</li> <li>• Can be satisfied without this level.</li> </ul> <p><b><u>Esteem</u></b></p> <p><i>Self-esteem</i></p> <ul style="list-style-type: none"> <li>• Need for personal sense of accomplishment, mastery.</li> </ul> <p><i>Social-esteem</i></p> <ul style="list-style-type: none"> <li>• Need for respect, recognition, attention, and appreciation of others</li> </ul> <p><b><u>Social</u></b></p> <ul style="list-style-type: none"> <li>• Need for love, affection, sense of belonging in one's relationship</li> <li>• Dealings with friends, family, and colleagues falls in here.</li> </ul> <p><b><u>Safety and Security</u></b></p> <p><i>Relationships</i></p> <ul style="list-style-type: none"> <li>• need for security in relationships</li> </ul> <p><i>Physical</i></p> <ul style="list-style-type: none"> <li>• need for security, protection from future threats, and stability.</li> </ul> <p><b><u>Physiological</u></b></p> <ul style="list-style-type: none"> <li>• Basic needs: food, water, etc.</li> </ul>	<p><b><u>Growth</u></b></p> <ul style="list-style-type: none"> <li>• Desire for continued personal growth and development</li> </ul> <p><b><u>Relatedness</u></b></p> <ul style="list-style-type: none"> <li>• Desire to satisfy interpersonal relationships</li> </ul> <p><b><u>Existence</u></b></p> <ul style="list-style-type: none"> <li>• Desire for physiological and material well-being</li> </ul>	<p><b><u>Motivation Factors</u></b></p> <ul style="list-style-type: none"> <li>• Improving factors leads to satisfaction, effort, and performance.</li> <li>• Related to job content; what employees actually do.</li> <li>• Factors:               <ol style="list-style-type: none"> <li>(1) achievement</li> <li>(2) recognition</li> <li>(3) work itself</li> <li>(4) responsibility</li> <li>(5) advancement</li> <li>(6) growth</li> </ol> </li> </ul> <p><b><u>Hygiene Factors</u></b></p> <ul style="list-style-type: none"> <li>• Improving factors prevents dissatisfaction.</li> <li>• Related to job environment more than nature of work itself.</li> <li>• Factors:               <ol style="list-style-type: none"> <li>(1) policies and procedures</li> <li>(2) supervision</li> <li>(3) relations with supervisor</li> <li>(4) work conditions</li> <li>(5) salary</li> <li>(6) relations with peers</li> <li>(7) personal life</li> <li>(8) relations with subordinates</li> <li>(9) status</li> <li>(10) security</li> </ol> </li> </ul>	<p><b><u>Need for Achievement</u></b></p> <ul style="list-style-type: none"> <li>• a drive to pursue and attain goals</li> <li>• accomplishment is important for its own sake</li> </ul> <p><b><u>Need for Competence</u></b></p> <ul style="list-style-type: none"> <li>• a desire to do quality work</li> <li>• want to develop skills</li> </ul> <p><b><u>Need for Power</u></b></p> <ul style="list-style-type: none"> <li>• desire to influence others</li> <li>• desire recognition of others</li> </ul> <p><b><u>Need for Affiliation</u></b></p> <ul style="list-style-type: none"> <li>• a drive to relate to people effectively</li> <li>• desire for close relationships</li> </ul>

In order to achieve the goals of this research and connect motivation theories with performance, as well as to make a study which will point out the motivation factors that lead to a better performance, a unique methodology has been created. Theoretical findings have built a path for making this research possible, pointing out the basic concentrations that needed to be explored. The fact motivation is something that cannot be uniformed, gives us directions for identifying a wider range of criteria that

needs to be satisfied too. The lack of performance measurement systems in organizations makes it hard for the managers to connect motivation and performance.

## ***2.1 The importance of a performance measurement system in organizations***

Reviewing the performance of an organization is an important step when formulating the direction of the strategic activities. It is important to know where the strengths and weaknesses of the organization lie as part of one measurement cycle. Measurement plays a key role in quality and productivity improvement activities [2]. Performance measurement frameworks play an important role in identifying and tracking employee and organizational progress, through measuring the achievement of organizational goals and identifying opportunities for improvement. They can be used as a tool for comparing performance against both internal and external standards. Recognizing people's achievements and strengths is a part of performance management. Feedback is the best way for informing employees about how well they are performing by reference to achievements and behaviours. They can also be helped to understand how they can do even better, by taking action to make the best use of the opportunities the feedback has revealed. There are two often-quoted statements that demonstrate why measurement is important. Using measurement can lead supervisors to a clear feedback about employees work and also create a firm ground for fair reward/punishment system. Yet it is surprising that organizations find the area of measurement so difficult to manage. Armstrong commented as long ago as 1976 that: "It is undesirable to have a direct link between the performance review and the reward review. The former must aim primarily at improving performance and, possibly, assessing potential. If this is confused with a salary review, everyone becomes over concerned about the impact of the assessment on the increment. It is better to separate the two [3]." Armstrong and Murlis comment that: "Some organizations separate entirely performance pay ratings from the performance management review. But there will, of course, inevitably be a read-across from the performance management review to the pay-for-performance review" [4].

## ***2.2 Reward as a part of a motivation system that drives performance***

Developing a performance measurement framework must be followed by a motivational system. A good performance measurement framework will focus on the customer and measure the right things. Performance measurement can provide a basis for motivating people by enabling them to develop their skills. They can be thanked, formally and informally, for what they have done. When looking at a task, we evaluate it in terms of how well it meets our needs to feel competent and in control. We will be intrinsically motivated to complete the task if we think we will be able to complete the task, requiring no further external motivation. Where a person has stronger internal locus of control they will feel they are in control of how they behave. Where they have a strong external locus of control, they will believe the environment or others have a greater influence over what they do. People may see external rewards as achieving some degree of control over them or may see the reward as informational, such as where they reinforce feelings of competence and self – determination. When people see reward as mostly for control, they will be motivated by gaining the reward, but not by enacting the requested behaviour [5]. This are the postulations of the Cognitive Evaluation Theory also called Self-Perception Theory [6]. Performance measures have to be very carefully chosen and have the following characteristics:

- Meaningful, unambiguous and widely understood;
- Owned and managed by the teams within the organization;
- Based on a high level of data integrity;
- Such that data collection is embedded within the normal procedures;
- Able to drive improvement;
- Linked to critical goals and key drivers of the organization.

Performance is considered to be a function of ability and motivation [7]:

$$\text{Performance} = f[(\text{ability}) * (\text{motivation})]$$
$$\text{Motivation} = f[(\text{valence}) * (\text{expectancy})]$$

Ability is defined as the variety of skills one person possesses, powered by employee trainings and available resources.

The best way for implementing a performance measurement system can be the acceptance of the basic strategies of motivation, while defining strategies and goals [8]:

- Positive reinforcement/high expectancy;
- Effective reward and punishment;
- Satisfying employees needs;
- Positive work environment;
- Setting work related goals;
- Restructured work places;
- Performance based rewards.

According to a 2003 survey conducted by WorldatWork and the National Association for Employee Recognition (NAER), the majority of companies maintain formal and informal reward and recognition programs and their use is becoming increasingly prevalent. The study identified the following driving forces for implementing and maintaining reward and recognition programs:



**Figure 1.** Key Goals of Rewards and recognition program [9]

In survey of 35.000 employees, researchers Joseph Cangemi and George Guttshalk, asked employees to nominate what they wanted most from their jobs. The research shows that there is no parallel that can be made between the “wants” of employees and supervisors. For many people there are few things more motivating than seeing the successful implementation of any idea they suggested. Supervisors overlook the possibility that their employees may be untapped mine of good ideas. An organization needs to evolve its own set of metrics, using any existing metrics as a starting point in understanding current performance. To ensure they trigger the improvement cycle, they should be in three main areas:

$$\text{Effectiveness} = \text{Actual output} \times 100\% / \text{Expected output}$$

The effectiveness metrics should reflect whether the desired results are being achieved, the right things being accomplished.

$$\text{Efficiency} = \text{Resource actually used} \times 100\% / \text{Resources planned to be used}$$

This is about the process input and measures the performance of the process system management cause it is possible to use resources efficiently but ineffectively.

$$\text{Productivity} = \text{Outputs} / \text{Inputs}$$

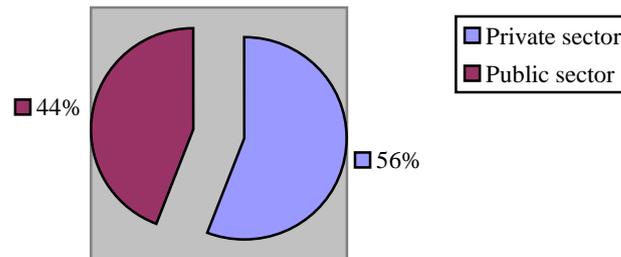
Productivity can also be quoted as:

$$\begin{aligned} \text{Expected productivity} &= \text{Expected output} / \text{Resources expected to be consumed}; \text{ or} \\ \text{Actual productivity} &= \text{Actual output} / \text{Resources actually consumed} \end{aligned}$$

The research which took part in the public and private sector in Republic of Macedonia has its basic accent on indentifying the reward methods that companies use and the factors that directly apply employee's motivation.

### 3. Innovative reward methods use – research

The research took place in 39 companies (219 employees). It is comparing theoretical postulations of motivation, linking them to performance and giving conclusions about the use of motivational systems and reward methods in our organizations.



**Figure 2** Employee structure

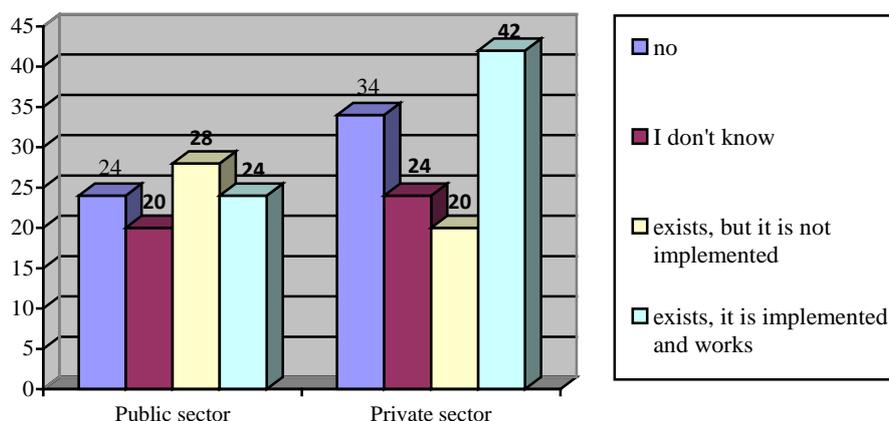
Considering the structure of the employees that were included in this survey, we can highlight that 49% of them are middle level managers which are in charge of working groups that count less than 20 employees. Most of the employees are: (a) around 41- 50 years old, (b) 58,7% have a previous work experience, (c) 61,4% are men, (d) 10,9% of the employees are MSc and (e) 2,7% of the employees have a PhD.

The basic points of the research were the relevant factors that apply directly to employee motivation and its connection with performance. The significance of the *personal factors* are taken in consideration as well as *leadership factors*, *team factors* and *system factors*, as defined from Armstrong and Baron [10].

*If we take a closer look at the results that apply to personal factors, we can point out the positive structure from the given answers. The work recognition employees get from their supervisors is rated as good - 46,7% of the employees defined it as level 3 on a scale from 1-4, where 1 is the lowest grade and 4 is the highest rating. These factors apply to personal skills, confidence, motivation and employee engagement.*

*Leadership factors, as quality of encouragement and support from employees and supervisors, can be stated as satisfactory (50,4% of the employees answered that their company encourages them to search for possibilities for their own growth and professional development). We have very disappointing results that are connected with the effort companies make to keep their high skilled employees, 34,8% answered that are partially satisfied with their company policy for keeping their high skilled employees (which is level 2 on a scale from 1-4, where 1 is the lowest grade).*

We can highlight *work systematisation* as one of the issues that has an urgent need to be improved. Employees from private sector have a huge need of systematisation of their work, mainly because of the extra effort they put into their work and not getting a satisfactory award and recognition for it.



**Figure 3** Reward systems in Macedonian Organizations

*It seems like most of the organizations from the public sector have reward systems, but they are not implemented right. The picture in the private sector is different. Most of the organizations (42 organizations) have a reward system which is already implemented and works.*

*The rewards used as a part of the reward systems in these organizations, are mainly financial awards that employees receive for a complex work that has been properly finished and didn't suffer additional expenses. Rewards, as additional pay for extra work, and yearly paid bonuses are also mentioned. Innovative rewards have not been identified or used.*

Very few organizations use performance evaluation plans for measuring their employees work. This is one of the basic issues that lead us to believe these organizations don't have a solid ground to create a strategy that will include implementation of a reward system.

One effective reward system should have the following characteristics [11]: (a) set high goals for performance, (b) develop accurate ways to measure performance, (c) train supervisors in performance appraisal, (d) link pay to performance and (e) make increases noticeable and meaningful.

The research has shown that the basic motivation method organizations use is the financial bonus given as a reward for the excellent work. Other mentioned rewards are: higher hierarchy position, public recognition, non-financial benefits etc.

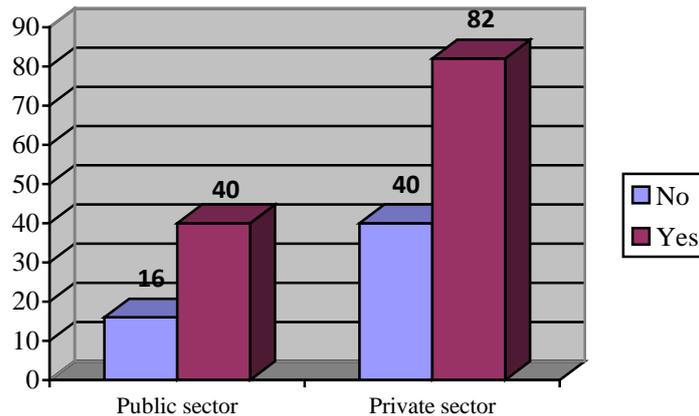
**Table 2** Expected rewards from employees

	1 (no)			2 (maybe)			3 (yes)		
	Pub. Sec	Pr. Sec.	(%)	Pub. Sec	Pr. Sec	(%)	Pub. Sec	Pr. Sec.	(%)
<b>Crystal statue</b>	80	76	<b>71,5</b>	12	32	<b>20,1</b>	4	14	<b>8,2</b>
<b>Functional reward</b>	20	38	<b>26,6</b>	58	42	<b>45,8</b>	18	42	<b>27,5</b>
<b>Certificate</b>	10	48	<b>26,6</b>	46	18	<b>29,3</b>	40	56	<b>44</b>
<b>Money/ bonuses</b>	4	18	<b>10</b>	18	20	<b>17,4</b>	74	84	<b>72,4</b>
<b>Days off - vacation</b>	8	42	<b>22,9</b>	20	38	<b>26,6</b>	68	42	<b>50,5</b>

\*Pub. Sec. – Public Sector

\*Pr. Sec. – Private Sector

Every employee has a need for praise and recognition, and the more often they get it the better. Supervisors are in the best position to give recognition, but few do it often enough or creatively enough [12]. Employees have made it very clear that their performance depends on the reward methods used in their companies.



**Figure 4** The case of existing rewards method: reward methods improve productivity

There are many kinds of rewards to choose from, besides regular awards. One of the easiest, most effective forms of rewarding is praise, which is misguided. Pay fails to motivate where bonuses or merit pay is too small, when there is non-existence link between pay and performance, performance appraisal is done poorly, when there is effect of unions and when employees have adaptation problems [13]. The fact that rewards tend to be given at big annual or semi annual awards ceremonies poses yet another problem. Since so much time elapses between awards cycles, the awards are typically granted for work that was accomplished many months in the past. This makes a very weak linkage between accomplishments and rewards. Employees need recognition more than once a year. Managers share the opinion that rewards may influence the financial picture of the company. Innovative rewards methods involve minimal or no cost. There are over 100 low-cost or no-cost programs which have been used successfully by companies [14]. Many of them are tied to performance [15], but employees should also consider non-performance based programs, which complement post-performance reward programs. Some examples of non-performance based programs include: (a) core hours (flexible work time), (b) Tips for improving performance (workshops on topics that affect some working issues), (c) casual dress program, (d) employee discounts for company goods etc. Another category of ideas to motivate employees and maximize performance are relationship-building programs [16]. These incentives may not be viewed by some as compensation because there is no exchange of cash or merchandise and no traditional or non-traditional benefits. These programs are a broad set of interactions which build open communication channels and break down organizational barriers. Some examples of a relationship building programs are: (a) executive coffee breaks, (b) family program, (c) cooperative charity day, (d) special dress days etc.

## 4. Conclusion

Companies are not bound by tradition when it comes to rewarding, compensating or motivating employees. It is a fact that good motivation leads to a better performance [17]. Implementation of a precise reward method is one way of achieving higher employee motivation and improving performance [18]. The use of innovative reward methods can create a positive working environment. Managers should consider the fact that not all rewards involve cost [19]. A need for developing and implementing an employee recognition programs is identified in our organizations. Employees are motivated to work towards achieving organizational goals [20]. Activities that are needed to be taken in consideration by the top management are: reducing ineffective work time and implementing an innovative reward methods system. The current motivation factor in our organizations are money, work recognition comes next, positive working environment is third and continuing training in the field of work, is also considered as one of the factors that lead to a better performance. All of these factors should be taken in consideration while projecting a work frame that can be used for future development of an innovative reward method - system.

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# Odds ratio, OR: calculation, use and interpretation in assessing the vulnerability of network systems

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Odds ratio (U.S. odds ratio, OR) is one of several statistical tests, which becomes increasingly important in the Internet-computer research and decision making. Since this is a test of the sample size is particularly useful because computers offers a clear and direct information on how to access security has the best chance for the benefit of users. Tests of statistical significance used for the ratio of the probability of Fisher's exact test, chi-squared (c2) probability ratio test and Pearson chi-squared (c2) test. Typically, the data consist of values for each pair of conditions and outcomes and are presented in table form. Occurs most often forms of 2 x 2, although possibly larger tables. Since it is easy to calculate,  $OR = (a \times d) / (b \times c)$ , OR can be calculated by hand on the spot, if it is necessary to determine the chances that a particular event will occur to the user at risk for this event. OR helps the computer professionals in making decisions about the implementation of security measures, since it offers a simple information that the users themselves can understand the network, and thus participate in decisions about the implementation of the protection of computers in a network that will be based on the prospects of successful implementation of prescribed measures.

## Keywords:

Odds ratio, chi-square test, computer protection, security in the network

## 1. Introduction

In order for the safety of the working environment was satisfied it is necessary to adhere to clear the table. Among other things, the user is obliged to observe the following rules:

- important information must be physically inaccessible to all persons who have no access to them,
- when not in the vicinity of the workplace user must disable access to the contents of your computer.

### 1.1 Using e-mail

Electronic mail is part of everyday communication, business and private, but its use can seriously jeopardize the safety of information systems. Potential threats and vulnerabilities in e-mail:

- Viruses of electronic mail can be malicious in character - as an attachment is a file that contains a virus,
- Uncertainty about the protocol messages travelling in plain text, and is easy to read or edit content, is easy to forge the sender's address ,
- Accidents on pressing the wrong key or selecting the wrong user in the directory message may be unwilling to (or more).

- That the threat of information system caused by inappropriate use of e-mails to a minimum, should observe the following rules:
- e-mail may not be used to send insulting, disparaging, disturbing sexual and other messages of similar content,
- not allowed to send chain messages that are burdening network resources,
- each written message is considered a document. You do not have the right messages that are sent to you personally to distribute without author-s permission,
- each message containing a suspicious attachment, you must check the contents of an antivirus program,
- Bureau has the right to filter messages in order to stop unwanted email (spam Eng.),
- in the case incident, the Department has the right to review all data (including electronic mail),
- messages that are part of the business process it is necessary to archive and preserve the prescribed period of time,
- the user may not send mass messages, regardless of their content.

## 1.2 Social Engineering

Social engineering is the kind of attacks on computer systems with the aim of persuading people to meet the demands of the attacker. This is primarily a way of collecting data to which the attacker legal channels could not reach. When it does not exploit failed implementation of operational systems, protocols and applications, but the assault was directed at the weakest link of the entire chain - the human factor.

## 2. Methods of protection

Only possible way to protect against social engineering is education users with implementation of security access control and physical security. All other methods of automatic detection, recording and opposition to this type of attack are not effective. Educating users to prevent those attacks in which victims of ignorance give the attacker the information you want. Educating users should include instructions on how to recognize social engineering and how to react properly.

There are a number of statistical tests that can help in making decisions about the choice of computer protection interventions, drawing conclusions about the effects of various causes of action or events in situations related to computer security. One of the tests that are commonly encountered is the odds ratio (U.S. odds ratio, OR). The odds ratio is estimated that the odds of a particular event or outcome in the same two groups. Explained in more detail, OR the odds seem to be the result of an event or perform, and it seems that this event will be absent. Computer terms, this often means that the researcher measured the ratio seems to be whether to develop some attempt to attack a computer or perform "death" of computers, due to attempts to attack or threats or attempts of computer security threats around the computer will perform. OR is used in the measurement of one of two possible events or outcomes in case of alleged causal factor. OR is statistically reliable test that can have a different application. For example, it can be used for the calculation seems to be some event occur due to certain protection measures carried out (1). It can calculate the odds of the outcome of a computer due to the exposure, or unexposed an attack or incident (2). OR is a measure of effect size (U.S. size effect) (as is the Pearson correlation coefficient) and therefore informs on the strength of association between two variables. However, OR is an indirect measure, which we will explain in more detail in the section on interpretation of statistical tests. Calculating the odds ratio calculation of the ratio seems pretty simple. The formula is as follows:

$$\text{Odds ratio} = \frac{PG_1 / (1 - PG_1)}{PG_2 / (1 - PG_2)}$$

where  $PG_1$  is a chance for the tested event for group 1, and  $PG_2$  is a chance for the tested event for the group second Another way of presenting the formula is a tabular form:

	Standard protection	For better protection
Event	a	b
No events	c	d

**Table 1**

**Odds ratio** =  $(a / b) / (c / d)$  or: odds ratio =  $(a \times d) / (b \times c)$

The mathematical rule sharing twin fractions other formula will give the same results as the other two formulas to calculate the OR. Another form of formula more frequently encountered in research.

## **2.1 Tests of statistical significance OR**

First thing we need to understand the tests of statistical significance of odds ratio is that the true value of the neutral (which indicates equal chances for both conditions), one (1), rather than zero (0). For the odds ratio can be used several tests to assess statistical significance. The most common are the Fisher exact test, Pearson-s chi-squared (c2) test and chi-squared (c2) test ratio probability.

### *Fisher-s exact test*

Data to calculate the OR is often displayed in a table with fields 2 x 2 and then used Fisher-s exact test. Its formula is

$$p = \frac{(a + b)! (c + d)! (a + c)! (b + d)!}{n! a! b! c! d!}$$

where p is the value of Fisher exact test, a, b, c and d represent the numbers in the fields of the table, and n is the total value of all four fields of the table.

### *Chi-square (c<sup>2</sup>) test*

If table contains more than 4 fields (or, if it suits the researcher), you should use a chi-square test. Chi-square assumes that the numbers in the fields represent the values and not ratios or mean, and assumes that the expected value  $\geq 5$  in 80% of the fields. In order to obtain the level of statistical significance test, the probability value obtained must be compared with values that are evident from the table for Fisher-s exact test for some degree of freedom. Many statistical computer programs, such as Stata and SPSS, calculate the value of Fisher exact test and chi-square test and give information about the statistical significance test. The formula for Chi-square test as follows:

$$\chi^2 = \sum \frac{(o - e)^2}{e}$$

where O represents the observed frequencies, and e expected frequencies.

Chi-square likelihood ratio test

Like all statistical tests to calculate the probability ratio, chi-square test of probability ratio is a logarithmic formula. If the data entered into the program for statistical analysis, this is the most appropriate test of statistical significance for the OR. The formula is:

$$G = 2 \sum f_i \ln \left( \frac{f}{f_i} \right)$$

Where G is the value of the probability ratio test, the observed frequencies f,  $f_i$  are the expected frequencies, and ln represents natural logarithm.

## 2.2 Determination of standard errors and confidence intervals for OR

OR values have normal distribution, so it is not possible to directly calculate the standard error (U.S. standard error, SE). However, the standard error can be calculated simply from the natural logarithm of the OR. It is calculated as follows:

$$SE = \sqrt{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}$$

In order to be found around the natural logarithm of calculated confidence interval (U.S. confidence interval, CI), will be the upper formula to calculate the SE, and the value (or a multiple of this value) OR add the logarithm of the value to obtain the upper limit of confidence intervals, respectively, and values (or multiples of that value) seized the logarithm value of OR to obtain a lower limit of CI. It should be remembered that the concept of "no statistically significant differences" in most statistical tests related to the difference is 0, and that generally means a variable extent, or when the situation is different. The term "no statistically significant differences" to test the statistical mean value of 1. Therefore, when the CI includes the value 1, a researcher and computer will immediately know that the prospects of the tested outcome the same for both (or all) groups to implement measures of protection (we call it in your own words, "treat the computer"), even if they do not examine statistical significance.

## 2.3 Examples of use of OR

Determination of test results carried out a measure of protection OR is often used in determining the effect size differences between the two treatments applied to the computer. Take the example of protection for users of infected computers from spam. Although the collapse of the computer from infection, and the range from 25% to 47%, assuming that the rate of the tested computers of his "death" of 38% with a standard anti-virus protection program. However, developing new malicious is much more dangerous viruses that attack your computer. The question is: what are the odds that your computer will be ejected from the function (call appearances of his "death") by taking a new medication (protection) compared with standard treatment malicious programs? OR has a way with which one can compare the odds of whether a particular outcome the same for two different groups. OR is the ratio of the following two ratios: the ratio of the standard "treatment" and a "treatment" in a group of computers that are thrown out the functions and the ratio of the standard treatments and new treatment in a group of computers that have survived. According to the values from Table 1, calculated as follows:

$$\text{Odds ratio} = (a / b) / (c / d) = (152/17) / (262/103) = 8.94 / 2.41 = 3.71$$

The formula can be expressed as  $(a \times d) / (b \times c)$ , and the result is the same:

$$\text{Odds ratio} = (152 \times 103) / (17 \times 248) = (15656/4216) = 3.71.$$

The result of calculating the OR can be interpreted as follows: in a group of computers that were treated with the standard way of protecting mortality was 3.71 times higher than in groups of computers that are treated with the new "drug". Based on these results, the researcher should conclude and suggest that all four machines that were diagnosed with malicious code prescribe a new drug protection. In making these recommendations certainly implies that both therapies have similar accompanying disadvantages.

How to interpret the results for the second OR: if OR is 1.00, meaning that it is equally likely that both groups investigated the computers to be completely infected - our words, they will "die". OR greater than 1 means that it is likely that respondents in the first group of computers (in this case, the computer treated with standard methods) to perform the event (death) than in other groups of respondents. OR less than 1 means that it is less likely that this event will occur in the first group examined the computer. However, the OR values less than 1.00 can not be directly interpreted. OR does not provide a result that tells us how far less likely that this event will occur in the first group examined the computer. It is important in the first column put the group which is expected to have a better chance for a performance event. Not worth trying to determine exactly how much less likely that the first group doing performances in comparison with other groups. If the chances of the first group, in which the event occurred, it seems less than other groups, will be replaced with seats in the table so that other groups came in the first column, a first in the second. You will then be able to interpret the statistically significant difference because the team relocating to calculate how many times an event occurred in the second group than in the first.

	Standard protection of computer	The new "cure" from the protection	Odds
"Death" of computers Died	152 (a)	17 (b)	152/17 = 8.94
Survived a computer attack Survived	248 (c)	103 (d)	262/103 = 2.41
Totals	<b>400</b>	<b>120</b>	8.94/2.41 = 3.71

**Table 2**

If you replace the columns in the above example, the OR will be at

$$(5 / 22) / (45/28) = (0.2273 / 1.607) = \mathbf{0.14}.$$

As you can see, it does not tell us that the group examined the computer "treated" the new anti-virus was 0.14 times less "death"; cases, but the tested computers where the "treatment"; standard mode. In fact, this procedure gives a result that can only be interpreted in the following manner "likely to occur in the first group event less than likely to occur in the event of another group". To what extents are correct, the chances of the first group are less than appears in other groups is not known.

### 3. Conclusion

Great importance ratio seems to lie in the fact that is easy to calculate, very easy to interpret and give the results by which they can make a managerial decision. Furthermore, sometimes in certain situations, it helps you to computers; we can explain how the odds are one outcome, and what else. If you know what are their chances to achieve the desired result of protection, users can easily decide on the acceptance or rejection of expensive anti-virus protection. Many users want to participate in decisions about their care, but in order to effectively participate must obtain information about the probable results on the Code of Conduct. In the industrialized world's; most knowledgeable enough to be able to understand the basic calculation of percentages and meaning of the concept of probability. OR provides information that is used to protect managers and users in decision making.

OR is one of the categories of statistical tests are often used by managers in making decisions about the implementation of protection strategies. Other statistical tests are often conducted to make decisions about the protection of statistical tests include risk assessment, such as the statistical test for absolute risk reduction (U.S. *absolute risk reduction statistics*) test and relative risk reduction (U.S. *relative risk reduction statistics*). OR values reveal information about the prospects for a particular outcome in relation to the prospects for the second outcome, and thus this test helps in making managerial decisions. Statistical tests of relative risk assessment (U.S. *relative risk assessment statistics*) are particularly suitable for setting diagnostic state computers and making decisions about the implementation of protection, and will talk more about them in a future study. The objectives of this study are to draw attention to the daily attacks on Web sites, as well as to draw attention to the consequences of exploitation of vulnerabilities in attack. The paper should: - indicate the obvious omissions in the information that the business of designing systems and their rehabilitation. Almost always, the web portal has the basic purpose and functions (business, communication, interaction). But their safety (the interface, technology, location, data) is very questionable. We set ourselves the question: what does this mean for end-users (the needs, habits, confidence). Is all this at risk? We took the types of vulnerabilities and attacks by - OWASP TOP 10.

**Table 3**

OWASP Top 10 – 2007 (Previous)	OWASP Top 10 – 2010 (New)
A2 – Injection Flaws	A1 – Injection
A1 – Cross Site Scripting (XSS)	A2 – Cross-Site Scripting (XSS)
A7 – Broken Authentication and Session Management	A3 – Broken Authentication and Session Management
A4 – Insecure Direct Object Reference	A4 – Insecure Direct Object References
A5 – Cross Site Request Forgery (CSRF)	A5 – Cross-Site Request Forgery (CSRF)
<was T10 2004 A10 – Insecure Configuration Management>	A6 – Security Misconfiguration (NEW)
A8 – Insecure Cryptographic Storage	A7 – Insecure Cryptographic Storage
A10 – Failure to Restrict URL Access	A8 – Failure to Restrict URL Access
A9 – Insecure Communications	A9 – Insufficient Transport Layer Protection
<not in T10 2007>	A10 – Unvalidated Redirects and Forwards (NEW)
A3 – Malicious File Execution	<dropped from T10 2010>
A6 – Information Leakage and Improper Error Handling	<dropped from T10 2010>

Attackers can potentially use many different paths through your application to do harm to your business or organization. Each of these paths represents a risk that may, or may not, be serious enough to warrant attention. Sometimes, these paths are trivial to find and exploit and sometimes they are extremely difficult. Similarly, the harm that is caused may range from nothing, all the way through putting you out of business. To determine the risk to your organization, you can evaluate the likelihood associated with each threat agent, attack vector, and security weakness and combine it with an estimate of the technical and business impact to your organization. Together, these factors determine the overall risk.

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# Science, Technology and Innovation (STI) and the Knowledge Economy: Implications for the Republic of Macedonia

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This paper highlights the importance of Science, Technology and Innovation (STI) in the new economic growth model leading to knowledge-based economies. It identifies the main drivers of the knowledge economy. It reviews various STI Indicators for selected countries. It identifies sources of financing Research and Development (R&D), and highlights the role of public and private sectors. The paper reviews funding sources and instruments for R&D. The role of Foreign Direct Investments (FDI) in technology transfer and the spillover effect are examined. The need to create the enabling environment for investments, including proper regulations to facilitate doing business are essential. The importance of venture capital for commercialization of proven technology is addressed. "Ease of Doing Business" indicators for selected countries using the World Bank/IFC Doing Business 2011 Report are presented. The paper will conclude that STI will enable countries to embark on knowledge-based economies to join the 21st Century. The paper makes some suggestion for consideration by policymakers in the Republic of Macedonia (Macedonia).

## Keywords

Science, Technology and Innovation (STI), R&D, knowledge-based economies, Indicators

## 1. Introduction

Many small countries such as Finland, Ireland, the Republic of Korea (Korea), Malaysia, Singapore and Taiwan have achieved knowledge-based economic growth by building up their national Science, Technology and Innovation (STI) capacity and implementing STI strategies. In Korea the Government has established a "Ministry for Knowledge Economy" and Ireland has articulated an explicit knowledge economy strategy. The emergence of Information Communication Technology (ICT), Biotechnology and Nanotechnology provide great opportunities for small and large countries to attain knowledge-based economies.

The World Bank identified (World Bank Institute (WBI) – Building Knowledge Economies, 2007) Four Interactive Pillars for Knowledge Economy, namely: (1) Economic and Institutional Regime: Provides incentives for the efficient creation, dissemination, and use of existing knowledge. (2) Education and Skills: An educated and skilled population can use knowledge effectively (3) ICT Infrastructure: Facilitates the effective communication, processing and dissemination of information, and (4) Innovation System: A system of organizations that can tap into global knowledge to assimilate and adapt it, as well as create local knowledge. The rationale of the four pillars is that "Knowledge economy relies on knowledge as the key engine of economic growth. It is an economy in which knowledge is acquired, created, disseminated, and applied to enhance economic development". WBI also developed a Knowledge Economy Index to measure countries "knowledge economy readiness".

The United Kingdom Economic and Research Council, in 2005, described the process of knowledge economy as "economic success is increasingly based on the effective utilization of intangible assets such as knowledge, skills, and innovative potential as the key resource for competitive advantage. The term knowledge economy is used to describe this emerging economic structure."

Main Drivers for Knowledge Economy: The main drivers for STI leading to knowledge-based economy include investments in: (i) education, at all levels, (ii) R&D, including capacity building and collaborative research, (iii) venture capital, (iv) techno-parks (science parks) and business incubators,

entrepreneurship, and (v) commercialization of proven technology. These investments will not yield the desired results unless (a) there is an overall macroeconomic framework with continues structural reform, (b) the enabling environment to encourage private sector development, and (c) removing the administrative barriers to facilitate the ease of doing business. These are important factors to encourage Foreign Direct Investments (FDI), which will also lead to technology transfers and spillover effects.

Policymakers and economists in industrialized countries view Science, Technology and Innovation (STI) and investments in R&D as the “Engine of Economic Growth” (Rand Report). According to the new economic growth model, economic growth is rooted in education, research, technology and innovation. Thus, investments in R&D could result in higher economic growth and have direct impact on the national economy and the well-being of the society. I believe that policymakers in Macedonia share this view.

## 2. Science, Technology and Innovation (STI) Indicators

Various indicators are used to monitor and measure STI. These indicators include, (i) Gross domestic Expenditures on R&D (GERD) as percentage of GDP, (ii) Number of Scientific and Technical Journal Articles, (iii) Number of Researchers in R&D per Million People, (iv) GERD per Researcher, (v) Number of Patents Applications filed, and (vi) High-Technology Exports as percentage of manufactured exports. In addition, Science Citation Index (SCI) is the most commonly used indicator to measure scientific output. It should be noted that STI Indicators which were relevant in the past may be less relevant today and should be complemented by indicators such as the number of internet users per 1000 people. The following section reviews some of these indicators for selected countries, with special focus on Macedonia.

**Table 1** Key STI Indicators for Selected Countries

	<b>R&amp;D Expenditures as % of GDP</b>	<b>Researchers in R&amp;D per Million People</b>	<b>High-Technology Exports as % of Manufactured Exports</b>	<b>Number of Patents filed by Residents</b>	<b>Number of Patents filed by non-residents</b>
<b>Israel</b>	4.74*	NA	16	1,528	7,263
<b>Finland</b>	3.47	7,382*	21	1,799	205
<b>Korea, Rep.</b>	3.47	4,627	33*	127,114	40,940
<b>USA</b>	2.67	4,663	27	231,588*	210,062*
<b>Austria</b>	2.52	3,774	12	2,298	745
<b>China</b>	1.49	1,071	29	194,579	80,155
<b>Montenegro</b>	1.18	NA	NA	NA	NA
<b>Croatia</b>	0.93	1,384	9	330	122
<b>India</b>	0.80	137	6	5,314	NA
<b>Moldova</b>	0.55	724	4	273	9
<b>Greece</b>	0.50	1,873	10	803	NA
<b>Serbia</b>	0.34	1,190	NA	386	NA
<b>Egypt</b>	0.23	617	1	516	1,008
<b>Macedonia</b>	0.21	521	1	34	NA
<b>Bosnia</b>	0.03	197	4	59	NA

Source: World Bank – World Development Indicators (WDI) 2010

All data are for 2008 or 2007. If data is not available for these years; the most recent data from previous years are used. \*Highest score for each indicator.

It should be noted that Israel has the highest ratio in the World (4.74%) of R&D expenditures as % of GDP. Finland and Korea are the second highest ratio of 3.47%. This is compared with a very modest ratio for Egypt (0.23%) and Macedonia (0.21%).

The highest number of researchers per million people is recorded in Finland (7,382) compared with 617 and 521 in Egypt and Macedonia, respectively.

The highest ratio of high-technology exports as % of manufactured exports is in Korea (33%) followed by China (29%) where as Egypt and Macedonia record only 1%.

The USA registered the highest number of patents 231,588 (residents) and 210,062 (non-residents) followed by China 194,579 (residents) and 80,062 (non-residents). This is compared with Egypt 516 (residents) and Macedonia 34 (residents).

R&D Expenditures as % of GDP: This is equivalent to the GERD as % of GDP, which is being used by the UNESCO Science Report 2010. This includes capital and current expenditures by both public and private sectors. While this is an important indicator, one should analyze the composition of these expenditures. In some countries these expenditures include very high amounts (about 85% – 90%) for salaries of researchers and technicians; which leaves little funds for buying equipments and materials for conducting research.

Researchers per Million People: While the number of researchers and technicians are important, it is the quality, the skills and competencies of the researchers that are more significant.

Ratio of High-Technology Exports: The higher the ratio of high-technology exports to manufacturing exports the more likely the country is moving toward a knowledge based-economy.

Scientific and Technical Articles: The number of these articles is important. However, how many of these articles are patented and commercialized is the “acid test” for contributing to the knowledge-based economies.

Patents: Scientists and researchers should be encouraged to register patents, but it is more important to commercialize patents and proven technologies

### 3. R&D Financing Sources and Instruments

This section of the paper summaries the main sources and instruments for financing R&D, as follows:

- **Government/Public Sector:** Direct budget funding (core funding) of national research institutions and university research. Governments also finance some research projects carried out by universities and private sector corporations/companies such as: Airbus, Philips, Siemens, Ericson, Nokia, IBM, GE, and Lockheed Martin, etc.

Table 2 and Chart 1 show the trends (2000-2008) of GERD as percentage of GDP for selected countries.

**Table 2:** Trends of GERD as % of GDP in Selected Countries\*

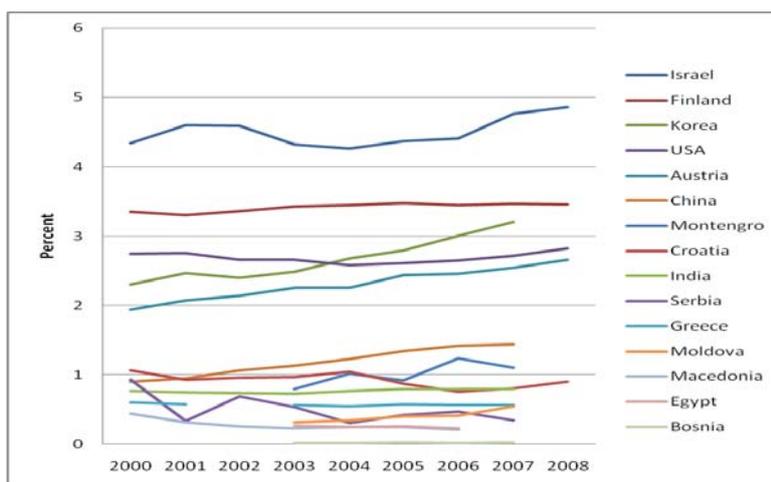
	2000	2001	2002	2003	2004	2005	2006	2007	2008
<b>Israel</b>	4.32	4.6	4.59	4.32	4.26	4.37	4.42	4.76	4.86
<b>Finland</b>	3.35	3.3	3.36	3.43	3.45	3.48	3.45	3.47	3.46
<b>Korea, Rep.</b>	2.3	2.47	2.4	2.49	2.28	2.79	2.01	3.21	
<b>USA</b>	2.75	2.76	2.66	2.66	2.58	2.61	2.65	2.72	2.82
<b>Austria</b>	1.94	2.07	2.14	2.26	2.26	2.44	2.46	2.54	2.66
<b>China</b>	0.9	0.95	1.07	1.13	1.23	1.34	1.42	1.44	
<b>Montenegro</b>				0.8	1.02	0.92	1.42	1.1	
<b>Croatia</b>	1.07	0.93	0.96	0.97	1.05	0.87	0.76	0.81	0.9
<b>India</b>	0.77	0.75	0.74	0.73	0.77	0.8	0.8	0.8	
<b>Serbia</b>	0.93	0.34	0.69	0.54	0.31	0.42	0.47	0.35	
<b>Greece</b>	0.6	0.58		0.57	0.55	0.58	0.57	0.57	
<b>Moldova</b>	0.81			0.32	0.35	0.4	0.41	0.55	

	2000	2001	2002	2003	2004	2005	2006	2007	2008
<b>Macedonia</b>	0.44	0.32	0.26	0.23	0.25	0.25	0.21		
<b>Egypt</b>	0.19			0.27	0.25	0.26	0.23		
<b>Bosnia</b>				0.02	0.02	0.03	0.02	0.03	

Source: UNESCO Science Report 2010

\* The numbers in the above table are slightly different from the numbers given by the World Bank – World Development Indicators (WDI) 2010 shown in Table 1.

**Figure 1** Trends of GERD as % of GDP in Selected Countries

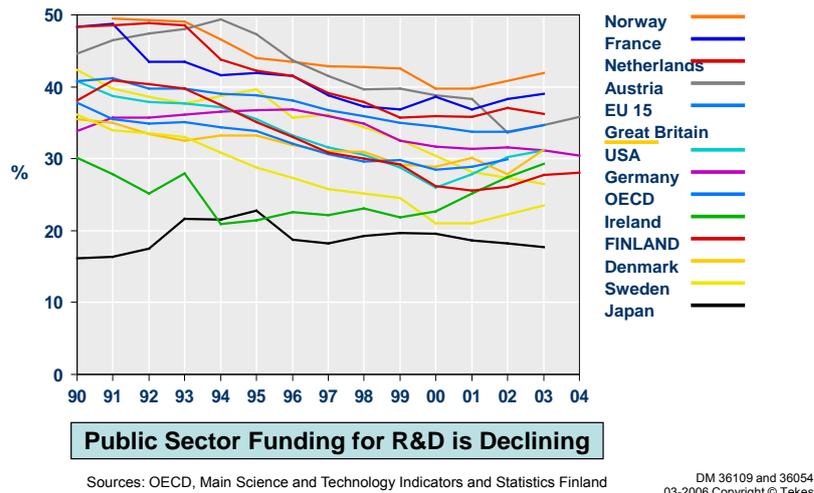


Source: UNESCO Science Report 2010

It should be noted that Korea's GERD as % of GDP has increased by almost 1% between 2000 (2.3%) and 2007 (3.21%). China's GERD as % of GDP has increased from 0.9% in 2000 to 1.44% in 2007, an increase of about 0.5% over 7 year period. This perhaps explains why Korea and China's high-technology exports as % of total manufactured export are 33% and 29% respectively compared with 27% for the USA (Table 1). Korea is planning to raise its GERD/GDP ratio to about 5% by 2012 compared with 3.21% in 2007. China is planning to raise the GERD/GDP ratio from 1.44% in 2007 to 2.5% by 2020. In the United States the Obama administration is to increase GERD/GDP ratio from about 2.7% to 3.0%. In 2009, the second stimulates package included significant investments in STI, including R&D. While higher spending on R&D is important, equally important is increasing expenditures on knowledge-based intangibles, such as ICT, skills and competencies to prepare "knowledge workers" to support knowledge-based economies.

- **Private Sector:** Many corporations/companies, including Small and Medium Enterprises (SMEs) directly invest in R&D by: (i) carrying out their own R&D, and (ii) financing specific R&D projects in public research institutions and universities. In Kuwait the private sector indirectly finances R&D through contributions (currently 1% of net profits for companies registered in the Kuwait Stock Exchange) to the Kuwait Foundation for the Advancement of Science (KFAS), which finances, among other activities, R&D projects and training in Kuwait and outside Kuwait.

**Public Sector funding for R&D is declining:** The share of public sector funding for R&D expenditures over the years has been declining. About 70% of all OECD R&D was performed by the enterprise/private sector in 2000, compared with about 10% by government sector and about 17% by universities (UNESCO – Global Investment in R&D Today, 2003). The share of private sector financing of R&D in the Arab World is rather low -- only about 3% -- (compared with about 70% in OECD countries), while the public sector financed about 89% and other sources funded about 8% (UNDP - Arab Human Development Report, 2003). Chart 2 shows the declining trends in public sector funding for R&D in selected countries.



**Figure 2** Trends of Public sector Funding for selected Countries

**Setting Targets for R&D Investments:** In 2000, at the Lisbon Summit the European Union made a commitment to increase R&D spending to 3% of GDP by 2010. This target has been reconfirmed during the European Council meeting in Barcelona in March 2002. The Barcelona meeting set a target of 3% of EU GDP for investments on R&D by 2010, with at least two-thirds (2/3) of R&D funding coming from the private sector. According to the UNESCO Science Report 2010, it seems that the EU is unable to meet the Barcelona target of 3% of GDP by 2010. It should be noted that in the United States, the business (private) sector accounted for 73% of R&D spending in 2008 (NSF 2010 Report).

- Taxes Incentives are specifically targeted to finance R&D. Many countries provide tax breaks for companies' expenditure on R&D. Such tax breaks could result in additional expenditures by companies in R&D. For example, (i) in the Netherlands, a one Euro of tax alleviation for companies have resulted in an added 0.01-0.02 Euro in R&D expenditures and (ii) in Jordan the Companies Law No.22 of 1997 and its amended Article 188 stipulate that "A Public Shareholding company should allocate at least 1% of its annual net profit to be spent for supporting scientific research and vocational training.....". Such an allocation is spent on "in-house" R&D and/or the company's human resources development. Turkey provides tax incentives for techno-parks (Science Parks), of which there were 18 in 2008 (UNESCO 2010 Science Report). In the United States, the Government promotes the conduct of R&D through tax incentives. About 11,000 companies claimed an estimated \$7.3 billion in federal research and experimentation tax credit in 2006, compared with \$6.4 billion in 2005 (NSF 2010 Report).
- Non-Profit Organizations, Grants, Endowments and Wills are means of financing R&D in many countries. Some private citizens and foundations, such as Melinda and Bill Gates foundation provide funds to carryout research in various areas such as cancer, HIV/AIDS and Alzheimer. Some not-for-profit organizations such as the International Development Research Center (IDRC) in Canada, the US Civilian Research & Development Foundation Global (CRDF Global), in the USA, finance R&D in their home countries and overseas.
- Collaborative research: A great deal of resources is available for financing collaborative research in various countries, e.g. the National Technology Agency of Finland (Tekes), Sandia National Laboratories in the USA, etc. A Rand Report prepared for the World Bank in 2001 indicated that about \$1.4 billion are available annually to finance collaborative research between scientifically advanced countries and other countries. More recent estimates indicate that collaborative research in the EU amounts to about Euro 60 billion annually. Collaborative research is important for countries since it (i) addresses common areas for local, regional and international issues and challenges, (ii) provides an additional source for funding R&D, and (iii) increases interaction and collaboration between scientists from different countries, which contributes to capacity building for scientists. CRDF Global, with the support of the State Department of United States, lunched in 2010 a Global Innovation through Science and Technology (GIST) Initiative. The GIST Initiative is one of the components of Science and Technology collaboration proposed by President Obama in his Cairo speech in June 2009. The first event of the GIST initiative was launched at the Library of Alexandria in December 2010. The main objective of this initiative is to enable policymakers,

research institutions, scientists, private sector and civil society to promote innovation, invention, and entrepreneurship to commercialize technologies and create knowledge based economies. The second event was held in Kuala Lumpur in February 2011 to focus the ideas and proposals from the Alexandria event on how to brighten the innovation environment to catalyze technology transfer for commercialization and promote technology entrepreneurship. GIST programs and their implementation guidelines will be announced at a conference entitled “Economic Development through Science and Technology Innovation” in Rabat, Morocco in June 2011. (GIST Website).

- Foreign Direct Investments (FDI) and Offset programs are good sources of financing R&D. Norway has required oil concession holders to spend certain portion of revenue on R&D. Oil companies fulfilled these obligations by funding R&D at Norwegian institutions. Kuwait had also reached a similar agreement with the Arabian Oil Company and KISR was the first product of such agreement. Thus, KISR is the first product of the offset program in Kuwait.
- National and International prizes provide incentives for quality R&D on specific topics and challenging areas of research.

#### 4. Investing in Macedonia

Macedonia has been encouraging investment by making it easier to do business. PRICEWATERHOUSECOOP'S report entitled “Guide to Doing Business and Investing in Macedonia 2010 Edition” documents the Business Environment, Foreign Investment, Banking and Finance, Importing and Exporting, Business Entities, Labor Relations, Auditing and Accounting, and Taxation. Macedonia has also made advertisements on CNN to entice foreign investment. Table 3 shows the ranking of Macedonia and selected group of countries in the World Bank/IFC “Doing Business Report 2011”.

**Table 3** Ranking of Selected Countries For Ease of Doing Business

	<b>2011 183 Countries</b>	<b>2010* 183 Countries</b>
<b>Macedonia</b>	38	36
<b>Slovak, Rep.</b>	41	40
<b>Slovenia</b>	42	43
<b>Armenia</b>	48	44
<b>Croatia</b>	84	89
<b>Serbia</b>	89	90
<b>Egypt</b>	94	99
<b>Greece</b>	109	97
<b>Kosovo</b>	119	118

Source: World Bank/IFC: Doing Business 2011

\*2010 rankings are adjusted to the 9 topics used in the 2011 Rankings, and reflect corrections from Doing Business 2010. The 9 topics are: Starting a Business, Dealing with Construction Permits, Registering Property, Getting Credit, Protecting Investors, Paying Taxes, and Trading Across Borders, Enforcing Contracts, and Closing Business.

It should be noted that Macedonia ranked number 38 out of 183 countries who participated in the Doing Business Survey in 2011. Macedonia's rank was by far better than Egypt and Greece whose rank was 94 and 109 respectively in the same survey in 2011. Starting a business in Macedonia was much easier than in any of the selected countries in Table 3. Encouraging investment and making it easy to do business in Macedonia are important factors in paving the way for knowledge-base economy.

## 5. Conclusions and Recommendations

As a small country, Macedonia has a limited market. Macedonia, however, should target its R&D to regional markets. Based on the analyses made in this paper the following conclusions and recommendations emerge for the consideration of the policymakers of Macedonia:

**Setting a Target for R&D Expenditures:** As indicated earlier, Macedonia currently invests about 0.21% of its GDP on R&D. This is very low by international standards, the World average R&D expenditures in 2007 was 2.21% of GDP and the average for the European Union was 1.98% in the same year. It is recommended that Macedonia set a target of 1.0% of its GDP for investments in R&D by the year 2020.

**Increasing High-Technology Exports:** In 2007, Macedonia exported only 1% of its manufactured exports as high-technology products. This is a very low ratio compared with a World average of 17% and the European Union average of 14% in the same year. The potential impact of increasing investments in STI and increasing high-technology exports from Macedonia will enable Macedonia to move faster towards a knowledge-based economy, which will increase economic growth and improve the well-being of the society. It is recommended that Macedonia make a concerted effort to increase its high-technology exports.

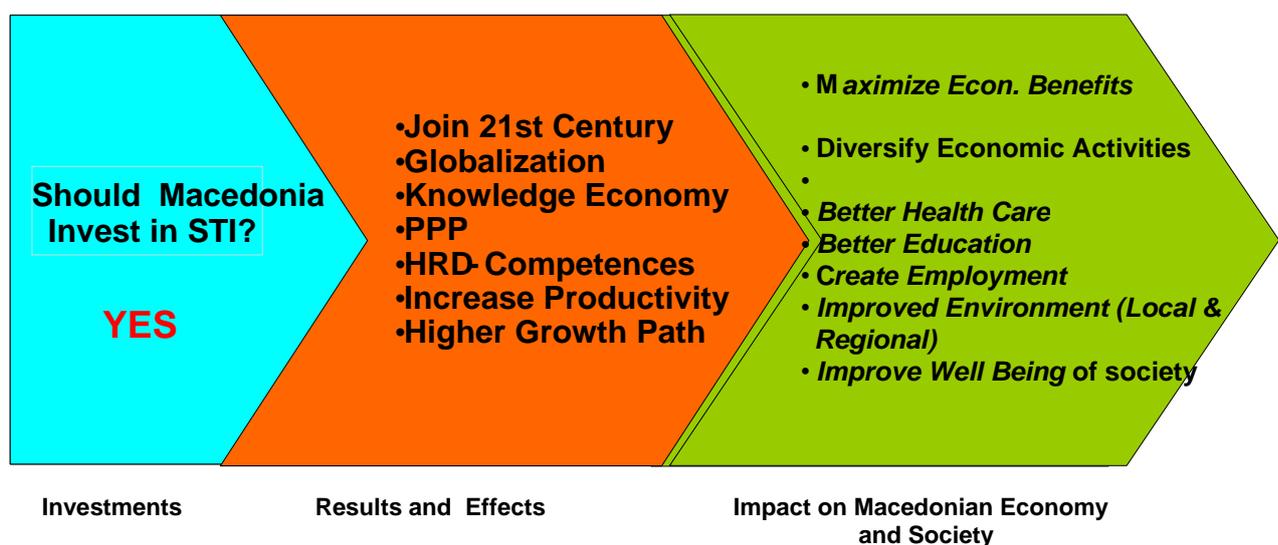
**Strategic Alliances and Increasing Collaborative Research:** Collaborative research will not only increase source of funding R&D but more importantly it increases interaction with regional and international scientists, which is important to build up the capacity of researchers and scientists in Macedonia. It is recommended that Macedonia establishes Strategic Alliances with reputable research institutions and increase collaborative research at the regional and international levels.

**Commercialization and Venture Capital:** In OECD countries about 0.07% of OECD GDP were allocated for early phase development and about 0.27% of GDP for expansion phase. In the USA these allocations were about 0.12% and 0.29% respectively. It is also recommended that specific allocations for venture capital investments for the commercialization of proven technologies should be allocated for early phase and expansion phase developments in Macedonia.

Increasing the private sector funding for R&D is also recommended.

**Establish an Annual Presidential Prize:** The proposed prize will encourage researchers to conduct high quality research for commercialization, which will contribute to higher economic growth and create jobs for the people of Macedonia. It is recommended that HE the President of Macedonia establishes an annual Prize for high quality research and innovation in areas of strategic importance to Macedonia.

### *Should Macedonia Invest in Science, Technology and Innovation?*



The above diagram is based on the National Technology Agency of Finland (Tekes) and summarizes the reasons why Macedonia should continue to invest and increase its investments in Science, Technology and Innovation (STI).

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# Macedonian Entrepreneurs and Their Efficient and Effective Time and Stress Management Skills

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**Purpose** – The purpose of this paper is to examine the relationships between time and stress management skills and their personality type among Macedonian entrepreneurs. **Design/methodology/approach** –It is argued here that Macedonian entrepreneurs have efficient and effective time and stress management, which is related to their own personality type. **Findings** –Results show that personality type is significantly related to time management and coping responses entrepreneurs use. **Research limitations/implications** – Limitations of this research include narrow sample, not the best representative of the population. **Practical implications** – This research provides implications for practice in several areas: development and sustainment of entrepreneurs with excellent time management skills and development and sustainment of entrepreneurs with excellent coping response strategies. **Originality/value** – This research contributes to the field by offering support and new findings. This study adds to the body of literature in what is considered a relatively new area of study. The survey conducted among Macedonian entrepreneurs contributes a lot for the knowledge about entrepreneurship in Macedonia.

## Keywords

Coping Response Strategies, Entrepreneur, Personality type A and B, Stress Management, Time Management

## 1. Introduction

Managing time and stress is one of the crucial management skills in a competent entrepreneur's repertoire. A review of the surveys conducted on time and stress management and its relation with human health illustrates the wide-ranging and devastating effects of stress. The National Institute of Occupational Safety estimated that almost half of all adults suffer adverse health effects due to stress. An estimated one million workers are absent on an average working day because of stress-related complaints and approximately 555 million workdays are lost each year due to stress. In one major corporation, more than 60 percent of absence was found to be stress related. And about 40 percent of worker turnover is due to job stress. It is estimated that business in the United States alone will spend more than \$12 billion on stress and time management training. [1]

Time is usually the greatest source of stress for entrepreneurs. Even though there are hundreds of books on time management, organizers, consultants, still entrepreneurs are increasingly stressed by a perceived absence of time. Time stress is escalating because the rapidity of change and the overwhelming amounts of information that entrepreneurs encounter on their job. Most of them are moving pretty fast just to keep up, but still feel inadequate because they find it impossible to completely keep up. The Hilton Time Value Survey found that 77 percent of people identified their top goal in the coming decade as "spending more time with family and friends". Two-thirds of the respondents indicated a desire to put more emphasis on "having free time". The trouble is that the average entrepreneur was required to engage in between 237 and 1073 separate incidents a day. More than a third of entrepreneurs indicated that they don't accomplish what they set out to do each day and time stress results. [2]

## 2. Stress and time management

Almost everyone suffers now and then from a pervasive feeling of time stress. Along with the information age has come an increasing sense that each of us is falling behind. For example, this week more books will be published in the United States or any other modern country, than any entrepreneur can read in the remainder of his life. Consequently, we all have the feeling that we just can't quite keep up. Somehow, no matter how much time is available, it seems to get filled up and squeezed out. Currently, the most common prescribed solutions for attacking problems of time stress are to use calendars and planners, to generate to-do lists and to learn to say "no". Although these tactics are sometimes useful, still they are more examples of an efficiency approach to time management, rather than an effectiveness approach. In eliminating time stressors, efficiency without effectiveness is fruitless.

Two sets of skills are important for effectively managing time and for eliminating time stressors. One set focuses on efficiently using time each day. The other set focuses on effectively using time over the long term. Managing time with an effectiveness approach means that:

- individuals spend their time on important matters, not just urgent matters;
- people are able to distinguish clearly between what they view as important versus what they view as urgent;
- results rather than methods are the focus of time management strategies;
- people have no reason not to feel guilty when they must say "no".

A number of time management experts have pointed out the usefulness of a "time management matrix" in which activities are categorized in terms of their relative importance and urgency. [3] Important activities are those that produce a desired result. They accomplish a valued end, or they achieve a meaningful purpose. Urgent activities are those that demand immediate attention. They are associated with a need expressed by someone else, or they relate to an uncomfortable problem or situation that requires a solution as soon as possible. Activities such as handling employee crises or customer complaints are both urgent and important. A ringing telephone, the arrival of the mail or unscheduled interruptions might be examples of urgent but potentially unimportant activities. Important but non urgent activities include developmental opportunities, innovating, planning and so on. Unimportant and non urgent activities are escapes and routines that people may pursue but which produce little valuable payoff: for example, small talk, daydreaming, shuffling paper or arguing.

**Table 1** Types of activities that determine Time Use

		Urgency	
		High	Low
Importance	High	Crises, Customer complaints	Developmental opportunities, planning, innovating
	Low	Mail, telephone	Escapes, routines

Usually in the lives of entrepreneurs dominate activities that are important and urgent. They are seen as "have to" activities that demand immediate attention. Attending a meeting, responding to a call or request, interacting with a customer or completing a report might all legitimately be defined as important and urgent activities. The trouble with spending all one's time on activities like this is that they all require the manager to react. They are usually controlled by someone else, and they may or may not lead to a result the manager wants to achieve.

The problem is even worse when it comes to unimportant and urgent activities. Demands by others that may meet their needs but that serve only as deflections or interruptions to the entrepreneur's agenda only escalate a sense of time stress. Because they may not achieve results that are meaningful, purposeful, and valued-in other words, important-feelings of time stress will never be overcome. Experiencing overload and loss of control can be guaranteed. Entrepreneurs are merely reactive in these situations. Moreover, when these time stressors are experienced over an extended period of time, people generally try to escape into performing activities that are non important and non urgent to relieve the stress. They escape, shut out the world or put everything on hold. Although feelings of stress may be temporarily relieved, no long term solutions are implemented, so time stress is never permanently reduced. That means lives are spent battling crises 95 percent of the time and escaping 5 percent of the time. A better alternative is to focus on activities that are important and non urgent, which may label opportunities instead of problems. They are oriented toward accomplishing high-priority results. They prevent problems from occurring or build processes that eliminate problems

rather than just reacting to them. Preparation, preventive maintenance, planning, building resiliency and organizing are all “non-have-to” activities that are crucial for long term success. But, because they are not urgent, they are driven out of entrepreneurs’ time schedules.

Important moderator of the effects of stress is an individual’s psychological resiliency. Individuals with certain psychological characteristics or personality types tend to handle stress better than others. Type A personality relates to a personality pattern many individuals develop as they enter the competitive worlds of advanced education and of management. For more than five decades, scientists have been aware of a link between certain personality attributes and stress-related behavioral, psychological and physiological problems such as anxiety, deteriorating relationships and heart disease. [4] Subsequent research has found that in America about 70 percent of men and 50 percent of women exhibit Type A personality traits, such as extreme competitiveness, strong desires for achievement, haste, impatience, restlessness, hyper alertness, explosiveness of speech, tenseness of facial muscles, free-floating hostility and so on. Most Type A individuals believe it is their Type A personality that has led to their success. Many are unwilling to give up that orientation because hard driving, intense, persistent action is generally admired and valued among entrepreneurs.

## 2.1. Time and stress management skills among Macedonian entrepreneurs

The purpose of this paper is to explore the research questions: How well are Macedonian entrepreneurs using their time and stress management skills? Is there a correlation between type of personality of the entrepreneur and the way he copes stress and his time management strategies among Macedonian entrepreneurs? Are they using their time management skills efficiently and effectively? Do entrepreneurs spend more time doing important and urgent matters or they can’t say “no” and spend time doing things that are urgent but not important?

Based on the research problem and theory the following *hypothesis* is formulated: There is a correlation between the personality type of entrepreneurs with the coping strategies and time management skills among Macedonian entrepreneurs. Also it was expected to find positive correlation between time management skills and coping strategies, as well as positive correlation between the coping strategies Macedonian entrepreneurs use.

## 2.2 Methods

### 2.2.1 Sample

The sample group consisted 82 entrepreneurs working in SME in Macedonia. Because of incomplete data 10 entrepreneurs were not included in the final analyzes of the results, which induced the sample to 72 entrepreneurs. The sample group consisted 47 males (65,3 percent) and 25 females (34,7 percent). Entrepreneurs in this sample group had different education: high school diploma, college diploma, university diploma, MA and PhD (Table 2).

**Table 2** Manager’s formal education

high school	college	university	MA	PhD
11	6	50	1	4
15,3 %	8,3 %	69,4 %	1,4 %	5,6 %

According to the marital status 53 entrepreneurs were married (73 percent), while 19 entrepreneurs (26 percent) were single or divorced. Their age was between 20 and 52 years, and the average age was 31 for all entrepreneurs, or the average age of the female in the sample was 29 years, while the mean age for the males was 33 years.

### 2.2.2 Data collection

An introductory email was sent to the sample population, explaining the study and inviting their participation. Following this introduction, we emailed the population to explain the study in greater detail and the method of participation. Three reminder email notices were subsequently sent to those who had not previously responded.

### **2.2.3 Measurement of variables**

*Independent variable: Type A and type B personality type that describes a pattern of behaviors that were once considered to be a risk factor for coronary heart disease.* Type A individuals can be described as impatient, excessively time-conscious, insecure about their status, highly competitive, over-ambitious, business-like, hostile, aggressive, incapable of relaxation in taking the smallest issues too seriously; and are somewhat disliked for the way that they're always rushing and demanding other people to serve to their standards of satisfaction. They are often high and over-achieving workaholics who multi-task, drive themselves with deadlines, and are unhappy about the smallest of delays. Because of these characteristics, Type A individuals are often described as "stress junkies." Type B individuals, in contrast, are described as patient, relaxed, and easy-going. [5] The personality types were assessed through the Type A and B Personality Inventory, designed by Friedman and Rosenman. The Inventory is composed of a series of behavioral indicators based on their theory. Respondents were asked to complete each item on a frequency scale ranging from "not typical for me" to "very typical for me". The scores described the person by 4 dimensions: competitiveness, impatience free-floating hostility and urgency.

We've chosen a questionnaire because it structured and we wanted all the respondents to be treated equally, answered the same questions, so that we can easily assess the answers later. Also this questionnaire was developed and used in lot of other research studies before; it has a good validity and reliability. Here are some questions that we ask the entrepreneurs to find out which personality type they are:

1. My greatest satisfaction comes from doing things better than others.
2. I move, walk, and eat rapidly.
3. I feel as though I can accomplish more than others.
4. I feel guilty when I relax or do nothing for several hours or days.
5. I hurry the speech of others by saying "Uh huh", "Yes, yes", or by finishing their sentences for them.
6. To do something well, you have to concentrate on it alone and screen out all distractions.
7. I find it intolerable to watch others perform tasks I know I can do faster.
8. Getting ahead in my job is major personal goal.
9. I simply don't have enough time to lead a well-balanced life.
10. I frequently try to do two or more things simultaneously.
11. I tend to fill up my spare time with thoughts and activities related to my work.
12. I find it anguishing to wait in line.

All these questions are very well chosen to clearly define the personality type and all its characteristics. For example, people with type A personality want to spend their time working, competing with others, setting goals that demand a lot of work in a very short period of time, they can't relaxed and that's why they are often stressed out or even burn out. But the way they manage their life also helps them to manage their time better, but the main question is are they efficient and effective? Asking these questions we wanted to find out how Macedonian entrepreneurs manage their time, work and life in general.

### **2.2.4 Dependent variables: stress management strategies and time management**

Stress management strategies can be strategies to approach stress situations and strategies to avoid stress situations. The stress management strategies were measured with Coping Response Inventory (CRI) by Rudolf Moos.[6] The CRI assesses an individual's approach and avoidance coping skills in response to stressful life circumstances and other challenges. The CRI also allows clinicians to develop more complete case descriptions and to evaluate treatment outcomes. Approach coping responses are: 1. logical analysis, 2. positive reappraisal, 3. seeking guidance and support, 4. problem solving. The first two are cognitive responses, and the second two are behavioral responses. Avoidance coping responses are: 1. cognitive avoidance, 2. acceptance or resignation, 3. seeking alternative rewards, 4. emotional discharge. Coping is a complex process. It is variously described as a situational and as a trait-like response, as a response to stress and as a disposition to respond to change. It is generally considered to be a stress-specific pattern by which an individual's perceptions, emotions, and behaviors prepare for adapting and changing. The more narrow view of coping is described here as "coping style" and represents a more observable but general style of interacting. Our expectations were that stress management strategies are relevant to the subject and we can get to know the entrepreneurs even better this way. It was important to see how Macedonian

entrepreneurs react and what strategies they use when they are under stress. All the respondents are entrepreneurs, so it is expected to have a stressful job. With this questionnaire we can see if the Macedonian entrepreneurs use approach coping responses or avoidance coping responses. Here are some of the questions that we asked: When faced with a problem did you:

- Had time to prepare?
- Thought of problem as a threat?
- Thought of way to resolve the problem?
- Thought of a problem as a challenge?
- Talked with your spouse or relative?
- Made plan of action?
- Tried to forget the whole thing?
- Felt angry, defeated, scared?

Time management is the second dependent variable. The inventory used to measure time management was developed by Whetten and Cameron and consists two parts, the first one which measures time management in every day life and the second part, which measures time management at work. The respondents were asked to complete each item on a frequency scale ranging from "never" to "always". The final score they have is between 0 and 160.[7]

Here are some of the questions that were asked:

1. I make a list of tasks to accomplish each day.
2. I divide large projects into smaller, separate stages.
3. I have some time during each say when I can work uninterrupted.
4. I set deadlines for myself.
5. I have clearly defined long-term objectives toward which I am working.
6. I continually try to find little ways to use my time more efficiently.
7. I finish at least one thing every day.
8. I concentrate on only one important task at a time, but I do multiple trivial tasks at once (such as signing letters while talking on the phone).
9. I don't procrastinate. I do today what needs to be done.
10. I do something productive whenever I am waiting.

This questionnaire offers lots of questions and measures how well people manage their time. But, also answering these questions entrepreneurs are telling how efficiently and effectively manage their time, especially the ways they use. [8] One of our goals is to see how Macedonian entrepreneurs deal with things that are important, but not urgent, or with things that are urgent, but not important. Having asked these questions we can found out are they using their time management skills efficiently and effectively? Do entrepreneurs spend more time doing important and urgent matters or they can't say "no" and spend time doing things that are urgent but not important?

### **2.2.5 Data analysis**

The hypotheses were tested using Spearman's rank correlation coefficient or Spearman's rho. The hypothesis suggested that is positive correlation between the personality type of the individuals and their coping mechanisms, as well as correlation between the personality type and time management skills. For all the variables descriptive statistics (means, standard deviations) were also calculated.

### **2.3 Results**

The descriptive statistics are reported in following tables. In Table 3 are reported means and standard deviations of all variables. If we compare the theoretical value of the independent variable (48) with the found one (47,29) we can conclude that there are entrepreneurs with both type A and type B personality behavior. According to the result on time management we can say that Macedonian entrepreneurs are very good time entrepreneurs. The descriptive statistics show that the most commonly used strategies among Macedonian entrepreneurs are: logical analysis, positive reappraisal and problem solving, which also mean that Macedonian entrepreneurs approach the stress situations. Sometimes they use strategies like: cognitive avoidance or seeking alternative rewards, which are avoidance coping responses.

**Table 3** Descriptive statistics

Variable	M	$\sigma$
Personality Type A or B	47,2917	7,5142
Time management	103,5556	14,7169
Logical Analysis	12,6389	3,5734
Positive Reappraisal	12,3611	3,4896
Seeking Guidance and Support	9,9722	3,9645
Problem Solving	12,9306	4,0985
Cognitive Avoidance	8,6528	3,9438
Acceptance or Resignation	6,3611	3,9193
Seeking Alternative Rewards	10,1111	3,6446
Emotional Discharge	3,7639	3,1778

Correlation between personality type and time management is 0,36 ( $p < 0,01$ ). The level of significance for this correlation is very high and statistically valid.

On Table 4 are presented the correlations between personality type and approach coping responses. There is high correlation between the personality type and Problem solving response. The same analysis is made for avoidance coping responses, shown on Table 5.

**Table 4** Correlations between personality type and approach coping responses

Variables	Logical analysis	Positive reappraisal	Seeking guidance and support	Problem solving
Personality type	0,124	0,204	0,215	0,326**

Notes: \* $p < 0,05$ ; \*\* $p < 0,01$ ;  $n = 72$

The results show positive correlation between these variables, especially between personality type and cognitive avoidance, seeking alternative rewards and emotional discharge.

**Table 5** Correlations between personality type and avoidance coping responses

Variables	Cognitive avoidance	Acceptance or resignation	Seeking alternative rewards	Emotional discharge
Personality type	0,352**	0,022	0,237*	0,485**

Notes: \* $p < 0,05$ ; \*\* $p < 0,01$ ;  $n = 72$

Also, correlations are calculated for all coping responses (shown on Table 6). As expected, we found correlations between almost every coping response. There are high positive correlations between all approach coping response.

The same way correlations are calculated for avoidance coping response (shown on Table 7).

**Table 6** Correlations between approach coping responses

Variables	Logical analysis	Positive reappraisal	Seeking guidance and support	Problem solving
Logical analysis	1,000	0,564**	0,230	0,467**
Positive reappraisal	0,564**	1,000	0,528**	0,489**
Seeking guidance and support	0,230	0,528**	1,000	0,449**
Problem solving	0,467**	0,489**	0,449**	1,000

Notes: \* $p < 0,05$ ; \*\* $p < 0,01$ ;  $n = 72$

**Table 7** Correlations between avoidance coping responses

Variables	Cognitive avoidance	Acceptance or resignation	Seeking alternative rewards	Emotional discharge
Cognitive avoidance	1,000	0,565**	0,202	0,401**
Acceptance or resignation	0,565**	1,000	0,250	0,232*
Seeking alternative rewards	0,202	0,250	1,000	0,170
Emotional discharge	0,401**	0,232*	0,170	1,000

Notes: \* $p < 0,05$ ; \*\* $p < 0,01$ ;  $n = 72$

Statistical analysis is made for the dependent variables and their correlations were calculated. The results are shown in the next tables.

**Table 8** Correlations between time management and approach coping responses

Variables	Logical analysis	Positive reappraisal	Seeking guidance and support	Problem solving
Time management	0,153	0,212	0,147	0,340**

Notes: \* $p < 0,05$ ; \*\* $p < 0,01$ ;  $n = 72$

**Table 9** Correlations between time management and avoidance coping responses

Variables	Cognitive avoidance	Acceptance or resignation	Seeking alternative rewards	Emotional discharge
Time management	0,007	-0,267*	0,346**	0,062

Notes: \* $p < 0,05$ ; \*\* $p < 0,01$ ;  $n = 72$

Time management was positively correlated with problem solving, and with seeking alternative rewards. Also, time management was negatively correlated with acceptance or resignation.

### 3. Conclusions

The results of this survey showed that the hypothesis was supported, because of the positive correlation found between the variables, time management, and personality type and coping responses. The positive correlation between personality type and time management means that entrepreneurs who are type A personality are better at managing time, than entrepreneurs who are type B personality. Entrepreneurs with type A personality set more short term goals. They also do things very rapidly, and are always in a hurry. They also have tendency to evaluate all activities in terms of measurable results. The determination to win every situation they have, made them learning skills which are important for better ways of managing time. [9]

Results showed that there is positive correlation between the personality type and approach coping responses. One of the approach coping response was problem solving, which points out that it is more expected from the type A personality entrepreneurs to have fast action and reactions toward the problem situations. These entrepreneurs are also prone to use some of the avoidance coping responses, like cognitive avoidance, seeking alternative rewards and emotional discharge. These strategies are behavioral, which also means that they use lot emotions too. Entrepreneurs, who are calmer, like entrepreneur with type B personality, more likely think a lot before they act or avoid the stress situation. The results from this sample group of entrepreneurs point out that Macedonian entrepreneur tend to use approach coping response more frequently than avoidance coping response. Macedonian entrepreneurs use logical analysis and positive reappraisal before acting. This fact conforms that the respondents use cognitive strategies when faced with a stressful situation, which leads to greater results and more problems solved. In addition to this, Macedonian entrepreneurs very often tend to use action in problem situations, supported with lots of information and appraisal from their colleagues. The active use of cognitive and behavioral strategies gives the entrepreneur power to restore his capacity and strengths in every stress situation, maintaining the individual balance.

The interview with Macedonian entrepreneurs showed that they have typical patterns of using time, not very different from the other population in the world. They often do the activities they like, before the activities they don't like. Also, they perform the things they know how to do faster, things that are easier, or require little time. Entrepreneurs stated that they have schedules and are planning things in

advance, setting dead lines on every goal. Still, they admit that sometimes, they respond to demands of others, before their own demands, and very often they respond to crises and things that are urgent, but not important. The good thing is that these entrepreneurs are aware of their ways of using time and are searching for techniques to improve their own time management skills.

From the questions we asked and behavior we can observe, we can say that these entrepreneurs have typical patterns of time use:

1. They do what they like to do before they do what they don't like to do.
2. They do things they know how to do faster than the things they do not know how to do.
3. They do the things that are easiest before things that are difficult.
4. They do things that require a little time before things that require a lot of time.
5. They do things for which the resources are available.
6. They do things that are scheduled (e.g. meetings) before nonscheduled things.
7. They sometimes do things that are planned before things that are unplanned.
8. They respond to demands from others before demands from us.
9. They do things that are urgent before things that are important.
10. They readily respond to crises and to emergencies.
11. They do interesting things before uninteresting things.
12. They do things that advance our personal objectives or that are politically expedient.
13. They wait until a deadline before they really get moving.
14. They do things that provide the most immediate closure.
15. They respond on the basis of the consequences to us of doing or not doing something.
16. They tackle small jobs before large jobs.
17. They work on things in the order of arrival.

In our proposal we expressed that we're interested to find out how many of the Macedonian entrepreneurs spend time to increase their management knowledge and to develop better management skills. For what we found is that Macedonian entrepreneurs sometime go to workshops to develop better management skills, but they do this very rarely. Our opinion is that Macedonian entrepreneurs have lack of management knowledge and need more theoretical knowledge, as well as practical.

*Implications for future theory and research.* This research provided an initial examination of the relationship between personality type and time and stress management skills. This research has sparked numerous additional questions to be addressed by future research. Research like this is rare in Macedonia, and it would be the best to replicate the same study on other entrepreneurs to provide more data about Macedonian entrepreneurs and their time and stress management skills. Further surveys will probably enhance the organizations and the educational system to take bigger steps in educating the entrepreneurs in these topics and create greater awareness of the skills they use and methods for improving them.

*Implications for practice.* The implications of the findings presented in this study are also important for practice. Information that will help organizations improve performance and have better employees is always desired. This research provides implications for practice in several areas: development and sustainment of entrepreneurs with excellent time management skills and development and sustainment of entrepreneurs with excellent coping response strategies.

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# Green Innovations within the Framework of International Cooperation: New Challenges for New Days

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In a learning economy, which indeed also is a knowledge-based economy argues that in our contemporary economy knowledge is the critical resource and learning the most important process, innovation should basically be understood as an interactive learning process, which is socially and territorially embedded and culturally and institutionally contextualized. This implies that competitive advantage is based on exploitation of unique competencies and resources, i.e. a firm or a region/nation competes on the basis of what they have which is unique in relation to their competitors. Unique regional capabilities rooted in particular patterns of inter-firm networking and inter-personal connections cannot easily be transferred over space [1] 'it can only be built up over time' [2]. Thus, a strategic perspective in the contemporary global economy is how to develop such unique competencies and resources in order to foster competitiveness based on competitive advantage.

However, research has revealed that the regional level is neither always nor even normally sufficient for firms to stay innovative and competitive. Moreover it points at the additional importance of extra-local (national and international) linkages and connections to create a sustainable competitive advantage. In an ongoing discourse on knowledge and globalization some authors argue, that as a result of globalization and codification processes originally tacit knowledge becomes increasingly ubiquitous, which implies that the competitive advantage of high-cost regions and nations runs the risk of being steadily undermined [3]. Other authors argue that much strategic knowledge remains 'sticky' and that important parts of learning processes continue to be localized as a result of the enabling role of geographical proximity (e.g. through face-to-face contact) and local institutions (e.g. regulation, conventions, informal rules and habits that coordinate economic actors under conditions of uncertainty), constituting region-specific assets that stimulate interactive learning.

In the perspective of innovation as culturally and institutionally contextualized, strategic parts of learning processes emerge as highly localized, as opposed to placeless. Thus, local contexts can represent important parts of the knowledge base and knowledge infrastructure of firms and regions, underscoring the role of historical trajectories. Governments and agencies at all spatial levels have increasingly become involved in seeking to stimulate innovation, and, consequently, innovation policy is put at the centre of policies for promoting regional and national economic development. At the regional level regional innovation systems and learning regions have been looked upon as a policy framework or model for implementation of long-term, development strategies initiating learning-based processes of innovation, change and improvement.

## Keywords

Innovation, international cooperation, globalization, partnership, R&D

# 1. Introduction

In the light of the need for sustained economic growth in the world (and in Europe), a new direction must be given to European leadership on energy and climate security. The risks of energy or climate disruptions are as great, if not greater than ever. Smart, green growth is the way forward, but to achieve this, European policies must shift to an innovation-centered approach in partnership with consumers and the progressive business community.

The European and international debate must be about opportunities and strategies for a better life in all countries. Innovation to drive “green growth” must be at the heart of this strategy. Europe can lead in innovation and investments which offer solutions which are effective, sustainable, multi-purpose and carry the support of key businesses and communities in the world. We therefore need a new approach for a partnership between business, legislators, civil society and Governments, each contributing to transformation in their own way.

It is essential to encourage and enable the business and investment communities to accelerate investments in innovations for three areas of transformational change:

Smart green growth is firstly about energy efficiency. Most of the reductions in European emissions by 2020 will come from improvements in efficiencies. Technologies for radical improvements exist, but are not widely enough used. Their potential goes beyond incremental improvements in the efficiencies of existing products and services. IT and electronic communications offer radical changes in the way services are provided; in new business models and services that substitute for traditional ways of doing things, and in making more intelligent use of energy in homes, offices and cities. The ICT sector is the motor of innovation capacities and has over 2 billion customers worldwide. It is also spinning-off more efficient lighting systems, solar energy and smart-grid technologies that can help meet our needs more efficiently. Enormous new investments are needed to exploit new opportunities in all societies, but can now be a key role in accelerating recovery from the current economic and financial crisis.

The opportunities for ICT-based green growth have been addressed by an EPC Task Force, from which the report is now published. The Task Force urges new action to put three critical infrastructures in place:

- A carbon accounting infrastructure to make energy use and carbon emissions visible to all;
- A smart electrical power grid system to accommodate new demands for renewable energy, energy efficiency and consumer empowerment, and
- High speed broadband access to the Internet to support a new range of efficient on-line services.

This will require sustained investment, and Governments must create the regulatory frameworks and partnerships within which such investments are secure. In addition, the Task Force suggests mobilizing ICT-based innovations in transport and logistics: smart buildings and smart green cities, and also stresses that the numerous dispersed initiatives for smart, green growth must be brought together in a coherent and synergetic framework.

In this paper the author present a sub-set of the findings from the systematic review and consider the *general* evidence base that has explored the relationship between innovation and networking across countries and sectors. In the following section I would like to outline the specific methodology I adopted to conduct this particular review.

## 2. Globalization as a Driver of Cooperation

Driven by more complex innovation projects and ever shorter innovation and product-life cycles, firms are faced with a demand for knowledge they cannot satisfy with their internal resources alone. “Tapping external sources of knowhow becomes a must” [4]. Firms thus have to look for partners for their innovation projects, which has led to an increase in the number innovation cooperations, documented among others by Hagedoorn [5].

The globalization of firms’ activities has contributed to the pressure to become more innovative and to conduct R&D and innovation activities on a global scale, leading to an increase in both domestic and international collaborative activities. With this increase, the type and structure of collaborations and partnerships between domestic and foreign partners has changed. While, in the past, international R&D and innovation alliances were mostly equity-based alliances, like joint-ventures, looser forms of collaboration between partners from different countries have emerged in recent years. Actually, most of the growth in international collaborative activities can be attributed to these looser and more flexible forms of collaboration between partners from different countries [6].

The increasing collaborative activities of firms and the exchange and flows of knowledge associated with them have attracted the interest of policymakers. Some national and European-level financing

institutions have established cooperation, and, in particular, international cooperation, as an essential condition for giving support to firms in the area of innovation and research and development in order to foster the flow of knowledge between national innovation systems [7]; [8].

The growth in international collaborative activities in innovation and R&D has led researchers from different areas to investigate the underlying motives for these kinds of agreements. Main contributions come from the international management literature, which is concerned with the strategic aspects of international innovation collaboration, and from economics, which looks at the growth of different forms of international alliances and their underlying motives. This paper is closely related to the second of these two strands of literature. I look at the factors and firm characteristics that influence firms' decisions to collaborate with foreign partners on their innovation and R&D activities. The paper contributes to the existing literature in two ways. First, we use a large scale survey to tackle the question at hand and not a case study approach. Additionally, the data we have also allow us to take the looser forms of collaboration into account and focus not only on equity joint-ventures.

### 3. Cooperation activities and R&D

The increased complexity of knowledge processes, which are the backbone of the creation of new technologies, leads firms to search for valuable knowledge and skills externally in order to complement their own capabilities [9]. Since the 1980s, the increasing instability of the competitive environment, with shorter product and technological life cycles, has forced firms to reconsider their innovation strategy in order to widen their technology base [10]. In this context, cooperation has gained an important role in the innovation process at the firm level, given that innovation cooperation activities are considered an efficient means of industrial organization of complex R&D and innovation processes. As described by Rosenfeld [11] and Hagedoorn et al.[12], not only multinationals firms but also small and medium-sized firms are engaging in more and tighter relationships with other companies to achieve greater economies of scale, market strength, or exploit new opportunities. These joint activities can take several forms, both formal and informal, such as co-marketing, co-production, shared resources, or joint development [13]. As far as innovation activities are concerned, the boundaries of innovation are shifting from a situation where firms perform R&D activities mainly internally [14] to a reality where corporate partnering, collaboration and external sourcing in R&D are used. In this new context, internal and external sourcing of innovation inputs, as R&D, are not seen as substitutes, but as complements, since internal innovation activities are not incompatible (and can be synergetic) with agreements with other firms, research agreements with universities, investments in the capital stock of new firms, and acquisition of small firms [15], [16].

Cooperation activities with other firms or institutions are seen by firms as an opportunities to access complementary technological resources (as skill sharing), for faster development of innovations, to improve market access, to realize economies of scale and scope, and to share costs and spread risk (see, for example, [17], [18], [6], [16], [19], [20]). Cooperation activities are usually characterised by intensive knowledge exchange and mutual learning, basically by combining complementary assets and building synergies [21], [9]. In other words, since innovation-related cooperative agreements favor knowledge accumulation that might be converted into new technological and organizational innovations, the firms' decision to cooperate opens up the range of their technological options [14], [22]. As argued by Gomes-Cassares et al. [23], firms enrolled in cooperation activities or alliances are involved in denser knowledge flows than non-allied firms.

The classic perspective for analyzing the decision to cooperate is to see it as an equilibrium between achieving a high level of knowledge flow and the protection of internal knowledge from leaking out, ie the internalization of spillovers (see, for example, [24], [25], [26], [27], [16]). Only firms that can protect their vital information are willing to engage in cooperative agreements, an issue which may be less present in cooperative agreements with research institutes and universities than in cooperation with other firms [28]. In other words, cooperation in innovation activities can be analyzed as a trade-off between spillovers: firms generate and receive spillovers to and from their cooperation partners. Therefore, firms must manage the external information flows in order to maximize the incoming spillovers from partners and non-partners while, at the same time, control the spillovers to non-partners.

A crucial role in that respect is played by a firm's absorptive capacity, ie its ability to "identify, assimilate and exploit knowledge from the environment" [29]. Firms can try to increase the extent of incoming spillovers both within cooperative agreements and from the environment in general by investing in "absorptive capacity". The higher a firm's absorptive capacity, the more able it should be to access and implement a larger amount of external knowledge [29]. Put differently, as argued by

[30], external knowledge is more effective for the innovation process when the firm engages in its own R&D.

The capacity of firms to take advantage of knowledge generated elsewhere has a positive effect on the probability of being a successful innovator and is positively associated with the decision to undertake formal research collaboration with other firms and institutions [31], [32]. *Perse* the effect on the cooperation decision is unclear, however, since higher absorptive capacity can make a firm less likely to cooperate because it can obtain access to external knowledge without cooperating.

Other factors that have been argued to influence a firm's cooperation decision include

- Public support [31], [33], [34]
- export activities [21], [34]
- size [35], [36], [37]
- Industry [38], [39]

## 4. International cooperation and Innovation

Globalization has contributed to a growing number of international R&D and innovation partnerships (see, for example, [40]). Luo [41] states that the growth of international competition and cooperation is a natural outcome of the expansion of firms into new markets and countries since this process makes firms face new realities and challenges. Some of the high costs of managing international projects [42] have been reduced by the availability and wide diffusion of new information technologies [43]. Associated reductions in communication costs and increases in the potential to coordinate activities across countries have certainly contributed to the boom of international R&D cooperation. The motives for cooperating on innovation in general are also potential motives for international R&D and innovation cooperation. However, there are also some specific motives for entering into international cooperative agreements. Glaister and Buckley [18] analyze UK firms' international cooperation behavior (in general and not just related to R&D) and show that motives related to technology development, like sharing of R&D costs and exchange of complementary technology, are more important for cooperation with domestic partners than for cooperation with international partners. The opposite is true of market development motives, such as faster entry into markets, conforming to foreign government policies or facilitating international expansion. Glaister and Buckley's [18] show that R&D cooperation motives are similar for international and national partners.

Von Zedtwitz and Gassmann [42] take a similar approach to analyzing international cooperative agreements. Using a database of 81 companies representing 1,021 R&D sites, they stress the significance of two main internationalization drivers in R&D: access to local science and technology sources, and access to local markets and customers. Von Zedtwitz and Gassmann's [42] findings that technology-intensive firms are trying to exploit location-specific innovation advantages through the internationalization of their R&D activities and are thus able to cope with the increasingly globalised environment, can serve as an explanation for Glaister and Buckley's [18] result. Firms no longer look for partners, say, to share R&D costs within their country only, they also consider firms outside of their country, leading to the observation that the motives for both types of R&D cooperation are similar.

Palmberg and Pajarinen [40] focus on the benefits of foreign R&D cooperation comparing non-equity international partnerships with FDI and equity-based international partnerships. They find that non-equity international partnerships are a mean for firms "to simultaneously be present, source knowledge and compete in multiple countries and regions without the liabilities associated with FDI or joint ventures" (p. 3). Similarly, von Zedtwitz and Gassmann [42] conclude that complete integration of globally dispersed R&D activities can produce high coordination and social costs, which drive firms to invest in local product adaptation and in foreign science clusters, usually through looser forms of innovation cooperation.

Another benefit of setting up international cooperative agreements is a potential increase in the competitiveness of the firm. Some empirical evidence stresses that dispersed R&D activities may contribute to firms' competitiveness when compared with centralized R&D operations since it is an opportunity to take advantage of host-country scientific inputs and reduce the uncertainty in unfamiliar business environments [43].

A different explanation for the growing number of international cooperation agreements has been presented by Narula and Hagedoorn [6]. They argue that the fact that few firms have resources to duplicate value chains in different locations has led to more cooperations.

Finally, the involvement of public authorities through support systems can be expected to have an impact on the willingness of firms to engage in R&D cooperation across borders [44]. In the European Union, for example, many funding schemes explicitly require firms to cooperate in order to gain access to funds for R&D and innovation projects.

In summary, access to complementary foreign knowledge and markets and a reduction or sharing of R&D costs seem to be the main drivers of international cooperation.

## 5. Conclusions

This paper analyses the decision of firms to cooperate with foreign partners on innovation projects. The main conclusion of this analysis is that the determinants of cooperating with a foreign partner on innovation activities are similar in all countries. In other words, the typical international cooperative firm of a small and less developed economy has the same characteristics as the international cooperative firm of a large and more developed economy: above-average absorptive capacities, receiving public funding, higher level of outgoing spillovers and above-average number of employees. It looks as though firms have the same needs and must own similar capabilities to be able to engage in international innovation networks. Supporting investments in absorptive capacities, the growth of firms and the production of knowledge, could thus be policies that promote innovation and internationalisation.

Future research should complement this study. One possible line of development could be deepening the analysis of the different types of partners, trying to scrutinize whether firms choose similar or different types of international partners (eg competitors, suppliers or research institutes) to develop innovation collaborations. In addition, the comprehensive analysis could provide further insight into the mechanisms behind international cooperation on innovation activities. Further research is necessary to compare the effects of domestic collaboration and international collaboration on various microeconomic as well as macroeconomic outputs.

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# Innovative and Competitive Structure of Regional Economies in Turkey

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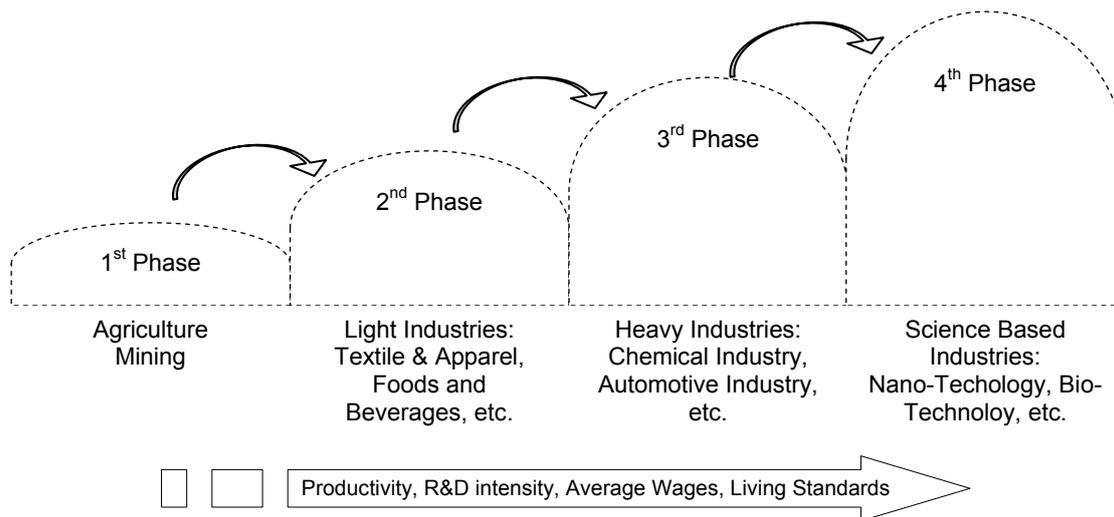
**After the elections of 2002 the new governments followed the same fiscal tightening policy offered by IMF as well as export-led strategy for real sector. However, one of the most serious problems of Turkish is widening current account deficit despite higher growth rate. One of the major reasons of current account deficit is technology gap between exporting and importing industries. As Turkey exports low-tech goods more, imports medium-high tech and high-tech goods more. Therefore, the technology gap incurs heavy cost as current account deficit. This situation shows that there are some structural problems in Turkish manufacturing industry and regional economies. We assume that it stems from lack of innovativeness and technological capability of Turkish regions. In this paper, we try to identify technological levels of 26 NUTS 2-level regions according to OECD's classification. Then, we develop an innovation and competitiveness index (ICI) for Turkey by employing Principal Component Analysis. In conclusion, we formulate some workable policy solutions and suggestions for regional economies in Turkey. According to index results, Istanbul is the most innovative and competitive region in Turkey. Ankara is becoming regional knowledge cluster thanks to its strong R&D infrastructure and high-qualified researchers.**

## **Keywords**

Technology Level, Innovation and Competitiveness Index, Turkey, Turkish Regions

## **1. Introduction**

All countries necessarily pass through a gradual development phase. Some of them are endowed with natural resources that trigger their development while other countries possess highly educated human capital, and potentially having higher productivity levels. Developing countries (DCs) have a long history of traditional agricultural production. In general, agricultural is considered domestic work and technology's interference was minuscule. This situation prevented higher savings which were needed for investments. Agriculture and mining sectors were dominant in the overall economic structure. Low productivity levels limit the competitive power of DCs in international markets as well. Western countries industrialization began in 19th century and agricultural production was performed as part of the industry. Early industrialization ensured capital accumulation and consequently a financial system that could provide necessary capital for heavy industry. As science based industries were growing, chemical, electrical machinery and automotive industries were diverted through DCs. This happened because industrialized countries were able to produce higher value added products with relatively less environmental problems, thanks to the advantages of early industrialization and division/specialization of labour. The following figure illustrates the general technology phases of industrial development stages in a country.



Source: TASCI (2009)

**Figure 1** Technology Phases of Industrial Development in a Country

As DCs started to benefit from the learning process by increasing trade volume with Western partners, they also received direct foreign investments and financial capital to produce capital intensive technologies. Governments of newly industrialized countries (NICs) like Taiwan, South Korea and Singapore combined import substitution and export promotion policies with the subsidization of high-tech industries. These countries succeeded in exporting higher value added goods and their GDP per capita got closer to that of the high-income countries. Within this framework, we will try to examine development levels of Turkish regions in terms of technology phases of manufacturing industries. Then, it will be developed Innovation and Competitiveness Index for Turkish regions by using these findings and other indicators.

## 2. Technology Development Levels of Turkish Regions

Although Turkey started off industrialization efforts in 1930s, it could not achieve much in the past 70 years. Turkey implemented import substitution policy until the 1980s but high level of agriculture employment and insufficient capital accumulation stood as hurdles for success. Trade liberalization in 1980s helped Turkey's international integration and Customs Agreement with European Union in the middle of 1990s. This enhanced competitiveness in the industrial sector. Export revenues increased dramatically in the last decade after the financial crisis of 2001. However, trade deficit also tremendously increased due to higher import expenditures. The share of high-tech export within the manufacturing sector is under 10 percent level which is one of the lowest one among OECD countries. Medium low-tech exports have been increasing during the period while medium high-tech import expenditures have risen since 2003. This fact illustrates the underlying reason for growing gap between export and imports. The regional development pattern of Turkey followed a pattern in line with the international trade scheme of the country. Import substitution policies caused high migration flow from eastern regions to certain cities including Istanbul, Ankara and Izmir. Industry localized around these demand centres since the economy was not yet open to the international markets. Increasing trade volumes in the last two decades ensured a more dispersed industrial location due to lower wages and land rents in other cities. Bursa, Kocaeli, Gaziantep, Kayseri, Denizli are those significant industry centres benefiting from industrial dispersion. Approximately 90 percent of international trade activities happened within the triangle of Istanbul, Ankara and Izmir. It is important to note that Istanbul NUTS II Region produces more than half the sum of exports and imports in Turkey. It is followed by TR41 and TR31 NUTS II Regions. Istanbul and its peripheral cities is absolutely the trading hub of Turkey. It is interesting to note that exporting regions create positive externalities for neighbouring regions. For example, Gaziantep is an important industry and export centre in South-East part of Turkey and contributes to the development of near cities, K. Maras, Sanliurfa and Adiyaman. In this very direction, government should combine regional and international trade policies to create strategic growth poles in the underdeveloped regions. Border regions seem promising in terms of future trade outlook.

## 2.1. Methodology and Data

A country's integration to world economy is a measure of its international trade in goods and services. In terms of GDP, small countries are usually more integrated as they have a tendency to specialize in a limited number of sectors and these countries need to import and export more goods and services than larger countries as domestic demand must also be satisfied. However, GDP of a country is not the one and only factor that determines the level of its integration with world economy.

Although international trade in goods and services has been seen as the sole path of economic integration, other forms and transactions are becoming more relevant and prevalent since the last 20 years (e.g. foreign direct investment, portfolio investment). Scientific or technological development and globalization can be quoted as those two terrific courses which are driving the world's economy in the last two decades.

**Table 1** Classification of Technology Intensity in Manufacturing Industries by OECD

Technology Level	ISIC Revision 3 Industry Classification
High-technology industries	Aircraft and spacecraft
	Pharmaceuticals
	Office, accounting and computing machinery
	Radio, TV and communications equipment
	Medical, precision and optical instruments
Medium-high-technology industries	Electrical machinery and apparatus
	Motor vehicles, trailers and semi-trailers
	Chemicals excluding pharmaceuticals.
	Railroad equipment and transport equipment
	Machinery and equipment,
Medium-low-technology industries	Building and repairing of ships and boats
	Rubber and plastics products
	Coke, refined petroleum products and nuclear fuel
	Other non-metallic mineral products
	Basic metals and fabricated metal products
Low-technology industries	Manufacturing, n.e.c.; Recycling
	Wood, pulp, paper, paper products, printing and publishing
	Food products, beverages and tobacco
	Textiles, textile products, leather and footwear

Source: (OECD, 2007)

In this section, we focus on Turkey's manufacturing industries with a technological perspective to identify the vulnerability of the industrial structure in the country, and also to contribute to the industrial policy-making process. To do this, we will consider OECD's classification of technology intensity in manufacturing industry. Taxonomy of the trade data for manufacturing industries is achieved according to the intensity of technology using the ISIC Rev. 3 breakdown of activity. Formerly, technology classification based on ISIC Rev. 2 industry classifications was what was mostly accepted. That methodology is based on three indicators of technology intensity which categorically reflect, "technology producer" and "technology-user" aspects to different degrees: 1) R&D expenditure/production 2) R&D expenditure/ value added 3) (R&D expenditure + technology involved in intermediate and investment goods) / production (OECD, 2007).

The classification of manufacturing industries into high-technology, medium-high-technology, medium-low-technology and low-technology groups was accomplished after ranking industries with respect to their average from the period of (1991-99) against the aggregate OECD R&D intensities. Industries that fell into higher categories have a higher average intensity for both indicators than industries in the lower categories. The low-technology group owes much to the limited, detailed R&D expenditure data across countries and consists of relatively aggregate sectors. In some exceptional cases, R&D intensities are available for more detailed (2-digit) breakdowns and predicate the classification of these industries into low technology (OECD, 2007).

## 2.2. Findings

Above mentioned OECD methodology has been applied to Turkish manufacturing industry. Related data employed in the study were obtained from the Turkey's Labour Statistics released by Turkish Statistical Unit, annually. The last available data for manufacturing industry is for 2008 and five different data will be used to determine technology development level of manufacturing industry. These are; number of firms, employment, wages, revenues and investments of manufacturing industries. Medium high-tech (MHT) and high-tech (HT) data consolidated and 26 NUTS II Regions are classified under three categories with respect to their share of medium high-tech and high-tech production within the country. Revenues obtained from medium high-tech and high-tech activities are used as the main criteria for determining technology development levels of regions.

First group NUTS II regions are composed of six regions and have the biggest share in revenues gained from MHT and HT activities. It should be noted that all of them are situated at the north-western part of Turkey and 43 percent of total population resides in these regions. Annual population growth rate and population density per km. are higher in these regions. It illustrates that technology diffusion has a positive impact on population movements. In other words, as the technology development level of regions increase, they attract population from other regions.

**Table 2** MHT and HT Development Level of First Group NUTS II Regions (2008)

	Number of Firms	Employment	Wages	Revenue	Investments
TR10 İstanbul	34,7	33,8	37,5	37,2	31,0
TR33 Manisa, Afyon, Kütahya, Uşak	1,9	8,4	7,9	16,9	17,9
TR51 Ankara	18,2	18,0	20,6	11,2	9,5
TR42 Kocaeli, Sakarya, Düzce, Bolu, Yalova	2,2	7,1	9,2	9,7	10,8
TR41 Bursa, Eskişehir, Bilecik	5,7	8,4	9,0	8,8	9,7
TR31 İzmir	5,5	6,9	5,7	4,9	5,9

The above table shows that İstanbul has the highest scores for MHT and HT firms, people employed in these sectors, wages earned by employees and revenues gained by MHT-HT firms and investments made by them. Around 1/3 of all high level technological activities are performed by İstanbul. When the population size of İstanbul which is 18 percent of total Turkish population is taken into account, it can be considered that industry sector in İstanbul twice as productive as the rest of the country. Although TR33 (Manisa, Afyon, Kütahya, Uşak) NUTS II Region has not a big share in the number of firms, it produces a big amount of revenue and has the second biggest share in MHT and HT investments. TR33 region hosts one of the biggest producers of consumer electronics, IT, digital technologies, and household appliances with €3.7 billion turnover. The company account for 21 percent of TV market in Europe. Another important point is that TR51 (Ankara) NUTS II region has comparably higher firm and employee numbers in MHT and HT sectors and 21 percent of wages earned there. Ankara suffers from revenue production and lower investment rates to technology. It mainly stems from small scale of technology firms most of which are located in METU and Bilkent Techno parks. Those firms are in a disadvantageous position in fund raising for new investments. On the other hand, Ankara is the leading region in human capital. In one thousand population, 150 people have university degree, 14,5 have graduate and 5.6 phd degree in Ankara. Further efforts are needed for Ankara region to employ qualified human capital in more innovative and technology intensive sectors.

**Table 3** MHT and HT Development Level of Second Group NUTS II Regions (2008)

	Number of Firms	Employment	Wages	Revenue	Investments
TR62 (Adana, Mersin)	5,0	1,7	1,4	1,5	1,1
TR21 (Tekirdağ, Edirne, Kırklareli)	0,8	1,2	1,7	1,0	0,4
TR32 (Aydın, Denizli, Muğla)	1,8	1,0	0,5	0,8	1,0
TR72 (Kayseri, Sivas, Yozgat)	3,0	2,3	1,0	0,7	1,0
TR52 (Konya, Karaman)	3,3	1,6	0,7	0,7	0,5

The first group NUTS II regions earn almost 90 percent of wages and revenues of MHT and HT sectors. Second group NUTS II regions left with only around five percent wages and revenues

obtained from technology intensive sectors. 17 percent of total national population lives in these five regions. TR62 (Adana, Mersin) NUTS II region has the highest share in the number of firms and revenues in the group. Adana province has the highest unemployment rate in Turkey. TR62 NUTS II region is a destination point for immigrants who migrate from eastern regions where illiteracy rate is high and qualified workforce is scarce. TR21 (Tekirdağ, Edirne, Kırklareli) NUTS II region is another important destination point for internal migrants. The region benefits from positive spillover effects originating from Istanbul region where firms search for new investment places due to the higher rent and labour costs in Istanbul. The economy of TR32 (Aydın, Denizli, Muğla) NUTS II region is more concentrated on service sectors, mainly tourism. According to the statistics of Ministry of Culture and Tourism (2008), Mugla is the second in the number of tourism facilities and third in international flights. Denizli province is a historically textile and apparel industry centre of Turkey. It is among four centres in this sector. The city suffers much from low level technology intensive production in textile and apparel industry and loses its competitive power against China because of the lower production costs.

**Table 4** MHT and HT Development Level of Third Group NUTS II Regions (2008)

	Number of Firms	Employment	Wages	Revenue	Investments
TR61 Antalya, Isparta, Burdur	5,7	1,9	0,9	0,6	0,2
TR22 Balıkesir, Çanakkale	1,1	0,4	0,3	0,4	0,6
TR83 Samsun, Tokat, Çorum, Amasya	2,1	1,5	0,8	0,4	0,3
TRB1 Malatya, Elazığ, Bingöl, Tunceli	1,5	0,9	0,3	0,2	0,0
TR63 Hatay, Kahramanmaraş, Osmaniye	0,5	0,3	0,1	0,2	0,1
TR71 Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir	0,6	0,7	1,0	0,1	0,1
TRC1 Gaziantep, Adıyaman, Kilis	2,4	0,4	0,1	0,1	0,0
TR90 Trabzon, Ordu, Giresun, Rize, Artvin	0,8	0,3	0,1	0,1	0,1
TRC2 Şanlıurfa, Diyarbakır	0,9	0,5	0,3	0,1	0,0
TR81 Zonguldak, Karabük, Bartın	0,4	0,5	0,2	0,1	0,1
TR82 Kastamonu, Çankırı, Sinop	0,2	0,2	0,2	0,1	0,0
TRA1 Erzurum, Erzincan, Bayburt	0,8	0,1	0,0	0,0	0,0
TRB2 Van, Muş, Bitlis, Hakkari	0,6	0,3	0,1	0,0	0,0
TRA2 Ağrı, Kars, Iğdır, Ardahan	0,3	0,1	0,0	0,0	0,0
TRC3 Mardin, Batman, Şırnak, Siirt	0,2	0,0	0,0	0,0	0,0

15 NUTS II regions are the ones that have the lowest technological development levels in manufacturing industries. Except TR22 and TR61 NUTS II regions, all of them are located in the eastern part of TR42, TR51 and TR62 NUTS II hypothetical border. 40 percent of total population lives in these 15 regions, while they produce just 2.3 percent of national MHT and HT revenues which amount only 1/7 of TR33 (Manisa, Afyon, Kütahya, Uşak) region's revenue. It is interesting to see that the least developed NUTS II regions of Turkey are also at the bottom in terms of technological production. 56 provinces, most of which are among third group NUTS II regions, have less than 10 patent applications in 2010, according to the Turkish Patent Institute statistics. 42 percent of patent applications originate from TR10 (Istanbul) NUTS II region which is followed by Ankara with 10 percent share. The situation holds for trademark registrations, as well. 52.6 percent of total trademark registrations came from Istanbul and eight percent from Ankara in 2009.

### 3. Innovation and Competitiveness Index for Turkish Regions (ICI4TR)

#### 3.1 Methodology and Data

Competitiveness of private sector is one of the major determiners of competitiveness of regions in both domestic-national and global market. Before taking initiative at policy field, observing and identifying the innovation and competitiveness performance of regions would be first action. A kind of Factor analysis, Principal Component Analysis is widely accepted tool to create composite indexes. Creating the ICI4TR, we will benefit from the statistical analysis method. Principal Component Analysis (PCA) Because of the page limitation, we could not be able to explain how Principal Component Analysis (PCA) works in detail (For detailed information, please see Vogelvang 2005). In order to create Innovation and Competitiveness Index for Turkish Regions (ICI4TR), the following variables have been used.

**Table 5** Variables

Variable	Name	Year	Source
Medium-High Tech and High-Tech Manufacturing Companies Share(%)	TECHCOMP	2008	TURKSTAT
Medium-High Tech and High-Tech Manufacturing Employment Share(%)	TECHEMP	2008	TURKSTAT
Urbanization Rate (%)	URBRATE	2010	TURKSTAT
Masters and PhD Degree Ratio within +15 Age Population (%)	MSPHD	2009	TURKSTAT
The Number of Patent Applications	PATENT	2009	TURKSTAT
The Number of Trademark Application	TRADEMARK	2009	TURKSTAT
Total Export Per Capita (US \$)	EXPORT	2009	TURKSTAT
Banking Credit Ratio (%)	BANKCREDIT	2009	The Union of Turkish Banks
GSM Subscription Ratio Per Head	GSPENTR	2008	ICT Authority
Broadband Penetration Ratio (ADSL/Household)	BROADBAND	2008	ICT Authority

In the above table, the first and second variables indicate technological level of manufacturing industries of Turkey. Medium high-tech and high-tech manufacturing industry companies and employment are directly related to productivity of country. We assume that the innovative capacity and competitiveness of regions increase as the regions reach scale. Therefore, urbanization rate variable would be expressive. According to OECD and EU classifications, full-time equivalent researchers should have at least master's degree, and high qualified human resources are the heart of knowledge based economy transformation. Hence, we used "Masters and PhD Degree Ration within +15 Age Population (%)" variable in order to measure capacity of human resources across the Turkish regions. The number of patent applications and trademark applications are the best known innovation indicators. Total export per capita is a useful indicator of competitiveness level of a region. Banking credit ration variable refers economic vitality of regions. The last two indicators of our model are related to e-readiness of Turkish regions. Regarding all above variables, the most recent available data has been used in our model.

### 3.2 Findings

PCA is a data elimination technique and indicates how many varieties are crucial to explain the observed variance in the data. The following table shows which principal component how much explains uncorrelated data. As explained variance increases, the principal component would be more explanatory for our index.

**Table 6** Principle Components for Selected Variables

Principal Components	Eigen Value	Explained Variance %	Cumulative Proportion
1	7,55571	75,56%	75,56%
2	1,01123	10,11%	85,67%
3	0,73630	7,36%	93,03%
4	0,28953	2,90%	95,93%
5	0,26049	2,60%	98,53%
6	0,07077	0,71%	99,24%
7	0,05476	0,55%	99,79%
8	0,01259	0,13%	99,91%
9	0,00753	0,08%	99,99%
10	0,00109	0,01%	100,00%

As seen from above table, the first principal component is good enough to explain model since it has 75.56% explained variance. Each component creates weights of variables which indicate which variable is more important at final index.

**Table 7** The Weights of Principal Component 1

Variable	PC1 Share%
Medium-High Tech and High-Tech Manufacturing Companies Share (%)	35,61%
Medium-High Tech and High-Tech Manufacturing Employment Share (%)	35,38%
Banking Credit Ratio (%)	35,18%
The Number of Patent Applications	34,85%
The Number of Trademark Application	34,33%
Total Export Per Capita (US \$)	34,21%
Broadband Penetration Ratio (ADSL/Household)	32,08%
Masters and PhD Degree Ratio within +15 Age Population (%)	28,15%
Urbanization Rate (%)	26,99%
GSM Subscription Ratio Per Head	11,39%

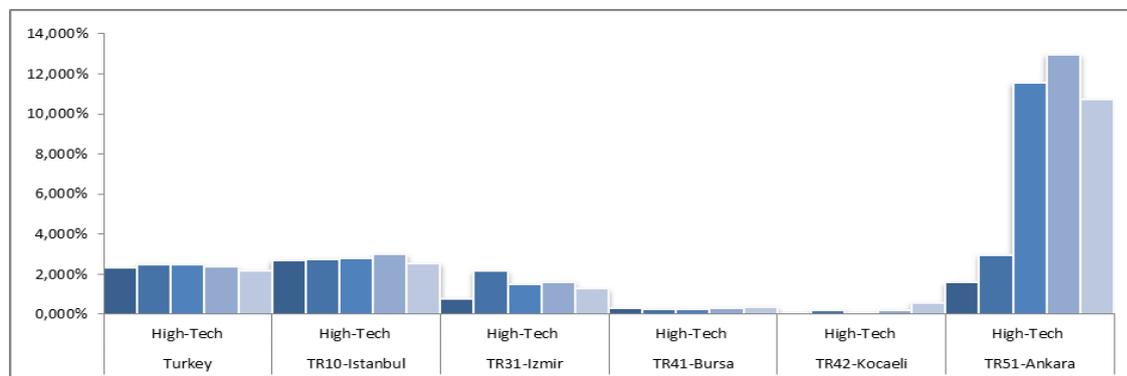
The following table shows innovation and competitiveness index rankings for Turkish NUTS-2 regions. According to index results, the regions have been categorized into 7 sub-groups that are respectively, globally competitive innovation center, regional knowledge cluster, regional competitive innovation center, emerging innovation center, take off stage regions, promising regions and lagged regions.

**Table 8** Innovation and Competitiveness Index for Turkish Regions (ICI4TR)

NUTS-2 REGIONS	INDEX VALUE	CLASSIFICATION
TR10 İstanbul	<b>12,015</b>	<i>Globally Competitive Innovation Center</i>
TR51-Ankara	<b>4,473</b>	<i>Regional Knowledge Cluster</i>
TR31-İzmir	<b>2,443</b>	
TR41-Bursa, Eskişehir, Bilecik	<b>1,352</b>	<i>Regional Competitive Innovation Centers</i>
TR42-Kocaeli, Sakarya, Düzce, Bolu, Yalova	<b>0,205</b>	
TR52-Konya, Karaman	<b>-0,122</b>	
TR62-Adana, Mersin	<b>-0,148</b>	
TR33-Manisa, Afyonkarahisar, Kütahya, Uşak	<b>-0,405</b>	
TR61-Antalya, Isparta, Burdur	<b>-0,417</b>	<i>Emerging Innovation Centers</i>
TR21 Tekirdağ, Edirne, Kırklareli	<b>-0,575</b>	
TRC1-Gaziantep, Adıyaman, Kilis	<b>-0,594</b>	
TR72-Kayseri, Sivas, Yozgat	<b>-0,643</b>	
TR32-Aydın, Denizli, Muğla	<b>-0,852</b>	
TR22-Balıkesir, Çanakkale	<b>-0,941</b>	
TR83-Samsun, Tokat, Çorum, Amasya	<b>-1,071</b>	
TRC2-Şanlıurfa, Diyarbakır	<b>-1,094</b>	<i>Take off Stage Regions</i>
TR81-Zonguldak, Karabük, Bartın	<b>-1,101</b>	
TRB1-Malatya, Elazığ, Bingöl, Tunceli	<b>-1,184</b>	
TRA1-Erzurum, Erzincan, Bayburt	<b>-1,190</b>	
TR63-Hatay, Kahramanmaraş, Osmaniye	<b>-1,297</b>	<i>Promising Regions</i>
TR90-Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane	<b>-1,352</b>	
TR71-Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir	<b>-1,415</b>	
TRA2-Ağrı, Kars, Iğdır, Ardahan	<b>-1,459</b>	
TRC3-Mardin, Batman, Şırnak, Siirt	<b>-1,503</b>	<i>Lagged Regions</i>
TR82-Kastamonu, Çankırı, Sinop	<b>-1,563</b>	
TRB2-Van, Muş, Bitlis, Hakkari	<b>-1,563</b>	

ICI4TR indicates that TR 10 İstanbul is the only one globally competitive innovative center in Turkey. By 2009, the city creates approximately 140 billion US \$ Gross Regional Product which accounts for 21% of national GDP, holds 165 billion US \$ export and import volume which accounts for 55% of total foreign trade of the country. With more than 13 million population and 44 universities, İstanbul is not only competitive economy in Eurasia but also globally competitive innovation center in the world. The

capital of Turkey, TR51 Ankara region is the leader in terms of R&D activities and innovation, and the city has 6 technology development zones of 39, as Ankara Silicon Valley. In 1981-2006, Ankara produced 61,458 scientific publications while Istanbul had only 40,006. By 2009, there were 69,987 people who had masters and PhD degrees in Ankara. As seen from the below figure 2, Ankara is the best place to work for high-tech labour in terms of wages and high-tech labour force has been continuously choosing the city. As result, we may identify Ankara as Regional Knowledge Cluster.



**Figure 2** Wages for High-Tech Employment (2003-2008)

TR31 İzmir, TR41 Bursa and TR41 Kocaeli regions are industrialized economies in Turkey. They are significant share of production and foreign trade of the country. While TR41 Bursa is the leading region in automotive industry with producing 622.000 cars which accounts for %65 total automotive production of Turkey by 2010, Kocaeli is the leading region in chemical and shipbuilding industry. Therefore, we call these regions as Regional Competitive Innovation Centers. Emerging Innovation Centers have newly established their research centers and been raised researchers. 8 regions of Turkey can be in this classification. 5 eastern regions of Turkey have been industrializing in recent years. So, we may call them as take off stage regions. There are 4 promising regions which are in a learning process. Government incentives has been re-designed for the regions and new universities founded in order to boost innovative capacity and competitiveness of these economies.

## 4. Conclusion

Istanbul has the highest scores for medium high-tech and high-tech firms, people employed in these sectors, wages earned by employees and revenues gained by MHT-HT firms and investments made by them. Around 1/3 of all high level technological activities are performed by Istanbul. When the population size of Istanbul which is 18 percent of total Turkish population is taken into account, it can be considered that industry sector in Istanbul twice as productive as the rest of the country. TR51 (Ankara) NUTS II region has comparably higher firm and employee numbers in MHT and HT sectors and 21 percent of wages earned there. Ankara suffers from revenue production and lower investment rates to technology. It mainly stems from small scale of technology firms most of which are located in METU and Bilkent Techno parks. Those firms are in a disadvantageous position in fund raising for new investments. On the other hand, Ankara is the leading region in human capital. In conclusion, there are deep technology gap among Turkish regions. Only 5 regions of the country have positive index values and internationally competitive. TR41 Bursa and TR42 Kocaeli regions have problems to pass next technology phase.

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# How Innovative South East Europe Is?

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**This paper focuses on innovative performances of South East European countries. It analyzes innovative performances of countries from South East Europe, benchmark their innovative performances with EU and innovation leaders; and provide insights about the strengths and weaknesses in innovation-related policies and practices. The findings presented here are based on studies on global innovation performances of countries in last four years. All presented studies suggest the same – SEE countries are not good at innovation. However, good news is that they have grown at a faster pace than the EU27 in the last year, showing the overall fastest rate of improvement in innovation performance. Finally, we highlighted three building blocks needed in order to enable SEE countries to fully capture the benefits of innovation and leapfrog to higher stages of economic and social development.**

## Keywords

Competitiveness, Governmental and regional policies on entrepreneurship, innovation and R&D Innovation measurement, South East Europe

## 1. Introduction

In a globalised, knowledge based world where markets, products, technology, competitors, regulations, and even societies change rapidly, innovation is becoming increasingly important for companies and countries. Tangible assets and natural resources such as minerals, coal, and oil no longer determine the fortunes of economies. In such a world, continuous innovation, together with the knowledge that enables it, has become an important source of the competitive advantage. Clearly, if economies are to grow, they need an innovative environment. Therefore, innovation is considered as a key policy instrument to accelerate economic growth, enhance job creation, promote development and improve quality of life [1].

Being a key enabler of progress and competitiveness in the knowledge based economy innovation has attracted attention in many countries. Innovation readiness at the national level has achieved top status on the public policy agendas'. Main stakeholders are involved in creating an enabling environment to support the adoption of innovation and spread their benefits across all sectors of society. On the one hand, companies and entrepreneurs regard it as a vital weapon in holding their corporate competitors off. On the other, it is recognised by governments that countries generating innovation create new technologies and encourage the adoption of these new technologies, grow

faster than those that do not. Furthermore, capacity of innovation is accepted as driver of growth, facilitator of countries' recovery, and a way in sustaining national competitiveness in the medium to long term [2]. Therefore, it is important to policymakers to measure innovation against certain benchmarked global standards and to evaluate the progress of innovation readiness in countries, highlighting the obstacles that prevent governments, businesses, and individuals from fully capturing the benefits of innovation.

Reflecting the importance of this topic, numerous studies on innovation performances of countries are conducted. The traditional approach to measure innovation has been to look at parameters like patents and publication of scientific journals per million of population or research and development (R&D) expenditure. However, the understanding of innovation has evolved over the last ten years. More holistic approach is currently used and the models are based on tens of parameters, including: political and macroeconomic stability, regulatory environment, human capacity, general and ICT infrastructure, openness of national economy to foreign investment, access to investment finance, protection of intellectual property, market and business sophistication. Using this framework, the world's economies are ranked on their innovation capabilities.

Clearly, some parts of the world are more innovation-friendly than others. Majority of studies focus on the world's best-performing economies or regions, showing low level of interest for less developed areas or countries. This is partly consequence of the conventional wisdom that innovation is most likely to drive growth in the highly developed countries, while poor and middle-income countries can import technology from abroad and therefore need not bother to innovate domestically. However, recent study [3] showed that for low- and middle-income countries, innovation yields a higher impact on economic growth than for high-income countries. This finding also reflects the fact that for low- and middle-income countries, domestic innovation activity tends to facilitate the more efficient and rapid absorption of imported technology. Thus, they benefit from their internal innovativeness as well as from the spillover effect of foreign innovations. This would tend to increase the catch-up prospects of the more innovative middle-income countries.

Following these arguments the purpose of this paper is to analyze innovative performances of middle-income countries from South East Europe, benchmark their innovative performances with EU and innovation leaders; and provide insights about the strengths and weaknesses in innovation-related policies and practices. We use data from different studies on innovation performances of countries conducted in last four years and focus on the following countries: Turkey, Greece, Bulgaria, Albania, Macedonia, Serbia, Bosnia and Herzegovina, Montenegro and Croatia.

The paper begins with overview of studies on innovation performances of countries. After a general discussion about innovation trends and brief description of innovation leaders, the paper goes on to analyze innovative performances of SEE countries and compare them with EU and innovation leaders. We examined innovation-related strengths and weaknesses of each country and of the whole region in order to detect and suggest measures for enabling these countries to leapfrog to higher stages of economic and social development. The paper ends with some conclusions and implications for policymakers in the Region designed to help to fully capture the benefits of innovation.

## 2. Global innovativeness

In the last few years a number of studies have assessed countries' global innovativeness. Table 1 summarise the most important features some of these studies. The Global Innovation Index (GII) [4] was developed by INSEAD in 2007. It is based on a mixture of hard data and survey data conducted annually by the World Economic Forum. The index is based on 60 variables and weighs the innovativeness of 132 economies in 2010. The Innovation union scoreboard [5] (previously known as European innovation scoreboard) is a comparative assessment of the performance of the European Union (EU) member states and a few select countries. The report is an initiative of the European Commission under the Lisbon Strategy. It divides nations into four categories - innovation leaders, innovation followers, moderate and modest innovators, to match up countries based on their performance in the innovation score. Global competitiveness report (GCR) [2] is published every year by World Economic Forum (WEF). Although it is in essence a report on competitiveness, it includes critical components of innovation. This report is based on 117 variables and weighed the competitiveness of 133 economies in 2010. The Innovation imperative in manufacturing [6], US centric innovativeness report investigates the current status of innovation in US companies, and position of the country on the world's innovation map. The report based on 24 indicators, ranks 110 countries and 50 states in the US. Furthermore, the Economist Intelligence Unit [3] conducted an online survey of

485 senior global executives on their opinions regarding innovation in order to understand the basic drivers of innovation. They ranked 82 countries on their innovativeness. Finally, the Atlantic century report [7] ranked a total of 36 nations and the four regions. It uses a total of 16 variables under six broad categories to understand how countries are performing in terms of global competitiveness and innovation.

It is clear that no one study is perfect or the best one. However, from them we can make several conclusions. First, countries like Switzerland, Iceland, Sweden, Denmark, Finland, Norway, Hong Kong, Singapore, South Korea, Taiwan, Netherlands, Germany, USA, Canada, Japan and UK are leaders in innovation regardless metrics used. These countries have a strong knowledge based economy founded on high level of business and governmental commitment to innovation. Excellent infrastructure, strong R&D sector with good international linkages, a number of global companies, strong base of talented work force and IT investments are just few representative features of these economies. Finally, bulk of the investments in R&D in the countries is by industries, followed by universities and then by public research institutes and industrial research institutes.

**Table 1** Countries' innovativeness – Summary of reports.

Report parameters	Global Innovation Index Report 2009-2010 [4]	Innovation Union Scoreboard (2011) [5]	Global Competitiveness Report 2010 – 2011 [2]	The Economist Intelligence Unit (2007) [3]	The Innovation Imperative in Manufacturing (2009) [6]	The Atlantic Century Report (2009) [7]
Countries covered	132 countries	34 countries	133 countries	82 countries	110 countries	36 countries and 4 regions
No of Variables	60 variables	29 variables	117 variables	4 variable	24 variables	16 variables
Top fifteen ranking countries in descending order	1. Iceland 2. Sweden 3. Hong Kong 4. Switzerland 5. Denmark 6. Finland 7. Singapore 8. Netherlands 9. New Zealand 10. Norway 11. USA 12. Canada 13. Japan 14. UK 15. Luxembourg	1. Switzerland 2. Sweden 3. Denmark 4. Finland 5. Germany 6. UK 7. Belgium 8. Austria 9. Netherlands 10. Ireland 11. Luxemburg 12. France 13. Cyprus 14. Iceland 15. Slovenia	1. Switzerland 2. Sweden 3. Singapore 4. United States 5. Germany 6. Japan 7. Finland 8. Netherlands 9. Denmark 10. Canada 11. Hong Kong 12. UK 13. Taiwan, 14. Norway 15. France	1. Japan 2. Switzerland 3. USA 4. Sweden 5. Finland 6. Germany 7. Denmark 8. Taiwan 9. Netherlands 10. Israel 11. Austria 12. France 13. Canada 14. Belgium 15. South Korea	1. Singapore 2. South Korea 3. Switzerland 4. Iceland 5. Ireland 6. Hong Kong 7. Finland 8. US 9. Japan 10. Sweden 11. Denmark 12. Netherlands 13. Luxembourg 14. Canada 15. UK	1. Singapore 2. Sweden 3. Luxembourg 4. Denmark 5. South Korea 6. US 7. Finland 8. UK 9. Japan 10. Netherlands 11. France 12. Ireland 13. Belgium 14. Germany 15. Canada
Top ranking SEE countries in descending order	45. Croatia 46. Greece 49. Bulgaria 59. Montenegro 67. Turkey 77. Macedonia 81. Albania 101. Serbia 116. Bosnia	22. Greece 25. Croatia 29. Serbia 30. Macedonia 32. Bulgaria 33. Turkey	49. Montenegro 61. Turkey 71. Bulgaria 77. Croatia 79. Macedonia 83. Greece 88. Albania 96. Serbia 102. Bosnia	30. Croatia 32. Greece 42. Bulgaria 56. Turkey 67. Serbia	42. Greece 48. Croatia 53. Bulgaria 67. Albania 76. Macedonia	37. Greece

Second, successful countries today are not geographically large or rich with natural resources. They are ones that have managed to expand opportunities for their populations through the full exploitation of the opportunities afforded by the world economy through international trade, foreign investment, and the adoption of new technologies [4]. Majority of named countries are relatively small with each having less than 0.5 per cent of the world population. These countries benefit from easier networking, efficient enforcement of economic and legislative policies, better management of resources and effectiveness of social benefits systems.

Finally, innovation is and will be global and technology based phenomenon. The current global trends indicate that innovation will be distributed globally rather than being a prerogative of the western world. On the other hand, our civilisation is technology based. Its sustainability, economic development and

growth are highly dependent on technological development. In order to maximise benefits from existing technology our society is adapting its organisational form to the permanent changes of technology. In such a world, technology-intensive industries play an increasingly important role and innovation is key process for long-run economic growth.

### 3. Innovation and South East Europe

The region of South East Europe (SEE) is also referred to as the Balkans. In geographical terms it includes all the countries on the Balkan Peninsula, territory south of the rivers Sava and Danube. In this paper we recognize the following countries as parts of SEE: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Turkey, Macedonia, Montenegro and Serbia. SEE has long been associated with political instability. Currently, it is the most complex region of Europe. Its complexity is result of historical legacies as well as the developments that occurred in the 1990s. During the Cold War era this area was divided region where neighbouring countries did not communicate either economically or politically. After the fall of the Berlin Wall in 1989, at a time when the countries of central Europe were becoming European Union (EU) members, this area was held back by civil war in SFR Yugoslavia.

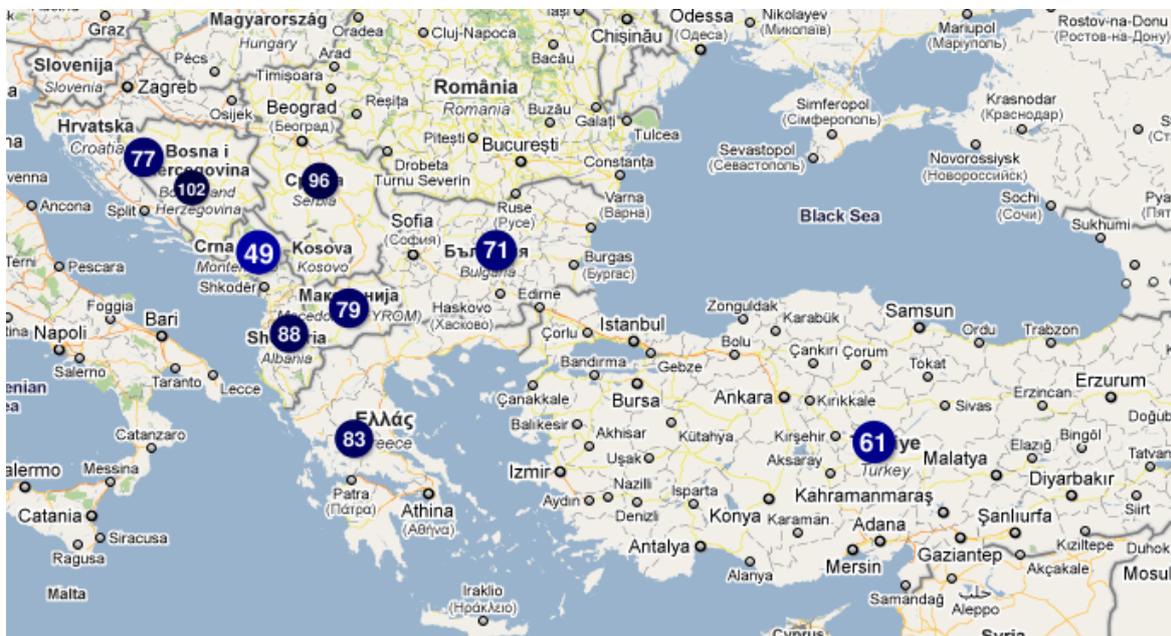


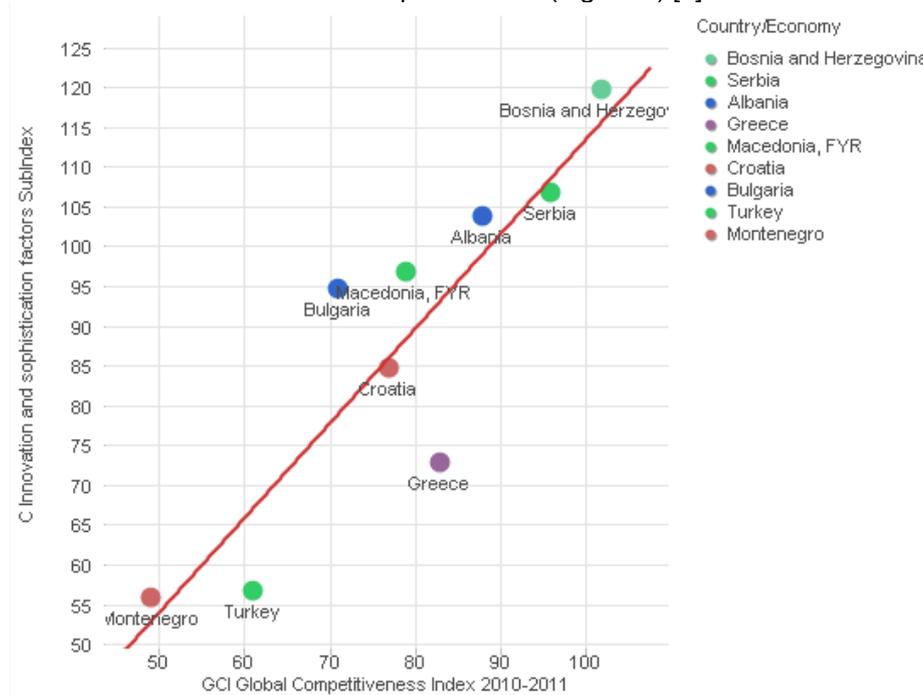
Figure 1 Competiveness of SEE countries [2]

Even today, serious problems are present: uncertainty regarding the status of Kosovo, the very complex institutional system in Bosnia and Herzegovina, big financial crises in Greece, corruption in Bulgaria and ethnical problems in Macedonia. Therefore, European integration represents the only viable project and objective to ensure social and political coherence of the region. Even for the SEE countries that are EU members (Greece and Bulgaria), prosperous neighbours are the best guarantors of stability and economic growth.

The economies in Southeast Europe are small and under developed. They are faced with many economic and social problems, including the rise in poverty, low wages, high inflation pressure, persistent trade deficits, large and untransformed industries [8]. However, these countries have potential to achieve economic growth. Their greatest economic potential is highly skilled cheap labour force, geostrategic position in Europe and in Euroasia generally, good natural raw materials and great skilfulness. But they lack a good system of organization to connect all these factors together and to generate growth [8].

Nowadays these countries are in the process of economic and political transition. They build a market economy and strive to create a new structure of the economy that is more in accordance with world and European market demands [9]. Although countries in the region of SEE share many common characteristics, they are heterogeneous. The SEE countries are at different stages of transition to a market economy, at different phases of EU integration, and consequently at different levels of

development (Figure 1). Nevertheless, SEE countries have some common features and face some similar challenges. One of the most important is the fact that innovation and technological readiness are among the worst dimensions of their competitiveness (Figure 2) [2].



**Figure 2** Innovation performances vs. global competitiveness of SEE countries [2]

All presented studies suggest the same – SEE countries are not good at innovation. Although, it is common place in all reports, Global Innovation Index report assesses all SEE countries and offers the best position to comment on countries performances. Table 2 and Table 3 show selected results from this report, including SEE countries. The SEE countries, as a group are well below EU27 average [4]. The gap between two groups is substantial. It is almost 1 point on 5 points scale, while the difference between the SEE and worst performing country (Syria) is 0.87 [4]. However, there is diversity in regional innovation performances. Croatia, Greece and Bulgaria in all studies perform better than other countries in the region. On the other hand, Serbia and Bosnia have the lowest levels of performance. Looking at SEE countries, it seems that there is strong correlation between innovation performance and the level of EU integration.

Similar results are reported by Innovation Union Scoreboard, where Macedonia, Bulgaria, Turkey and Serbia are grouped as modest innovators (the last one), while Croatia and Greece are one step ahead as a moderate innovators. However, good news is that all SEE countries have grown at a faster pace than the EU27, showing the overall fastest rate of improvement in innovation performance [5].

The results of Global Innovation Index [4] show that countries have different strengths and weaknesses. All countries from selected region have problem with the efficiency of legal system, but especially in area of intellectual property protection. Foreign direct investments are an extremely important channel for integration of innovations, new processes and technologies in SEE. Furthermore, companies' spending on R&D is very low, financial market is not developed and venture capital is not available. Finally, intensity of local competition is very low and university-industry collaboration in R&D is not developed. Political stability is marked as a problem in Turkey, Serbia and Bosnia. On the other hand, Albania and Bosnia perform very low in human resources aspects, innovative culture and capacity for innovation. It seems that main strengths of the region (except Albania and Bosnia) are good human resources with relatively large numbers of researchers, scientists and engineers, a well organised education framework and scientific output.

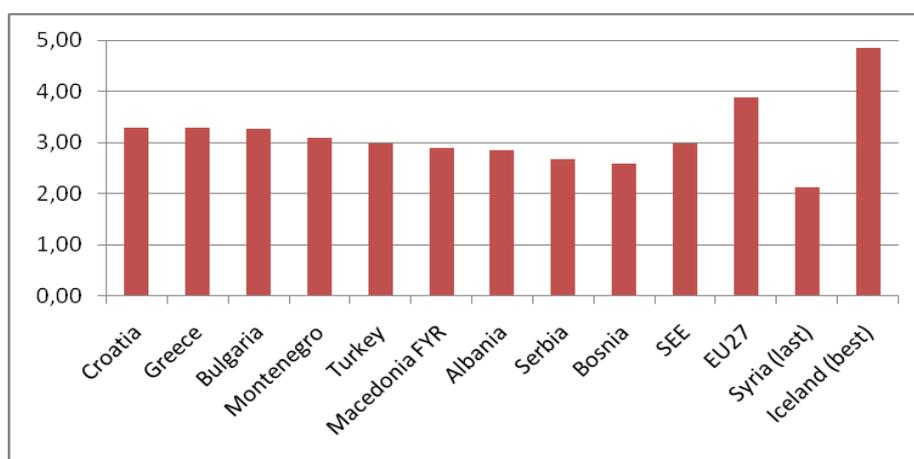
**Table 2** Selected innovators [4]

Country	Global innovation index	Ranking
Iceland	4,86	1
Sweden	4,85	2
Hong Kong, China	4,83	3
Switzerland	4,82	4
United States	4,57	11
Japan	4,50	13
UK	4,42	14
Germany	4,32	16
Taiwan, China	3,97	25
Slovenia	3,80	26
China	3,32	43
India	3,10	56

**Table 3** SEE countries [4]

Country	Global innovation index	Ranking
Croatia	3,28	45
Greece	3,28	46
Bulgaria	3,26	49
Montenegro	3,08	59
Turkey	2,99	67
Macedonia FYR	2,89	77
Albania	2,86	81
Serbia	2,68	101
Bosnia	2,58	116
SEE countries	2,99	~70
EU27	3,89	~26

Two points should be additionally emphasised. First, the role of the business enterprise sector in funding and performing R&D is very limited in SEE [4, 10]. There is no country in SEE in which business sector plays a dominant role in terms of both funding and performance of research. Only in Croatia and Turkey companies are important in terms of funding, while in all other countries funding and performance of R&D is dominated by the government sector. This means that R&D in SEE is performed for industry, while R&D in OECD member countries is performed in industry.

**Figure 3** Innovative performances of SEE countries [4]

Second, SEE economies are not able to employ their innovation capacities effectively [10]. They have a noticeable innovation demand gap. This may be due to several factors, including low level businesses processes, which do not exploit new technologies, and inappropriate structure or quality of R&D capacities, industry structure, which is dominated by small firms in traditional industries. Whatever the reason is, it can result in high brain drain, with significant consequences for innovativeness of the region.

## 4. Conclusions

This paper is our effort to contribute and to improve overall understanding about innovation performances of SEE countries. In particular, we were interested in question: "How innovative South East Europe is?". To better understand problem we have first reviewed reports on global innovativeness, innovation trends and described innovation leaders. After that we analyzed innovation

performances of SEE countries and compared them with EU. We examined innovation-related strengths and weaknesses of each country and of the whole region.

In this section, as a conclusion, we are suggesting direction and possible measures in order to enable these countries to fully capture the benefits of innovation and leapfrog to higher stages of economic and social development.

The SEE countries have achieved a large amount of progress in recent years, but clearly there is a lot more that could be done. Lisbon Strategy [11] sets out a vision of Europe as 'the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion'. The SEE countries have a chance to contribute to this goal and become valued members of the community only if improve their competitiveness and innovativeness. In opposite they will continue to be the backward periphery [10].

We want to highlight three building blocks needed for improvement of innovative performances in the SEE countries: 1. long-term commitment to innovation; 2. entrepreneurial university; and 3. international and regional partnerships

Long – term commitment to innovation is crucial for economic development of each country. The frequent changes in direction and policy orientation, institutional set-up, and in the responsibilities of different public agents are very risky and hinder innovative potentials of country [12]. Therefore, it is essential for the SEE countries to promote commitment to innovation as a 'non-political issue' and to isolate it from the daily politics [3]. National innovation policies need to be designed to raise public awareness about the knowledge-based economy and the key role of innovation and technological progress for economic growth. It imperative is to be coherent with other relevant policies and accompanied by a high level of coordination in terms of policies and different ministries and public agencies [12].

The long – term commitment and coherence in innovation policy at the national level should positively result in numerous ways, closing the existing gap with more developed countries [12]. First, it will be easier to create private-public partnerships that bring together the better performing segments of the public and industrial sector and which result in new ventures, high productivity and more jobs. Second, it will end in supportive infrastructure (new laws, technology transfer offices at universities, business plan competitions, innovation funds and science enterprise centres) facilitating the collaboration, networking and entrepreneurship. Finally, it should make available more capital for start-ups and growing businesses through venture capital and credit guarantee schemes.

Being a primary source of new knowledge production and innovation in SEE countries [13], universities and research institutes are crucial element for technological change in vital segments of economy. However, this is only possible if universities develop in the direction of entrepreneurial institutions which are able to become innovation hubs and cornerstones of knowledge regions. One of good examples can be the region of knowledge that emerges in Serbia around University of Novi Sad [13]. SEE Universities should take more prominent role, develop entrepreneurial spirit, promote innovations, creativity and open the door to the sector of small and medium sized enterprises. In this way, universities will become not only a source of new ideas for existing firms, but also, a source of new firm formation, especially in advanced areas of science and technology [14]. Developing entrepreneurial climate and effective cooperation with business sector the universities will be able to contribute to key innovation-based strengths, such as ability to apply new technology, to develop new products, to access new markets successfully, to incorporate best practice in the management, and to develop skill across the full spectrum of the labour force [15]. Enterprises have become increasingly dependent on external sources of knowledge and technology, and the need of constant technology renewal and innovation motivates them to become an intrinsic part of the innovative networks which include universities.

Additionally, to enhance the business skills of potential new technology based firms founders, SEE universities should provide courses, accessible to both staff and students, in entrepreneurship and new business development. That effort should be especially made to combine the empirical skills of scientists and engineers with the managerial skills of others who have experience in the private sector. Only in this way SEE can create an ecosystem that can offer local opportunities and drive down brain drain, which is among the highest in the world, particularly in Bulgaria, Montenegro, Albania, Bosnia, Macedonia and Serbia. However, the equally important role of these universities is to provide high quality human resources according to emerging knowledge and skills needs related to industrial development at global and local level.

Finally, coordination, regional and international cooperation is crucial for innovative performances of the region. One of a specific SEE response to enhance local research and innovation capabilities in globalised world is partnerships among universities and R&D institutes through consortia. Europeanization of innovation policies is inevitable. This process brings a large number of benefits to

SEE. The most important is increased R&D funding through Framework Programs and similar actions. However, governance reform, best practice transfer and infrastructure building are also important. Weak and fragmented R&D points have a chance with EU assistance to improve innovativeness of the region.

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# Pattern for Intellectual Property Rights Management of students in Higher Education Institutions

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**Purpose:** In the knowledge-based global economy, it becomes increasingly difficult to manage knowledge, and the importance of higher education becomes more prominent. IPR-related issues have become gradually relevant and important for Europe Union (EU) members as they should provide to the society an optimum environment for future innovations. Products and services provided by Intellectual Property (IP)-based industries are the main driver in facilitating innovation and social and economic growth. Higher Education Institutions (HEI) play a key role in this process. **Design/ methodology/ approach:** The research methodology included mainly ethnographic research and narrative inquiry, together with a thorough review of the related literature on Intellectual Property Rights (IPR) policy in EU member states. **Findings:** Making university students' IPR a priority in HE, potentially leads to several benefits including increased trust, better rank, and greater business and social value, and a prospect for revealing innovation potential of students. Widely implemented in industry is IPR issues to be covered through contracts, in conformity with the law. Following good practices for IPR management in HEIs through law and contract, despite assorted implementation of EU Copyright Directive (EUCD) in EU members regarding HEI, would be much beneficial for the society to apply similar basic concepts. The description of a pattern of good practices in IPR management offers a strategic tool for HE institutions. **Research limitations:** Limitations in the implementation and adaptation of the pattern are related to social environment and national legislation. Specifically, limited duration in the case of copyright and patents; language-specific, and technology-specific limitations, regarding dissemination; limitation in IPR management in so called "sandwich" education program, compared to that education program at one HEI. **Practical Implications:** The patterns approach described in this paper can help HEI managers take more informed and structured decisions, and enhance the process of IPR policy development. **Originality/ value:** Developing and implementing a strategy for IPR management in HEIs, is expensive and much time consuming project. The paper offers a pattern with reusable solution for dealing with students' IPR in any HEI. The pattern / solution could be used and reused in different countries. **Paper type:** Applied Pattern

## Keywords

Pattern, Innovation, Knowledge Management, Intellectual Property Rights in Higher Education, Governmental and regional policies on entrepreneurship, IPR Strategy

# 1. Introduction

Until recently some countries ignored IPR management as an issue. However, in an era of globalization it has become unsustainable to be isolated from the global IPR system. Higher education and research institutions in EU members demonstrate a key case in this respect.

UK High Court Patents Judge Sir Hugh Laddie in the report of the Commission on Intellectual Property Rights states:

“Whether IPRs are a good or bad thing, the developed world has come to an accommodation with them over a long period. ... For too long IPRs have been regarded as food for the rich countries and poison for poor countries. ... The Commission suggests that the appropriate diet for each developing country needs to be decided on the basis of what is best for its development, and that the international community and governments in all countries should take decisions with that in mind”[3].

The foundation of the current information era was built during last century. The existing knowledge society highlighted emerging challenges in education, research and knowledge transfer. The priority of i2010 and Lisbon Strategy goals focused on the EU’s research and development instruments and sets priorities for cooperation with the private sector to promote innovation and technological leadership. A lot of challenges for policy makers, regulators and organizations in the EU were raised, and set new trends in the on-going activities in education and research. [4]

Today technology evolution and innovations enrich the knowledge society. Digital media and the internet have become a part of everyday life in education. Digital Rights Management (DRM) is an important tool for IPR strategy. DRM focuses not only on the management of ‘traditional’ IPRs such as copyright, but also on the management of technology and its use, on legal and social rights, and on policy and culture, where rights are determined through law and contracts (Figure 1).

To date EU countries’ national legislations are in line with EU Commission policy, and have implemented the EU Copyright Directive [5]. According to many EU members’ national legislations, the first owner of the IPR is the author, if it is not stated otherwise in the employee contract. In addition, the employer (depending of the specific national legislation) has normally the rights to deal with the product without asking for permission and without specific payment to the author (current or former employee). In countries where the copyright of employees’ work belongs to the employer the HE institutions normally reassign the ownership of copyright of the employees’ work to the author (with the purpose of publications), with an exemption for example of copyright in course materials, copyright in software programs, etc.[6].

In many EU countries HEIs have developed and implemented their own internal policies, dealing with these sensitive issues as for example HEIs in UK. However, development and implementation of such internal policies is a long term project, and expensive as well.

Therefore in this paper authors try to generalise their expertise together with observed and analysed good practices among the European HEI, and to suggest a strategic solution in a form of a pattern. The proposed solution serves better as a general frame, and decision makers should pursue their own legal and professional advice in related law issues relevant to their own socio-economic-political environment.

The pattern presented here is mainly intended for those developing and implementing IPR strategies and policies. This group includes, but is not limited to: current and future managers in HE and research institutions, academic staff, as well as entrepreneurs. It is also directed to scientists, researchers, and HE students.

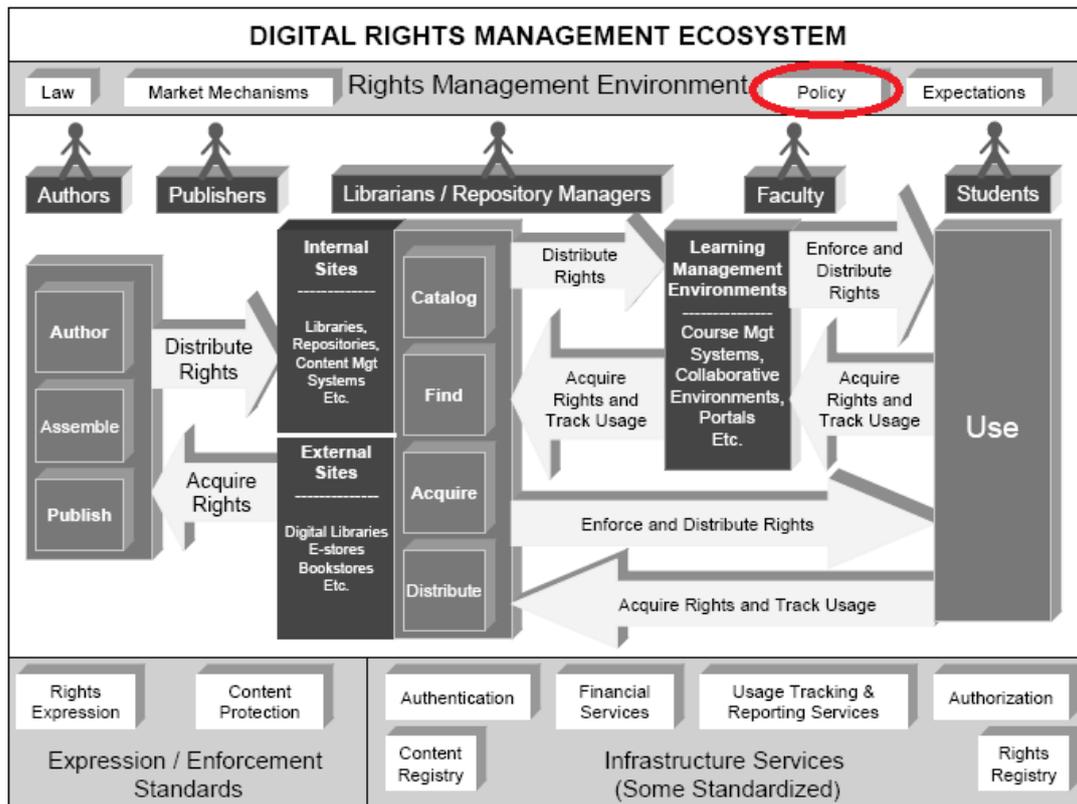


Figure 1: Adopted DRM Ecosystem Model for Education Community [7]

## 2. The Patterns

As a most likely “father” of the patterns is considered Christopher Alexander, Emeritus Professor of Architecture at the University of California, Berkeley. In his book “A Pattern Language”[8], he describes patterns as follows

“Each pattern describes a problem which occurs over and over again in our environment and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over without ever doing it the same way twice.” [8]

Shortly, a pattern could be described as a solution to one problem in a certain context. However, patterns are not magic solutions. Rather, they just describe simple, basic norms, and suggest solutions. [9]

Since the early 1990’s patterns have been widely used to document software development practise IBM’s pattern database is very popular [10]. Later some pattern writers crossed beyond the technical aspects, and used patterns to discuss organisation structure topics [11].

A lot of pattern books and articles have been published. The majority of them concern IT issues. Business, education, and social area deal in most of the cases with intangibles, and therefore is difficult to write a pattern for it. An example of such valuable patterns are in “Strategies for Leading through Times of Change” by Manns and Rising which contains patterns for introducing change into organisations, and “Customer Interaction Patterns” [12]. The paper adopts an Alexandrian style of pattern writing with the main parts Context, Problem, Forces, word “Therefore ...” as connecting element to Solution, Consequences, Variations, and Example.

## 3. Students’ IPR

Dealing with intellectual property rights in Higher education institutions is extremely difficult in today’s knowledge society. Describing a pattern for this complex area is even more difficult and challenging.

The next figure (figure 1) presents map for IPR patterns in HE.

The HEI should recognise that students in the process of fulfilling their students’ plans could contribute to the generation of intellectual property, and even generate such, and as a result they have their own IPR. Although by law HEI don’t claim ownership of intellectual property generated by students at the

time of studentship, the institution could develop a policy to arrange IPR matter for example in the case where there is a financial support to student by the institution or where the student decides on his/her sole discretion to assign ownership to the institution. [6]

A HEI should preferably assign a Committee responsible for IPR. These IPRs normally accumulate to the institution (university, college, etc.) from research, discoveries and inventions, made by staff and students. A good practice is IPR policies in HEI to provide possibilities for the mutual benefit and commercialization to the author of the intellectual property and the HEI. [6]

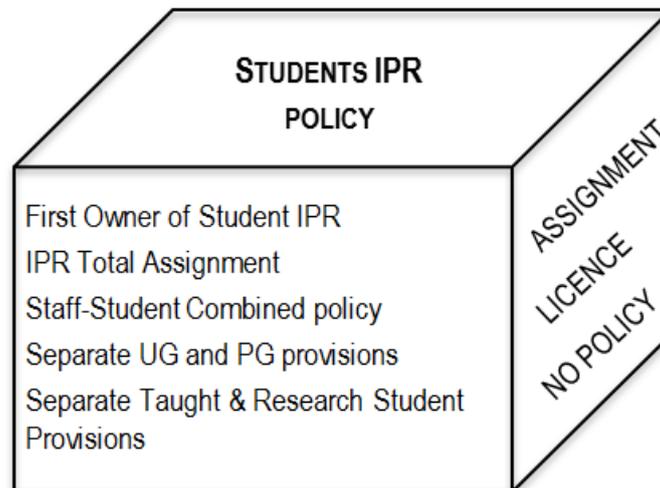


Figure 1 Map for IPR patterns in HEI[1]

### 3.1 Context

In the field of science, in higher education institution as well as in research institutions, there is still room for designing and implementing appropriate for the society policies. On the one hand, students, scientists and researchers should be free to do their work, to innovate, and to bind and transfer knowledge blending the national borders. On the other hand, they should also feel protected, and in this sense free, to produce knowledge and innovations, despite difficulties in cross-border transfer of knowledge caused by national legislation. Despite the varieties in the national legislations, EU countries and EEA countries are in line with EU commissions' policies.

Dealing with freedom and protection in the area of knowledge and IPR, the society should care especially after its young generation. There is still lack of policy dealing with IPR in higher education institutions, especially for students. In this sense and for the purpose of the paper, the term students means full time students, part time, undergraduate, postgraduate, PhD students, students which are also staff of the HEI, etc. In some countries undergraduate students are still not adult in the sense of the code of law, especially on the time of enrollment. In addition to the law perspective, the social perspective reveals variety priorities for undergraduate students. Therefore the society and the HEIs should be involved in the process of care after not only their own IPRs but also for students IPRs.

### 3.2 Problem

**How can higher education institutions claim ownership of intellectual property generated by students at the time of their studentship, while being social responsible institutions and caring after intellectual property rights of the students itself?**

### 3.3 Forces

In the process of knowledge transfer from HEI to students, a lot of uncertainties appear. Some students receive financial support from Institution in which they are enrolled in view of scholarship. Should it be the same IP policies for students receiving financial support, and for students not

receiving such financial support? In business, for example, it is not normal changing the IP policy according to raising the remuneration after regular attestation of employee's work.

Working on external or internal for HEI project, students, researchers and staff contribute to the generation of IP. They all they normally receive financial support for their work on external projects. In some cases the institution should transfer IP to the external organisation, and there is a need of clarifying the copyright issues, generated by involved staff and students. In this case is there a need of different policy for staff and students? Additionally there is a need of clarifying the necessity of specific policy for external project and internal one.

A well-known fact is that students, whether undergraduate or postgraduate, are not employees and HEI is not an employer for them. HEI as a social responsible body for future society should care after the IPR of their students and should also pay extra attention to and offer support and protection to its students and young researchers.

Normally students are not able to grant rights in third party material used in their work, hence the institution is responsible for the development of procedures for respecting the third party rights in reuse of the students work.

***Therefore ...***

### **3.4 Solution**

**The HEI should develop and implement a contract between the institution and the student and IPR policies should be included in the contract.**

HEI should assign a committee responsible for the development and implementation of IPR policy.

HEI without IPR policy should develop and implement an IPR policy.

Institutions with an existing IPR policy should review regularly the clauses to guarantee rational balance and compliance with national legislation.

Institutions should make available their IPR policy freely for the society and in this way give an opportunity to prospective students to acquaint themselves to IPR issues prior to committing to study at that institution.

HEI should develop and implement contract between institution and student. The contract should be signed prior to the students' enrolment.

A statement regarding the ownership of IPR should be included in one of the documents in a package (e.g. research proposal form, or equivalent)

### **3.5 Consequences**

Learning to deal with IPR, students will be inspired to work in a creative way and to generate original ideas and often to make innovations. They will learn how to be aware of their own IP, and how to deal with respect to others' IPR. They will fill themselves protected by the institution regarding their IPR and applying it via the institution's project they could also have a fresh start and new opportunities of their ideas.

From the perspective of the institution, if IPR policies are applied, the institution could more easily and lawfully monetize IPR. When Institution controls the entire educational and research process, including IPR, it can give talented students and researchers special attention to address their needs and concerns. Institution can decide which IP is worth pursuing and spending time on, and to make business and promote innovations with it in external projects. Beneficiaries of this approach are both sides. In case of suitable and adequate IPR Management, the reputation of the institution could raise up, along with the reputation of its students, researchers and staff.

### **3.6 Variations**

Variations shall be expected when different paths in developing IPRs are pursued. In the process for developing IPR policy patterns such as ASSIGNMENT[2], LICENCE, OR NO POLICY (AN ASSIGNMENT OF RIGHTS BY THE STUDENT TO THE INSTITUTION, a LICENCE OF RIGHTS BY THE STUDENT TO THE INSTITUTION, OR NO ASSIGNMENT NOR LICENCE OF RIGHTS) could be selected. There are a lot of questions which the institution should answer and decide on. Just to name a few: Who is the First Owner of Student IPR?

Does HEI possess total assignment or license? Is there separate policy for staff, for researchers and for students? Are there separate provisions for undergraduate and for postgraduate students? Are there provisions for undergraduate in general? How are regulated reward provisions? Etc.

Depending of the approach and institution's strategic goals variations shall be expected when IPR policy are developed and implemented.[13]

### 3.7 Example

Digging in details, in next table could be seen different approaches in development of IPR in some of world class HEIs.

**Table 1:** Analysis of institutional intellectual property rights policies [14]

Institution	First Owner of Student IPR	Total Assignment	Staff-Student Combined policy	Separate UG and PG provisions	Separate Taught Student & Research Student Provisions	Discipline Specific	Reward Sharing Provision
University of Aberdeen	Student	Yes (1)	No	No	No	No	Yes
University of Bath	University	Not Applicable	Yes	No	No	No	No
University of Bristol	Student	Yes	No	Yes	Yes	No	Yes
University of Cambridge	Student	No	Yes	No	No	No	Yes
Coventry University	University	Not Applicable	No	Yes	No	No	Yes
University of Durham	University	Yes	No	No	No	No	Yes
University of Glamorgan	University	Not Applicable	No	No	No	No	Yes
Heriot-Watt University	Student	No	Yes	No	No	No	Yes
University of Leeds	University	Not Applicable	Yes	No	No	No	Yes
London South Bank University	Student & University (2)	Yes	Yes	Yes	No	No	Yes
Robert Gordon University	Student & University (3)	Yes	No	Yes	Yes	No	Yes
University of Oxford	University	Not Applicable	Yes	No	No	Yes (4)	Yes
Sheffield Hallam University	University	Yes	No	No	No	No	Yes
University of Stirling	Student	No (5)	Yes	No	Yes	No	Yes
University of Southampton	University (6)	No	Yes	No	No	Yes (7)	Yes
University of Ulster	University	Yes	Yes	No	No	No	Yes
University College, London	Student (8)	No	No	No	No	Yes	Yes
University of Wales, Bangor	University	Yes	No	No	No	No	Unclear
University of Wolverhampton	University	Yes	No	No	No	No	Unclear
University of York	Student (9)	No	Yes	No	No	No	Yes

## 4. Conclusions

Research shows that the majority of EU further education institutions lack evidence of relevant IP policies. As for HEI, some of EU countries have relevant policies, and some doesn't have evidence for that. Despite the geo-political situation for European countries, researchers, students, faculties and institutions are not only authors, but also publishers of learning materials and knowledge with all the rights and the responsibilities this brings, and they should be utilising existing copyright exceptions freedoms accessible to them.

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/\* COM/2009/0532 final \*/  
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# Clusters as a Driver of Regional Development

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The key weakness that all existing clusters in the Republic of Macedonia share is lack of capabilities in the area creating economies of scale in purchasing, gathering, applying and expanding knowledge and creating innovative solutions to business challenges.

Area that clusters have to improve are: trust, strong social capital, rapid tacit information flows and the development of collaborative knowledge based of an abundance of eyeballing (rather than emailing); co-specialization amongst local firms; the merits of a demanding local market; an ongoing exploration of new opportunities at the cluster's periphery; close alignment amongst public agencies around the cluster's priorities and aggressive leadership coming especially from the private sector.

In upgrading regional competitiveness through clustering approach scientists particularly identifies:

- Close and frequent personal contacts between the senior players in the cluster, covering business, academia, and local politicians;
- Excellence in research and education in the appropriate discipline;
- A tight focus on a specialization;
- A tight geography ... at the most 30 km radius;
- A technological infrastructure that attract customers, creative talent and new start-ups and
- A cultural / lifestyle infrastructure.

In this paper, we present the current state and the level of development of the clusters in the Republic of Macedonia.

## Keywords

Cluster strategy, Evaluation of clusters, Knowledge industry, Networking, Supply chain.

## 1. Introduction

Governments are showing great interests – and some are spending considerable amounts of money in developing research clusters that they hope will benefit their local and national economies. We have seen every day an increasing interest in evaluating the effectiveness of such policies. In spite of a rapid increase in the number of cluster policies and programs, and thousands of local cluster initiatives around the world, we see very little evidence of serious cluster evaluation in our data. Today, regional clusters of related industries are the source of jobs, income, and export growth, and evaluation must come to the forefront in the construction and reconstruction of clusters across the world.

Porter defines a cluster as a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementariness where, the 'value of the system ...as a whole is greater than the sum of its parts'. [1]



**Figure 1** Cluster structure

Natural comparative advantage is no longer sustainable and the source of competitive advantage often lies outside a given company or even outside its industry, residing instead in the locations of its business units. The nature of competition and competitiveness now emphasizes *'think global, act local'* as a way of doing business and succeeding in the international marketplace.

Over the past ten years, the concept of regional clustering has gained much popularity in business, government and academic world. Geographically concentrated cooperation is viewed as an organizational survival strategy in today's competitive business environment. Nowadays, firms have to cooperate in order to remain competitive.

Regional clusters often emerge in the market spontaneously without much government intervention. Local government can influence the supply of premises, the quality of local transport services, and can assist the creation of a business support infrastructure. In addition, they can influence the quality of education and the supply of skills.

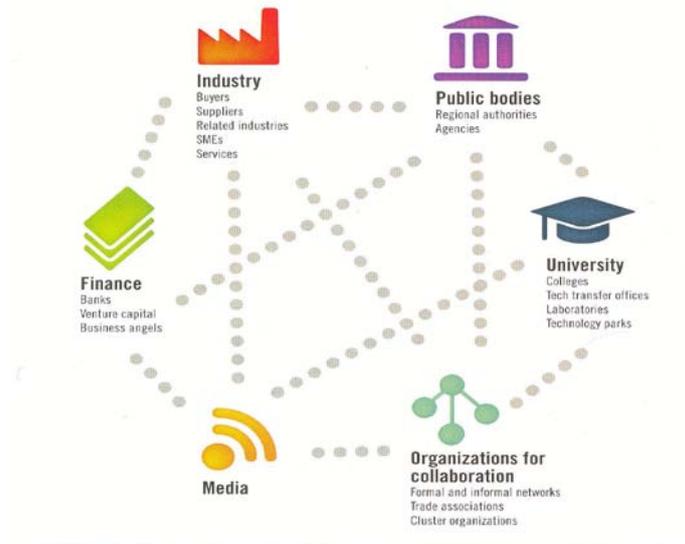
The two competing tendencies, of the globalization of economic activities and the localization of industries have created policy challenges for national and local governments around the world. As a result, in the last decade we have seen a proliferation of development policies based on clusters or firms and industries. Such policies have focused on various aspects of growth such as regional development, SME development, overall economic development, domestic capability building, national systems and growth of 'knowledge' industries.

## 2. Importance of Clustering

In 1990, Michael Porter introduced the so-called "diamond" as an analytical tool to assess business environments. The diamond includes the four elements factor conditions (e.g., physical infrastructure, skills, etc.), demand conditions (e.g., sophistication of local customers, product and consumer regulation), the context for strategy and rivalry (e.g. taxation structure, competition laws, and the strategies of competing local companies), and the presence of related and supporting industries (e.g., the breadth and depth of the cluster). These elements interact in their impact on specific companies and clusters; they exhibit system-effects where the weakest element often tends to have the strongest impact on the overall quality.

The diamond can be used to analyze the general quality of the business environment at the national or regional level. However, it can also be applied at the regional cluster level, looking at the specific conditions relevant for the cluster in the four categories defined.

Many types of firms and organizations constitute the set of actors on the cluster "stage". Here, we have identified six main types: firms, financial actors, public actors, universities, organizations for collaboration and media (see Figure 2). [2]



**Figure 2** Actors on the Cluster Stage

Government policy has an impact on all elements of the cluster-specific diamond. It often has responsibilities for large parts of the infrastructure, it sets key rules and regulations affecting competition and demand, and it affects the cluster presence through, for example, recruiting companies from other locations to make investments.

More recent research emphasized the need to look at government policies in a more differentiated way, separating the role of government at different geographic levels - from the cross national, to the national and local.

Other recent research has also stressed the importance of different types of “institutions for collaboration”, [3] that create specialized platforms for interaction among cluster participants. Because the performance of a cluster depends on the strength of interaction among its constituents, the presence of such institutions that allow knowledge to flow more easily and enable the cluster to organize collective actions has a significant impact on how the available assets in the cluster are being deployed. This research develops earlier work that had stressed the strength of networks and open collaboration within different regions as a key factor for economic success. [4]

## 2.1 Approaches for Evaluation of the Clusters

The first and most important step in developing clusters is to assess capacities, resources, and opportunities. Given the importance of planning, the tools are surprisingly weak. No one tried-and-true acid test for cluster capacity or potential exists. A number of methods have been used-ranging from ad hoc formalized consulting and opinion formation, to valuing or analyzing cluster capacity through descriptive or institutional analyses, to empirical, statistical analyses of detailed industrial data-but no truly the potential efficacy of a cluster likely requires a blend of quantitative and qualitative approach, understand or evaluate.

Given that clusters are to some extent self-defining, one approach often used is to convene an industrial, expert, or community forum to identify common interests and opportunities. While useful for identifying actors, or at least companies that would willingly participate, these processes are simply a start-up point. In the first instance, they likely determine whether the necessary number of interested/engaged actors can foster effort to develop a cluster. The processes can also be valuable for identifying scale and scope of current traded or untraded interdependencies, as well as for planning future development that may either require or generate greater connections in a community. However, they often run the risk of becoming either subject to groupthink (where everyone goes along with the most important or loudest participant) or to end as unfocused debates about what is, is not, could be, or should be happening locally. Every process needs to move beyond rhetoric. Depending on local capacities, two main approaches have been tried.

One common analytical approach is to look at the institutional composition and leadership of the industry, supply chain, technology, or market. Generally speaking, clusters always represent a high

concentration of people and activity within a particular region. Thus, qualitative analyses of clusters would measure that reflect those concentrations relative to benchmarks or other regions. A foundational theory that underlines any number of quantitative approaches is central place theory, a geographical theory that seeks to explain the size and spacing of human populations. The theory relies on the notion that the centralization is a natural principle of human order and that the nested hierarchies of people and institutions will follow this principle. [5]. In the context of that theory, many communities will seek to identify the community's array of industry (for example, leading companies and suppliers), supply chain (that linked suppliers ranging from input industries through production to transportation, wholesale, and retail trade), and functional actors (finance, marketing research, and labour services).

## **2.2 Methods of Evaluation**

To evaluate clusters and clusters programs is a complex proposition. As a part of preparing this paper, we conducted a simple survey of cluster evaluation. Data was gathered through a questionnaire sent by e-mail to the existing cluster organizations. The questionnaire covered ten questions regarding the evaluation of cluster programs and initiatives. Some of the questions were based on a five-step Likert scale (ranging from 1, "strongly disagree" to 5, "strongly agree"). [6] Out of 12 clusters, 8 participated in the study; four stated that they had not done any form of evaluation. The fact that only three organizations had conducted formal evaluation with an external evaluator is an indication that evaluation indeed is a rare task among cluster organizations.

External factors that were identified in this analysis and were shown to affect business growth include:

- Funding (Financial capital) – including levels of investment and time and cost to commercialization
- Skills and recruitment (Human capital) – number and type of graduate numbers, occupational level and salary average.
- Networks (Social capital) – growth of networks, study of industry organizations and inter-organization joint working.
- Global market position (Market capital) – success or failure information on foreign investment and exporting levels.

Further, more, some clusters are affected by several policy instruments in parallel, including regional policies, science and innovation policies and so on, and thus it is difficult to separate out of the effects from a particular cluster instrument. Evaluations tend to be carried out within to three to five years, and then few if any major effects on the cluster should be detectable, especially if the cluster is an emerging one.

## **3. Macedonian's Clusters Assessment**

Several cluster initiatives are already operating in Macedonia: textile cluster, information technology cluster, wine cluster, tourism cluster, agricultural mechanization, automotive components, wood processing, food-processing cluster, fashion design cluster etc. These clusters are at various stages of development and as such need specific support to further accelerate their development.

The key weakness that all Macedonian existing clusters share is a lack of potential for innovation, new products and services development to compete better in the global markets. Existing clusters have mainly been created with the purpose of "grouping of small enterprises" to better sell on the markets and have done much less in the area of sharing and creating economies of scale in purchasing, applicable research and development and innovation. Big companies are generally not active members of Macedonian clusters. Analysis of successful clusters around the world shows that successful clusters gather, apply and expand knowledge and create innovative solutions to business challenges. These qualities of clustering still need to evolve in Macedonia. [7]

In assessing Macedonian's current position, we could conclude that government is focused on three of the dimensions of the diamond so far. Namely:

- Open-up the economy to global competition (through tariff reductions and introducing national competition policy)
- Microeconomic reform and restructuring of major inputs (electricity, transport, telecommunications, finance, and the regulatory framework)

- Supporting public sector research infrastructure and providing a strong education system (as a result both the government, and the Macedonian consumers).

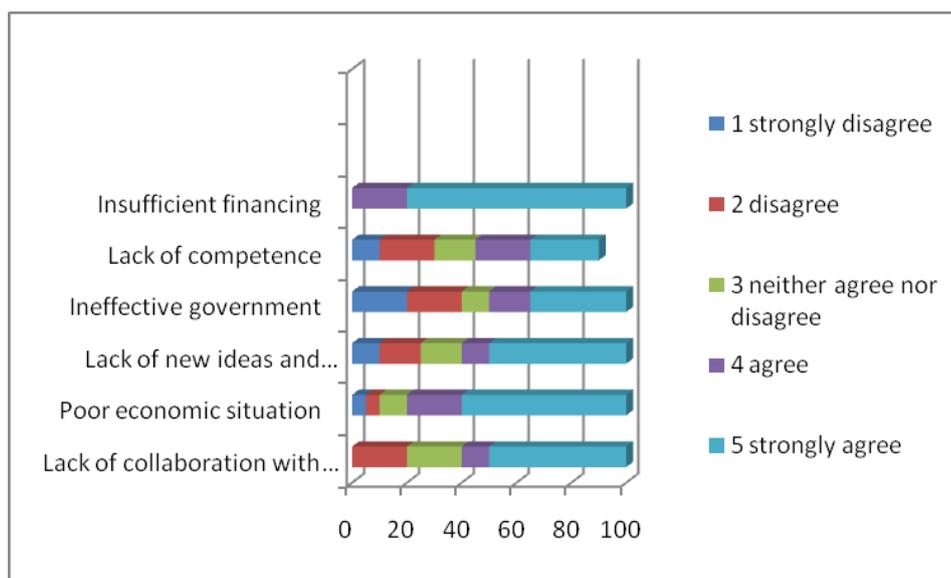
From case study comparison, three properties are common to all successful clusters. These properties are:

- Formal and informal networking, allowing for effective transfer of technology and other organizational capabilities;
- Close user-producer collaboration allowing for production flexibility and joint development;
- Mobility and flexibility in the local labour market, allowing low redundancy costs and easy adaptation to changes in products and processes.

The benefits for Macedonian clusters from clustering process include:

- The availability of specific natural resources – many clusters have traditionally formed around natural resources (textile cluster, cluster for agro-equipment, wine cluster).
- Supplies of special labour– specialized labour pools develop around clusters, flexibility and efficiencies for firms seeking specialists’ skills in the market and facilitates the technology transfer.
- The economies of scale in production – some industries can support a number of efficient-scale plants in a given region (Tikvesh region)
- Superior access to information – informal, unplanned, face-to-face, oral communication is a critical to the innovation process. Clusters facilitate this type of communication. The geographic concentration of firms, suppliers, and buyers in the cluster provides short feedback loops for ideas and innovations. Clusters provide the opportunity to access the specialized information embedded in personal, community and business relationships, about markets, technology ad competitive strategies.
- Institutional support – clusters often have mutually supportive relationship with local universities, standards agencies, research laboratories, training providers, trade associations, and financial institutions.
- Obtaining critical mass, the clustering of firms reduces the unit costs of technical services provided to members of the cluster. By operating in close proximity, firms also more easily subcontract to competitors those orders that exceed their own capacities (especially the textile cluster).

Looking forward, we also asked respondents in an open-ended question what they viewed as the biggest threats to clusters organizations (see Figure 3). The largest threats indicated were: insufficient financing, poor economic situation and lack of new ideas and commercialization.



**Figure 3** Biggest threats to clusters

### **3.1 Cluster development programme**

In place of a uniform measure for encouraging the development of clusters, Ministry of Economy designed a wider package of measures for encouraging cooperation's and networking. The implementation of Cluster program has been conceived in three phases. The first phase entailed the identification of potential clusters, the second the definition of cluster policy, and the third the implementation of the cluster policy in practice. The original concept was, on the basis of the clusters identified, to promote the development of those clusters that were of strategic importance to Macedonia in terms of the number of companies, the proportion of employment, the existing advantages, development potential, and market share in Macedonia and on foreign markets.

Cluster development policy in Macedonia pursues three objectives. The first is to encourage cooperation and networking between companies in order to strengthen individual and joint abilities to develop partnerships in different areas of business and to intensify cooperation between companies and research and development institutions in order to strengthen the common capabilities required for promoting innovation and technological development. Here The Ministry of Economy co-financed joint projects carried out by at least three companies and at least one R&D institution in the areas of technological improvements, product development, specialization, supplier chains, joint production and marketing. The second objective is to promote the development of clusters through increased investments in support infrastructure. This primarily entails investment in strengthening the know-how, skills and expertise required by actors of cluster development (people and institutions) for promoting the development and functioning of clusters. A training program was designed to improve of cluster development, and to develop a network of cluster promoters, coordinators and potential cluster managers. The third objective is to initiate the formation of clusters in practice.

## **4. Conclusion**

In summary, our findings clearly indicate the importance of evaluating cluster initiative. Cluster thinking and cluster strategies have the potential to accelerate regional economic growth and assist with the nation's needed economic restructuring, but they are more a paradigm than a single program. In that sense, the opportunities that a cluster policy framework provides for delivering impact, clarifying economic priorities, and coordinating disparate programmatic efforts will only grow more important in the coming era of intensified competitive pressures and tightened resources.

Evaluation of clusters should be made in real time, on a regular basis and by an external party.

In any event, globalization, increased competitor-state policy activism, and the current economic crisis are all helping to make clusters an important framework for working out a pro-market, pro-productivity stance that avoids old-style "industrial policy," but it gives government an active role in fostering competitiveness. After all, through the natural and fostered emergence of diverse, locally-embedded clusters of excellence the nation can compete aggressively without slipping into directly "picking winners." Likewise, through the bottom-up development of strong, place-based clusters that nation stands a better chance to build unique new industries that will be harder to off-shore.

*Regional leaders should identify cluster challenges and coordinate cluster actors.* Regional intermediaries should work to identify and describe local clusters, identify their binding constraints, and facilitate regional joint action to implement needed exchanges and initiatives.

*Local policymakers should bring to tools to influence on-the-ground implementation of cluster-oriented economic development.* They should manage zoning and permitting issues to benefit the physical infrastructure in which clusters exist, and they should keep an eye out for the broader demographic and social context in which new industry clusters might form and to which existing ones must adjust.

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# Virtual Classroom for Graphic Technology

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**The combination of three-dimensional (3D) modeling and Web technologies supports the development of adaptive learning environments. These environments enable learners to interact and behave in a natural manner. In this paper modeling and implementation of Virtual Classroom for Graphic Technology (VirCGT) is presented. VirCGT enables learning through exploration and collaboration in order to understand the basic concept of graphics technology. VirCGT with smart tutorial has been developed using Web3D technologies. We evaluated our system quantitatively, and qualitatively, using formal performance assessment, a pilot project, and syllabus.**

## 1. Introduction

Virtual Reality (VR) is a computer simulated environment regardless of the fact that environment is a simulation of the real world or an imaginary one. VR allows user to interact with virtual environment (VE). VE could be visual experience shown on the screen, with which it could be possible to interact using standard input devices, such as keyboard and mouse systems or by using various multi-modal devices, with tactile feedback.

The combination of synchronous learning tools, Web technology, social networks and video games, haptics and tracking devices creates rich 3D learning environments. These environments enable learners to interact and learn the way not possible outside of virtual worlds. Achieving high level of immersion could provide better distant communication, interaction, and collaboration. Conventional input devices such as the mouse and keyboard lack in intuitiveness when it comes to 3D manipulation tasks.

In practice, there are not yet fully integrated systems to support 3D model of e-learning. The result of this work is a VirCGT classroom that enables interaction between the on-site and distant students and teachers using educational resources through integrated virtual and real classrooms.

The key features of VirCGT are: communication using chat; collaboration characteristics with manipulation of shared 3D objects, using the same space by concurrent users, and predefined and saved models.

Section one introduces the concept of virtual environments, being motivated by pedagogical approach, and educational contexts in which environments can be used; section two gives an overview of published works; section three illustrates virtual classroom for graphic technology; section four describes offset technology process; section presents evaluation of educational applications of graphics technology; section six ends with contribution, conclusion and future work.

## 2. Related Work

Multi-user 3D environments have seen tremendous growth. Not only they affect large number of participants [1], or hosts big number of VE [2] but the emphasis on interpersonal communication, participation in the joint construction, and development of 3D content is also important.

There are lot of examples from papers and locations [3] [4] [5] [6] [7] [8] of environments which provide facilities to enable modeling, displaying and collaboration. They are created in order to display external media such as video, audio, graphics, and web pages. It could be a classroom for educational purposes or room for design and development. Virtual printing is a simulation of real printing using "woodblocks", "a paper sheet", "a BAREN (Japanese squeegee)", and "inks" in a virtual 3D space [9] [10].

The integration of multimedia content with virtual environment is common in the development of VR applications. There are many technologies that enable presentation of 3D data on the Internet. X3D (royalty-free open standards file format and run-time architecture to represent and communicate 3D scenes and objects using XML) enables the visualization of applications in VR and augmented reality through integration of interactive real time 3D technology [11].

### 3. VirCGT description

There are many X3D content-creation tools [11]. In this paper, X3D-Edit is used for the environment creation. X3D-Edit is a graphics file editor enabling simple error-free editing, authoring and validation of X3D scene-graph files. Base model, named "VD-30", is virtual representation of real classroom "D-30" as one of many classrooms intended for practical exercises in computer science (fig. 1).



**Figure 1** Virtual classroom VD-30

The existence of such classrooms enables real time teaching to be run (fig 2). Interaction between teacher and student is achieved by using various educational resources through the integration of virtual and real classrooms. Dynamically adaptive system is used to student's and teacher's requests. Time and spatial concurrent work is enabled. Elements are loaded from the library, different browsers are used, interaction is enabled through access to the same elements (at the same time), and external applications and services are integrated.



**Figure 2** Complete integration of real and virtual environment

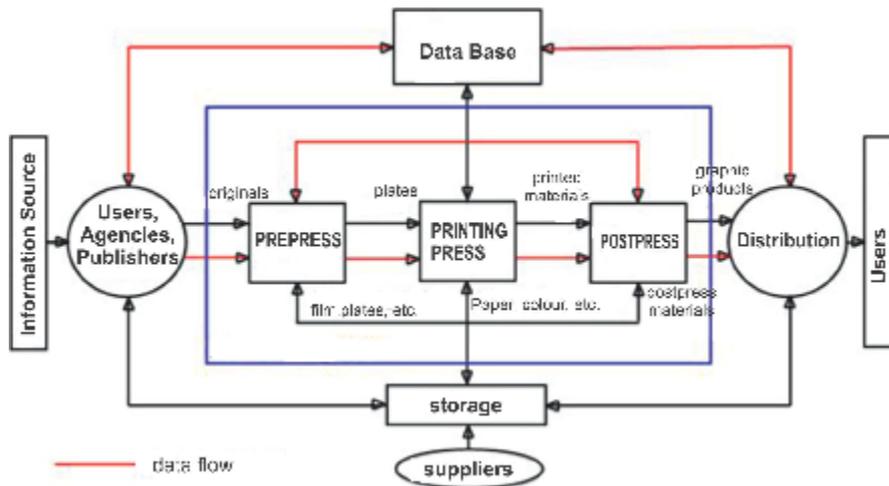
The interface of this system includes X3D model display area and communication area (fig. 3). The users could operate directly the X3D model, performing usual actions such as navigation, exploration, moving objects, and communicating with teacher or student. A teacher or student can add and move objects in the floor plan, making their own schedule. A chat panel is responsible for the chat communication, either text or video, between online users.



**Figure 3** Description of graphic user interface

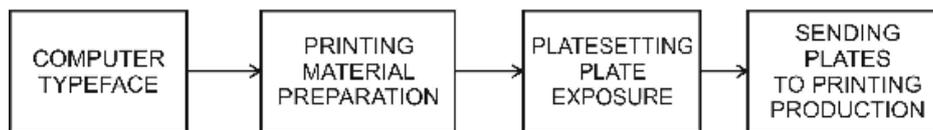
#### 4. Description of the offset technology process

The workflow process of printing technology that we use in this virtual model is shown in figure 4. The process starts by entry of the material that is used in printing process and customer's demand to create a certain product. The first phase of this process is the design of the graphic product and computer realization of typeface so that the product can be developed further on. During this phase a need arises for description of computer resources, both hardware and software that is being used through this phase of realization in this technology.



**Figure 4** The workflow of printing technology process

After this phase, technological technical prepress follows. It consists of preparation of the material that will be used during the printing phase (cutting paper to the dimension of printing sheet, selection of plates etc.) In this phase, binding of sheets is also being done, proof printing and film or offset plate exposure are realized (fig. 5).



**Figure 5** Technological technical prepress

After choosing the material and plate exposure we are ready for the next phase which is printing of sheets. During this phase we describe printing machines and their functioning as well as the way of proof creation. It is also necessary to describe the quality control of proof which is essential for quality printing.

In offset printing we differentiate two basic choices of machines, the sheet-fed press (that prints on individual sheets of paper) and rotation printing machine roll to roll and roll to sheet. The choice depends on print run and purpose of product, and of the quality we wish to achieve. Having finished sheet printing, we move on to post press phase or the final realization of product. Apart from printed sheets, some specific materials such as various kinds of adhesives, foils, cardboard, wire, thread etc. belong to this phase. During this phase, all kinds of binding sheets into final product are being conducted, sheet folding, sheet binding, sheet lamination, cutting and perforation of sheets as well as folding boxes and gluing sheets into a final product, and other operations currently not mentioned. Part of this phase is cutting certain products into their final size (books, magazines, catalogues etc.) and their packaging. The last phase of printing process is storing final products and distributing them to end-users.

## 5. Evaluation

System efficiency is measured by comparing the final results of students in the third year at the Faculty of Informatics and Computing who accessed that classroom through the virtual and physical interface. As most objective abilities to analyze the efficiency of virtual classroom in practical use were identified by comparing results of students who used real and virtual classroom. Results of final exam are compared. Exam was conducted in controlled environment and 40 students (20 students that used physical and 20 that used virtual environment).

Results of this statistical analysis were expected and are very important for our further work. Absence of statistically important difference in results of control and treated groups, when using confidence interval of 95 percents, proves usability of this concept.

## 6. Conclusion and Future Work

This paper presents the results of a one-year experiment in incorporating 3D modeling educational environment in Computer Graphics courses which are part of the Programming and Design engineering degree. The results of our initial experiments are promising enough to encourage further integration of VirCGT model with sensors and 3D searching.

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# Global Entrepreneurship Index for Western Balkan countries and Slovenia participants in the GEM 2009 project

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Focus of this paper are entrepreneurial performances of Bosnia and Herzegovina, Serbia, Croatia and Slovenia, that will be analyzed through construction of Global Entrepreneurship Index (GEINDEX), which is created with aim of unique measurement of entrepreneurship between countries and during the time. Global Entrepreneurship Index captures essence of contextual characteristics of entrepreneurship and fills the gap in measurement of entrepreneurship and development within certain country. This index captures contextual characteristics of entrepreneurship by focusing on entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations. It has been developed by researchers gathered within the project Global Entrepreneurship Monitor (GEM) and the basis for its creation are GEM variables created from research results of the countries that participate in the project. Western Balkan countries, Bosnia and Herzegovina, Serbia and Croatia, as well as Slovenia participate in the project Global Entrepreneurship Monitor (GEM), so it is possible to calculate and analyze Global Entrepreneurship Index for these countries. First part of the paper contains basic information on the project Global Entrepreneurship Monitor (GEM), since GEM variables are basis for creation of the Global Entrepreneurship Index. Then, methodology of building the Global Entrepreneurship Index will be shortly presented. Final part of the paper contains calculated Global Entrepreneurship Index for Bosnia and Herzegovina, Serbia, Croatia, and mutual comparison of calculated GEINDEX of these countries. The aim of this paper is to analyze and compare entrepreneurial performances of Bosnia and Herzegovina, Serbia, Croatia and Slovenia, countries that participated in the project Global Entrepreneurship Monitor 2009, through construction of Global Entrepreneurship Index, and to promote a new way of unique measurement of entrepreneurship.

## Keywords

Economic development, Entrepreneurial performances, Entrepreneurship, Global Entrepreneurship Index, Global Entrepreneurship Monitor.

## 1. Introduction

It is widely acknowledged that entrepreneurship has the key importance for understanding the economic development. Dynamics of the entrepreneurship process can vary depending on the institutional context and the development level of certain country. This is the reason for accepting the notion that in order to understand entrepreneurship within one or within several countries, it is needed to review wide spectrum and relation between entrepreneurship, economic development and institutions. Connection between entrepreneurship, institutions and economic development helps in understanding why relative contribution of entrepreneurship varies between certain countries and regions. In accordance with this, in previous period great level of importance is given to role that

institutions have in economic development of certain country. In order to get better insight and understanding of the role of entrepreneurship, scientist are searching for the measure with which comparison of the entrepreneurship performances of the countries will be enabled. Those attempts were more intense during the last decades. Taking in consideration the advantages and lacks of previous researches on entrepreneurship, two respectable researchers Zoltán J. Ács (School of Public Policy, George Mason University, VA, USA and Max Planck Institute of Economics, Jena, Germany) and. László Szerb (Faculty of Business and Economics, University of Pécs, Pécs, Hungary) defined the basic preconditions for building of the one integral entrepreneurship index which should be sufficiently complex in order to capture multifunctional characteristics of entrepreneurship, besides the quantity to be the indicator which refers to differences related to the quality and to incorporate variables of the individual level as well as the institutional variables. Taking in consideration presented preconditions for building of the one integral entrepreneurship index with a will to contribute to better understanding of economic development through building of entrepreneurship index, previously mentioned researchers have developed the Global Entrepreneurship Index - GEINDEX that incorporates the essence of the contextual characteristics of entrepreneurs and fills the gap in measuring of entrepreneurship and development.

The Global Entrepreneurship Index (GEINDEX) captures the contextual characteristics of entrepreneurship by focusing on entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations. Construction of the Global Entrepreneurship Index involves 31 variables, 17 from the Global Entrepreneurship Monitor and 14 from other data sources, from which 14 pillars, three sub-indexes and one "super index" is built. The Global Entrepreneurship Index can have value from 0 to 1. The most of the variables used for creation of indicators are from master data sets of the GEM annual adult population surveys, and since Bosnia and Herzegovina, Serbia and Croatia, as well as Slovenia participate in the project Global Entrepreneurship Monitor (GEM), it is possible to calculate and analyze Global Entrepreneurship Index for these countries.

Data for Croatia, Serbia and Slovenia are from the 2006-2007 years survey while for Bosnia and Herzegovina are from the 2008 survey. Amongst those countries that participated in both years original yearly data are averaged, while single year data is applied if certain country participated only in one year. GEM has a lack of necessary institutional weighting variables so the authors of GEINDEX substituted the index with certain widely used relevant data from World Bank, UNESCO, United Nations and similar. In cases, where certain variable was missing, the authors of the GEINDEX estimated the data by estimation conducted by the by expert estimation technique.

## 2. Global Entrepreneurship Monitor (GEM)

The Global Entrepreneurship Monitor (GEM) is a not-for-profit academic research consortium that has as its goal creation of high quality international research data on entrepreneurial activity which are available and understandable to wide audience. GEM is the largest single study on entrepreneurial activity in the world. The Global Entrepreneurship Monitor research program is the annual estimation of entrepreneurial activity in a national level. Since 1999, number of countries – participants in the GEM project has been increasing, so the GEM research is expanded from 10 countries in 1999. to 21 countries in 2000., 29 countries in 2001., 37 countries in 2002., to 54 countries in 2009.

The GEM research has three main objectives:

- To measure differences in the level of early stage entrepreneurial activity between countries;
- To uncover factors which determine the levels of entrepreneurial activity;
- To identify the policies that may enhance the level of entrepreneurial activity.

This research is based on data collected through three research sources:

- Data collected through Adult Population Survey (APS);
- Data collected through National Experts Survey (NES);
- Data collected through Standardized cross-national datasets.

Unique and the most important dataset in the GEM project is got from the Adult Population Survey. Every participating national team complete the Adult Population Survey in its country. The APS surveys provide harmonized estimations of the level of entrepreneurial activity in the country. Each national team must survey at least 2000 adults in their country, so the sample of surveyed people is in most cases 2,000 adult persons (18 to 64 years old), but this sample can be higher. Adult Population Survey presents the harmonized measure of the prevalence of entrepreneurial activity in the country.

The second relevant data source for the research on entrepreneurial activity are the attitudes and opinions of experts, collected through standardized questionnaire consisted of several groups of questions which refer to entrepreneurial environment. These data are collected within the National Experts Survey, which is a survey of experts conducted by GEM national teams each year. The main objective of this survey is to provide information about the entrepreneurial framework conditions in each nation. National Expert Survey also provides experts' opinions on abilities of population, their knowledge and skills to start up, perceptions about opportunities to start up, women support to start up, high growth support and other topics of interest. NES questionnaire can also have questions on special topics. Every GEM national team is responsible to conduct an interview with 36 experts from their country. Through interview, experts estimate the entrepreneurial conditions in their country by using the elements of the Licert Scale.

Standardized national data are gathered from international data sources such as the International Monetary Fund, the World Bank, and the United Nations. These data are used for establishing the link between macroeconomic conditions and national levels of entrepreneurial activity, as well as the impact of the state of national conditions which are required for establishment of this link.

### 3. Global Entrepreneurship Index (GEINDEX)

Methodology of creation of the GEINDEX was developed by two respectable researchers Zoltán J. Ács (School of Public Policy, George Mason University, VA, USA and Max Planck Institute of Economics, Jena, Germany) and László Szerb (Faculty of Business and Economics, University of Pécs, Pécs, Hungary) who were led by the principle that for creation of the Global Entrepreneurship Index it is needed to include individual level as well as environmental, institutional variables and that proper weights should be used. One of the novelties of this methodology is that the institutional variables are considered as interaction variables, not as independent indicators.

The construction of the Global Entrepreneurship Index includes 31 variables, 17 from the Global Entrepreneurship Monitor and 14 from other data sources, from which 14 pillars, three sub-indexes and one "super index" is built. The Global Entrepreneurship Index can have value from 0 to 1. The criteria for selection of certain institutional variable is that it is an environmental variable where exist the logical link of the certain entrepreneurship variable and the interpretation and the possibility of explanation of the selected variable.

When creating the Global Entrepreneurship index it is started with the definition of entrepreneurship that it is a dynamic interaction of entrepreneurial attitudes, entrepreneurial activity, and entrepreneurial aspiration that vary across stages of economic development. There are four steps of index building: selection of variables and weights; indicators; sub-indexes and the super-index.

The GEM Adult Population Survey is the basis for creation of the Global Entrepreneurship Index. The starting variables which are all individual level variables directly come from the original APS data sources for each country included in the analysis. The institutional variables are gathered from various sources, by using the selection criteria previously described. All the indicators are calculated from the variables, and the indicators are the fundamental building blocks of the sub-indexes. The super-index, the Global Entrepreneurship Index, is the average of the three sub-indexes.

Sub-indexes include number of indicators so they can be interpreted as building blocks of the Global Entrepreneurship Index. Those sub-indexes are: entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations.

*Entrepreneurial attitudes* are defined as general national attitude towards opportunity recognition, personal knowing entrepreneurs, referring high status to entrepreneurs, taking risks related to business start up and possessing necessary skills for successful business start up.

*Entrepreneurial activity* is defined as rate of starting up a new ventures adjusted to effect of business discontinuation initiated by educated entrepreneurs.

*Entrepreneurial aspirations* can be defined as the efforts of the early-stage entrepreneurs to introduce new products/services, develop new processes of production processes, enter at new markets, increase the number of employees etc.

In order to address the dynamism of the index and to normalize created indicators the authors of the GEINDEX used special developed approach called "penalizing for bottleneck" (PFB) which will not be presented in this paper, since the topic of the paper is to analyze the Global Entrepreneurship Index for Western Balkan Countries who participated in the GEM 2009 project and Slovenia. For more detailed explanation of the methodology and "penalizing for bottleneck" (PFB) approach please refer to Ács Z.J. and Szerb L. (2009) „The Global Entrepreneurship Index (GEINDEX)“ Foundations and Trends® in Entrepreneurship Vol. 5, No 5, 341-435.

### 3.1. The Entrepreneurial Attitudes Sub-index (ATT)

The purpose of the Entrepreneurial Attitudes Sub-index is to identify the entrepreneurial attitudes of the population in certain country related to entrepreneurship. One of the aspects of entrepreneurial attitudes is the opportunity perception. This aspect is important and it shows whether the population in certain country sees good opportunities for business start-up. Additional aspects are perceptions regarding skills for business start up and possibilities to network, which is one of the basic conditions for successful use of the business opportunity. On the other hand, no matter if the population see good opportunities for business start up, have positive attitudes towards own skills and possibilities to network for purpose of business start-up, if the fear of failure is present, it can prevent those people with positive previously mentioned aspects of entrepreneurial attitudes, to start the business. This is the description of the individual level variables that are used for creation of the Entrepreneurial Attitudes Sub-index. As institutional aspects that affect the entrepreneurial attitudes, and which are used for creation of the Entrepreneurial Attitudes Sub-index, selected are market size, education, the riskiness of a country in general, the usage rate of the Internet in the country, and culture.

The Entrepreneurial Attitudes Sub-index contains five indicators: “*opportunity perception*”, “*start-up skills*”, “*nonfear of failure*”, “*networking*” and “*cultural support*”. All of the mentioned indicators are combination of individual and environmental variables.

Table 1 contains data on GDP per capita (in analyzed period) and the calculated Entrepreneurial Attitudes Sub-index for Bosnia and Herzegovina, Croatia, Serbia and Slovenia.

**Table 1** The Entrepreneurial Attitudes Sub-index and the GDP per capita (in analyzed period) for Bosnia and Herzegovina, Croatia, Serbia and Slovenia

Country	GDP per capita (\$)	ATTINDEX
Slovenia	24172	0.62
Croatia	14040	0.39
Serbia	5351	0.29
Bosnia and Herzegovina	7048	0.22

GEM groups the economies into factor-driven, efficiency-driven, and innovation-driven economies based on the World Economic Forum’s (WEF) Global Competitiveness Report that identifies three phases of economic development based on GDP per capita and the share of exports comprising primary goods. According to that Croatia, Serbia and Bosnia and Herzegovina are classified as efficiency driven economies, while Slovenia is classified at the group of innovation-driven economies.

Slovenia is one of the most developed countries in the Balkans, and most developed country among the countries that are included in the analysis for the purpose of creation of this paper. All of the included countries were part of the Yugoslavia and have similar economic and political background. Slovenia is a member state of European Union, its economy is innovation-driven, with GDP per capita over 20.000 \$. If we look at the Slovenian results for the Entrepreneurial Attitudes Sub-index, it is the highest among countries included in the analysis. Croatia, Serbia and Bosnia and Herzegovina has significantly lower result for the Entrepreneurial Attitudes Sub-index, especially Bosnia and Herzegovina, which results is 0.22. This implies that in Croatia, Serbia and Bosnia and Herzegovina should be worked on improvement of attitudes towards entrepreneurship, since this aspect is very important for entrepreneurship development in countries. Entrepreneurial environment should be improved in order that people enter at entrepreneurial activity not just because they are “pushed” into it and because they did not have other opportunity to work, but because they see good opportunities for that. Economies should enable to people to start the businesses when it is necessary, but it is also needed to work on decrease of fear of failure and encouragement of those who are attracted to entrepreneurship by opportunity.

### 3.2. The Entrepreneurial Activity Sub-index (ACT)

New firms have the important role for economy of certain country, but in the past low importance was given to mentioned role of new firms. Global Entrepreneurship Monitor takes a comprehensive approach and includes in the analysis and considers the level of involvement in entrepreneurial activity of population in certain country, as well as different types and phases of entrepreneurship.

Entrepreneurial activity can have different forms, but one important aspect according to GEM is the extent to which population in certain country creates new business activity, in absolute terms as well as relative to other economic activities including discontinuation of business. GEM also considers the entrepreneurial activity as a process rather than an event, and measures entrepreneurial intentions, nascent, new, and established business activity, as well as business discontinuation activity.

The Entrepreneurial Activity Sub-index mainly involves and is dedicated to measurement of start-up activity with potential for high growth. Entrepreneurship creates new businesses with greater potential for high growth than non-entrepreneurial subjects. Measures included within this sub-index are opportunity motives for start-up, business operations in technology intensive sector, the educational level of population and the uniqueness of the offered product or service. The institutional variables used, include the ease of doing business, the availability of the latest technology, the level of human development, and the freedom of business operation. The Entrepreneurial Activity Sub-index contains four indicators: “*opportunity startup*”, “*tech sector*”, “*quality of human resources*” and “*competition*”.

Table 2 contains data on GDP per capita (in analyzed period) and the Entrepreneurial Activity Sub-index for Bosnia and Herzegovina, Croatia, Serbia and Slovenia.

**Table 2** The Entrepreneurial Activity Sub-index and the GDP per capita (in analyzed period) for Bosnia and Herzegovina, Croatia, Serbia and Slovenia

Country	GDP per capita	ACTINDEX
Slovenia	24172	0.58
Croatia	14040	0.30
Serbia	5351	0.26
Bosnia and Herzegovina	7048	0.19

As for the Entrepreneurial Attitudes Sub-index, Slovenia has the highest score for the Entrepreneurial Activity Sub-index, among the countries included in the analysis. Bosnia and Herzegovina, at the other hand, has extremely low result for the Entrepreneurial Activity Sub-index. Croatian and Serbian result is not satisfactory, and scores 0.30 that is 0.26. Taking in consideration that the Entrepreneurial Activity Sub-index measures the average quality of startups rather than the quantity of business, the low results of this index is related to low quality of start up businesses in given country, and the governments should contribute to improvement of aspects that refer to the quality of start up businesses.

### 3.3. The Entrepreneurial Aspiration Sub-index (ASP)

Entrepreneurial aspirations are related to the qualitative side of entrepreneurial activity, including aspirations of entrepreneurs to introduce new products and production processes, to enter the foreign markets, to use new technology, to develop a significant organization, and to fund growth with external capital. Realized entrepreneurial aspirations can contribute to the important economic impact of entrepreneurial activities.

Individual level variables included in this sub-index are related to the newness of the product and of technology, internationalization, high growth ambitions and finance variables. The institutional variables of this sub-index are related to the R&D potential, the sophistication of business and of innovation, the level of globalization, and the availability of risk capital. So, the Entrepreneurial Aspiration Sub-index (ASP) contains five indicators: “*new product*”, “*new tech*”, “*high growth*”, “*internationalization*” and “*risk capital*”.

Table 3 contains data on GDP per capita (in analyzed period) and the Entrepreneurial Aspiration Sub-index for Bosnia and Herzegovina, Croatia, Serbia and Slovenia.

**Table 3** The Entrepreneurial Aspiration Sub-index and the GDP per capita (in analyzed period) for Bosnia and Herzegovina, Croatia, Serbia and Slovenia

Country	GDP per capita	ASPINDEX
Slovenia	24172	0.41
Croatia	14040	0.39
Bosnia and Herzegovina	7048	0.23
Serbia	5351	0.16

Among all presented sub-indexes for Bosnia and Herzegovina the Entrepreneurial Aspiration Sub-index is the highest, although the score of this index is also low, and not encouraging. Serbia has extremely low result for the Entrepreneurial Aspiration Sub-index, while this sub-index is the lowest among three presented ones for Slovenia. Entrepreneurial aspirations are important for development of entrepreneurship, because, as it was already mentioned, they are referred to the qualitative side of entrepreneurial activity and tendencies of entrepreneurs to improve their businesses and ensure their growth, which is important for sustainability of businesses and their capability to compete at the market. Aspirations of entrepreneurs to ensure the growth of the enterprise and implemented activities related to it, have effect on development of qualitative side of entrepreneurship in the country. When analyzing the three entrepreneurial sub-indexes it should be considered that all these sub-indexes does not have the same level of importance. In relation to entrepreneurship development in the country, aspirations sub-index is probably more important than either the attitudes sub-index or the activity sub-index. Of course this depends on level of development of the country and other specific contexts in the country.

#### 4. The Global Entrepreneurship Index (GEINDEX) for Bosnia and Herzegovina, Croatia, Serbia and Slovenia

The Global Entrepreneurship Index is calculated as the average of the three sub-indexes, that is the Entrepreneurial Attitudes Sub-index (ASP), The Entrepreneurial Activity Sub-index (ASP) and The Entrepreneurial Aspiration Sub-index (ASP). The GEINDEX correlates strongly with the level of economic development and its advantage is that it links entrepreneurship and the entrepreneurial environment to economic development.

Table 4 contains data on GDP per capita (in analyzed period) and the values of GEINDEX for Bosnia and Herzegovina, Croatia, Serbia and Slovenia.

**Table 4** The GEINDEX and the GDP per capita (in analyzed period) for Bosnia and Herzegovina, Croatia, Serbia and Slovenia

Country	GDP per capita	GEINDEX
Slovenia	24172	0.54
Croatia	14040	0.36
Serbia	5351	0.24
Bosnia and Herzegovina	7048	0.21

Slovenia is ranked at the highest place of GEINDEX among all other countries included in the analysis. Although Croatia is ranked second, and stands better than Serbia and Bosnia and Herzegovina, the result is not satisfactory and the entrepreneurial aspects and other aspects related to the components of the GEINDEX should be improved in this country. Serbia has extremely low score of the Entrepreneurial Aspiration Sub-index, so the weak performance in this area should be handled, and activities aimed at this aspect should firstly be implemented because it can have the negative effect on all the other features of entrepreneurship. Bosnia and Herzegovina has the lowest score for GEINDEX among countries analyzed in this paper. This country has also low scores for all three sub-indexes which resulted in low GEINDEX. Bosnia and Herzegovina is still struggling to revive its economy. The political and administrative structure of the country is complicated and has many levels. New entrepreneurial activities are mostly based on necessity, and entrepreneurial environment is not supportive to business start ups, so this score of GEINDEX for Bosnia and Herzegovina is not surprising. Policy makers in Bosnia and Herzegovina, as well as in Croatia and Serbia should consider all three aspects, that is entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations and adopt policies and implement programs to foster entrepreneurship in their countries. Policy makers in all countries included can use the GEINDEX and its components, to see how their country ranks, and which are the weak aspects that should be strengthened, and work on their improvement.

### 3. Conclusions

During the last decade there were many attempts for construction of entrepreneurship index, which will be theoretically grounded and empirically proven, but those attempts did not have much success. However in 2009, two respectable researchers Zoltán J. Ács (School of Public Policy, George Mason University, VA, USA and Max Planck Institute of Economics, Jena, Germany) and László Szerb (Faculty of Business and Economics, University of Pécs, Pécs, Hungary) defined the Global Entrepreneurship Index which captures the contextual characteristics of entrepreneurship by focusing on entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations.

The authors of the GEINDEX are researchers gathered in the Global Entrepreneurship Monitor and the most of the variables used for creation of indicators that are part of the sub-indexes are from master data sets of the GEM annual adult population surveys. Bosnia and Herzegovina, Croatia, Serbia and Slovenia participate in the Global Entrepreneurship Monitor and it is possible to construct and analyze the GEINDEX of mentioned countries.

Slovenia has the highest scores for all three sub-indexes which are the components of the GEINDEX. Other included countries have the low scores, but among Western Balkan countries Croatia stands the best. Serbia has the weakest performance in the Entrepreneurial Aspiration Sub-index, and for other two sub-indexes is third among four countries included in the analysis. Among three presented sub-indexes for Bosnia and Herzegovina, this country has the best score for the Entrepreneurial Aspiration Sub-index, although it is a low score, and not encouraging. Since, the GEINDEX correlates strongly with the level of economic development, the ranks of analyzed countries at the GEINDEX are not surprising. Slovenia is ranked at the highest place of GEINDEX among all other countries included in the analysis, while scores of Croatia, Serbia and Bosnia and Herzegovina, are not satisfactory and the entrepreneurial aspects related to components of the GEINDEX should be improved in these countries.

Global Entrepreneurship Index can provide important insights in entrepreneurial performances of the country, and it can help in understanding entrepreneurship and its components as well as their role in economic development of the country. GEM national teams could use the Global Entrepreneurship Index to estimate and present the weak and strong aspects of entrepreneurship in their country to policy makers and other relevant subjects from the field of entrepreneurship, which is a great contribution to understanding the entrepreneurship, entrepreneurial environment and its components.

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# Halal Standard – Chance for producers of food products

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**In the first part of this paper the description of the halal products market is presented. The halal market of the regions, of the EC and the world was observed. This market is growing every day and the interested producers of food should adjust their production to halal standard in the aim of taking advantage of this market.**

**In the second part of this paper the term “halal” in Islam is explained and the bases of this standard and the standard for the system of managing food safety – HACCP and ISO 22000 are described; before the implementation of halal standard, the standard for food safety management systems should be implemented. Presently there are an increasing number of requirements for proving the halal status of food products. According to the Islamic rules halal food is the one permitted to be consumed. In order to acquire halal status, the products should not contain forbidden raw materials and additives, such as: pork, alcohol, blood and other components.**

**In the final part of the paper the experience of the firms in Serbia having implemented the above mentioned standards is explained.**

## **Keywords**

Food, Halal, haram. standardization,

## **1. Introduction**

The consumers require the producers of food to respect the customs and habits of various groups of the population. Everyday the consumers are selecting the products whose characteristics of quality they consider most appropriate, opting not only according to its brand, but also to its kind and the composition of its basic components. The alimentation of different population groups is often part of their religious obligations. Accordingly, the consumption of halal food is a part of the Muslim religious obligations. According to estimates, the Muslims present a fourth part of the world population. Generally, the Muslim countries are not producing enough food, thus being obliged to its importing. Due to a large demand for halal products on the market and a growing mass trade with those products, the producers of food intending to place their products on those markets, should present proofs about their halal status. Accordingly, the UN institutions recognized the need of protecting the interest of those consumers, and set the standards and instructions on using the term “halal” [1].

In Islam the rules of alimentation are prescribed as well as the provisions classifying the permitted and forbidden food. Some rules are strictly concrete (banning pork meat, alcohol, carcass, blood, etc.), while others are defined in an indirect way. For example, each food product with a potential or proved damage to the brain, body, or spirit is haram and its consumption is forbidden. Halal is the Arabic word meaning permitted, i.e. food appropriate according to the Islamic rules. The rules referring to food in Islam are based on the Koran and Sunet (Muslim religious law), the base of the Islamic law – the Sheriyat. According the rules, the prescribed food, as well as the additives, can have the status: Halal – permitted, Haram – forbidden and Meshbuh –suspicious. [1]

## 2. Halal Products Market

The halal products market can be divided according to several criteria, but most practical is to observe its size, i.e. the number of consumers and their concentration in a given area. According to those criteria, the market may be divided into: the regional, the EU and the world one.

The regional halal market covers somewhat more than 5 million members of the Islamic religion in the area of the former Yugoslavia. This market is developing every day, and there is a growing interest to certificate halal products and services. In the aim of a further development of this market, the highest possible diversity of halal products should be provided. In this area halal quality is controlled by the Islamic community or an authorized Agency for Certification, authorized by that community. In this area halal standard is registered only in Bosnia and Herzegovina in the Institute for Standardization of Bosnia and Herzegovina, as a national standard entitled "Halal Food – requirements and Measures", BAS 1049:2007 (new version – BAS 1049:2010).

The EU Halal Market: The halal market of the EC can be most prospective to the producers of alimentary products in our country and those in the region, since the members of the Islamic religion are nearby, and their purchasing power is at a very high level. In Europe there are more than 52 million Muslims, and according to estimates the halal market in the European Community amounts to 66 billion dollars. In France there are about 7 million Muslims, in Great Britain over 3 million final consumers of halal food, in Germany 3,3 million [2]. In France the annual increase of the consumption of halal meat increases for 7 to 10%, although the total consumption of meat is decreasing for 2 to 3% [3]. The unique report entitled 'The Halal meat market: Specialist supply chain structures and consumer purchase and consumption profiles in England', gives an overview of the Halal market in the UK. While the Muslim community in the UK represents only 3% of the population, they consume 20% of all the lamb sold in England, together with an increasing amount of beef. The Halal meat sector is a multi-million pound contributor to the British economy. [4]

The World Halal Market is certainly interesting to our businessmen for its proximity and the traditionally positive economic relations. According to estimates one of the best ways of Serbia's facing its foreign trade deficit and a very small scope of export is to restore the neglected positive business relations and trade exchange with the countries of the near and Middle East and Northern Africa. There are several reasons in favor of such a statement [5]:

1. The compatibility of the economies of Serbia and all the countries in the Near East and Northern Africa is highly prominent. The unfavorable geographic conditions prevent those countries to develop agriculture, and a number of industries, due to the lack of water. On the contrary, Serbia disposes of exceptionally favorable conditions for the development of agriculture and tithe production of a wide range of alimentary products, and has a prominent production of a number of industries not existing in those countries.
2. The traditional trade connections should be used. In comparison to the former Yugoslavia, with very good relations with the Muslim countries resulted in large export, now those markets are covered by foreign multinational companies, and Serbia's economic cooperation is not significant.
3. Those countries, exporters of oil, were not fully protected from the global economic crisis. Still, when compared to the major European trade partners of Serbia, they underwent the consequences of the World economic crisis in a far less dramatic way

The above mentioned arguments are clearly in favor of the thesis that in those markets, or at least in a number of them, Serbia can expect considerable opportunities for export, and should redefine its export strategy and examine more thoroughly the possibility of increasing the scope of its foreign trade with those countries. The total value of importing food in the countries with the majority of the Muslim population amounted to over 120 billion USD in 2008 (Table 1). According to the data of the World Trade Organization, the import of food in some of those countries amounted to one fifth of the total import of commodities. Now the largest exporters of halal food are the non-Muslim countries like Australia, New Zealand, Thailand and Brazil, meaning that the supply of qualitative food is of crucial importance.

**Table 1.** Import of Food in Some Islamic Countries [6]

Country	Value (Million dollars)					Share in economy's total merchandise imports %	
	1990	2000	2006	2007	2008	2000	2008
Algeria	2306	2578	4062	5473	8457	28.1	21.4
Bangladesh	650	1254	2620	3946	5059	14.1	21.2
Egypt	2903	3531	3936	5242	7981	25.2	16.5
Indonesia	1104	3336	5455	7857	9383	7.7	7.4
Iran	...	2585	3177	3884	6304	18.6	11.0
Jordan	672	851	1523	2029	2809	18.5	16.6
Kazakhstan	...	459	1644	2241	2938	9.1	7.8
Kuwait	561	1249	2261	2757	3972	17.5	16.0
Lebanon	...	1107	1438	1896	2076	17.8	12.4
Malaysia	2021	3526	6841	8549	10966	4.3	7.0
Morocco	677	1585	2168	3883	4893	13.7	11.7
Oman	486	1122	1167	1562	2494	21.9	10.9
Pakistan	1276	1524	3061	2889	5014	14.0	11.8
Saudi Arabia	3319	5375	9388	11827	15255	17.8	13.2
Sudan	...	360	1053	519	1229	23.2	13.4
Syrian Arab Rep.	745	726	1519	1848	3187	19.0	17.4
Tunisia	582	706	1231	1873	2515	8.2	10.2
Turkey	1856	2128	3486	5167	8502	3.9	4.2
UA Emirates	1627	3622	8271	10487	15280	10.3	9.2
Yemen	...	...	1509	2125	2405	...	24.1
Total	20786	37622	65811	86055	120718		

### 3. Halal Standards for Food Safety Management

From World War II up to the end of the 20<sup>th</sup> century, the total production of food in the world was based on the permanently growing consumption, so the producers were more oriented towards satisfying the demand in quantity. The new model of the food market is oriented to quality, and not to quantity. In other words, according to this model, quality becomes more important than quantity. [7].

According to the market and contemporary provisions, the producers should manufacture primarily the products safe for health. Presently, there is a number of standards in the world, whose implementation and certification by the authorized bodies contribute to proving the safety of the products to the consumers. In that aim numerous standards are set in managing food safety: HACCP, ISO 22000, the French standard IFS, the British standard BRC, GLOBALGAP, etc. They define the systems for managing food safety; they contribute to identify and follow up the concrete dangers possible to be present in the food products (biological, chemical or physical characteristics of the product), and exert a negative influence to the safety of food products. In those standards the subject having the final responsibility for providing its produced food safety is clearly defined. The organization is required to analyze its processes in the aim of identifying the critical points of control, to define the critical limits and the processes of their follow-up.

The international rules establish, on the global level, the regulations of importance for the health correctness of food. The states establish also their own national regulations, which should as a rule be in accordance to the international rules. The application of the standards for managing food safety is most frequently a legislative obligation. In its intention to advance the existing system of food safety, Serbia passed the law predicting the application of the HACCP-concept in all the plants of food production.

The halal standard is one of the increasingly present requirements in the alimentary production. In contrast to HACCP, halal standard is not obligatory in our country; it is applied by the organizations on a voluntary basis. The organizations implement this standard primarily in the aim of expanding their markets. This standard is based on the preventive, proactive method and is compatible to other international standards managing the qualitative food production (ISO, HACCP and others). Before the implementation of the requirements of halal standard the organization is advised to set HACCP or the standard ISO 22000. The following documents were used as a basis for making halal standard [8]:

1. CAC/GL 24-1997, General Guidelines for Use of the Term “Halal”,
2. CAC/RCP 11-1993, Codex Recommendation for Fresh Meat,
3. BAS ISO 22000: 2006, Food Safety Management Systems – Requirements for Any Organization on the Food Chain,
4. BAS ISO 9000:2001, Quality Management Systems – Fundamentals for Vocabulary
5. Sheryat Principles – Koran and Hadis

The halal quality may be confirmed only by the Islamic community or an authorized Agency for Certification possessing the permission of the Islamic community. In Serbia and in the neighboring countries the Islamic community applies the halal standard registered in the Institute for Standardization of Bosnia and Herzegovina as a national standard entitled “Halal Food – Requirements and Measures”, BAS 1049:2010. This is a reference document used by the Expert Group for Standards of the Organization of the Islamic Conference for the production and introduction of a unique international halal standard. [9]

## 4. Requirements for Halal Food

The producer needs to introduce the system which can guarantee that the products placed on the market by certain producer are halal and that there is no possibility of mistake or commission during the production which would lead to the production of not “halal” but a “haram” product. The system is called HAS (Halal Assurance System). Accordingly, the application of HAS can be formulated as a tendency towards an ideal situation, according to the so called concept of “3 zeros”, i.e.

1. Haram substances cannot be present in the production (zero limit),
2. No haram products can be produced (zero products) an
3. No possibility for risk during the implementation of the system (zero risk). [10]

Therefore the halal standard was introduced as a document clearly setting the procedures of halal certification. The following is established by halal standard:

- what is permitted or forbidden to the Moslems,
- how to certify and check the application of the provisions of halal standard,
- how to perform halal butchery of animals,
- how halal products are labeled,
- which additives are halal and which are not.

The halal product is the one satisfying all the rules on the health correctness, both hygienic and sanitary, and containing not a single ingredient forbidden for the Moslems. In the process of manufacturing halal products the producer respects the requirements of halal standard and cannot use the forbidden raw materials.

Founded on the Basic Instructions for using the term “*halal*” (CAC/GL 24-19971) [9], issued by the Secretariat of the Joint FAO/GL Program of the Alimentary Products (1999), halal food is defined as permitted according to the Islamic laws and should meet the following requirements:

- should not contain any ingredient forbidden by Islamic rules,
- should not be prepared, processed, transported or stored by using any installations or means containing anything forbidden by Islamic rules,
- should not be in contact with any alimentary products not meeting the conditions 1 and 2 in the process of preparation, production, transport and storage.

The forbidden food for Moslems can be of animal or plant origin. The food from the following animals is forbidden:

- pigs and wild boars,
- dogs, snakes and monkeys,
- carnivorous animals with claws and canine teeth, like lions, tigers, bears and similar animals,
- birds of prey with claws, like eagles, vultures, etc.,
- pests, like rats, centipedes, etc.,
- animals not permitted to kill according to Islamic laws, like ants, bees and woodpeckers,
- animals considered as “disgusting”, like worms, flies, beetles, etc.,
- animals living on land and in water, like frogs, crocodiles, etc.,
- mules and donkeys,

- poisonous and dangerous sea animals,
- meat from any of the permitted animals if it was not butchered according to Islamic rules,
- blood (of any animal).

Food of plant origin from toxic and narcotic plants is forbidden, except where harmful components are eliminated during the process of production. Alcohol and other narcotic beverages (drinks) harmful to health are forbidden to the Moslems, regardless to their name.

Also, the standard regulates halal butchery of animals whose meat is appropriate for consumption to the Moslems. The animal should be healthy and alive or at least show the signs of life before butchery. The person performing the butchery should be a Moslem, mentally sane and trained for such an activity. The animal should be treated in a human way, the words "Bismillah" (in the name of Allah) should be pronounced before the butchery. The meat of the animals that perished, but were not slaughtered or hunted, is strictly forbidden. Fish and other sea animals are excepted and their meat may be consumed although they were not butchered. [11]

Halal bans the use of additives made from any haram component.

Additional requirements: Besides strictly defined raw materials and the conditions of butchery, halal product requires also an appropriate processing, preparation, packaging, labeling, storage and transport. This primarily means the prohibition of using the plants not meeting the requirements for halal products, and the prohibition of using hygienic or other means of origin or in contact with forbidden, haram products.

In some cases, when the production of halal products and those not being halal is impossible to be completely separated, the use of separate lines of production and separate storage in the same space is allowed, under condition of undertaking all the measures necessary to prevent their contact.

In exceptional cases, it is permitted to carry out the processing, preparation, storage and transport of halal products in the plants and spaces previously used for food not meeting halal requirements, if they are thoroughly cleaned in an appropriate way before use. The recommendation for cleaning and the permission for using the space may be issued only by the Agency for Certification of Halal Quality, after inspection. [8]

Labeling of halal products is one of the tasks that should be met by the producers. Labeling is performed in the aim of an easier identification of halal products by the consumers. Halal product should be labeled according to the valid legislation and the sign of halal quality.

The trademark of halal quality is applied on the products in different forms and sizes (Figure 1). [8]



Figure 1. Different forms of halal signs

#### 4.1. The Procedure for Halal Standard Certification

The process of the certification of halal standard is carried out through the procedure set by the Agency for the Certification of Halal Quality. For acquiring the certificate, the HACCP system should be established (critical points of controlling haram), meaning the analysis of additional risks and steps where the control should be applied and documented, in order to prevent the possibility of halal products to "become haram". A supervising agency or a body for certification should also be engaged, authorized or nominated by the Agency for Certification of Halal Products to set, verify and check the products meeting the requirements in quality. [8]

The Agency for Certification of Halal Products carries out the process of certification on the basis of the halal certification procedure, equal for all the organizations deciding to make their products appropriate to halal quality and thus permitted for consumption to the Moslems. The procedure of halal certification is an integral part of halal standard. [9]

The procedure of halal certification consists of the following steps:

1. The firm presents the requirement for certification and submits to the Agency its documentation, as a proof about its business operation being in accordance to the law and possible to satisfy the requirements of halal quality.

2. The Agency checks the submitted documentation.
3. The Agency and the firm sign a contract on certification.
4. The Agency points to the staff in the organization what should be undertaken for the products to be halal.
5. The organization prepares the documentation containing the description of all the production procedures and checking of all raw materials and components used in their production.
6. The Agency checks whether the organization has met the conditions for acquiring the certificate.
7. The Agency submits all the documentation to the Committee for verification which checks whether the certification has been performed in a proper way.
8. The Managing Board decides about granting the certificate.
9. The Agency grants halal certificate to the firm.

After granting halal certificate, the Agency follows-up and controls the products and installations in the firms, through announced and unannounced audits and laboratory analyses. According to the Book of Regulations and other acts for halal quality certification, the laboratory analyses are carried out as a way of validation halal certified product.

The laboratory analyses are carried out so that the products are sampled and analyzed for the ingredients not permitted to Moslems, primarily pork meat and alcohol. It is performed as follows: a product from a supermarket or a shop is taken for analysis in some of the authorized laboratories. Halal standard clearly defines that halal certified products should not contain forbidden ingredients even in shops. The meat products and manufactures products are analyzed for the presence of proteins or raw materials of pork origin. Soft drinks are analyzed for the presence of alcohol, since very often they may contain some percentage of alcohol [8].

Besides the alimentary products for human use, the Agency also carries out the analysis of cattle fodder, since often the farmers add raw materials of animal origin into fodder and premixes, and accordingly such food becomes forbidden.

The development of industry considerably made difficult the process of approving the products halal status. Today the firms use a large number of ingredients in the process of making the alimentary products, and knowing that a number of them has no clearly defined origin of raw materials, they are obliged to apply also to the suppliers for the certificate for halal origin of raw materials, for example: various plant and animal products used as additives may contain lard as an additive. The producers are not obliged to declare these characteristics on label; therefore the information presented on the label does not guarantee that this food staff is halal. [10] Therefore the process of implementing halal products is not simple, but very demanding.

## 5. Examples of the Companies from Serbia

After realizing the importance of halal standard for the companies dealing with food production, the Ministry of Agriculture of the Republic of Serbia invested in 2009 and 2010 stimulating funds for their implementation. The state subsidized the producers having opted for the implementation of halal standard in their production by donating 50% of the value of the implementation expenses. The Agency for Foreign Investments and Export Promotion of the Republic of Serbia SIEPA, from 2006 provides free financial assistance to the domestic economic societies in the activity of the implementation and certification of halal standard. The agency USAID and the project *Agrobiznis* joined this process providing a support to selected companies for the production of food according to halal standards, and prepared them to present their products on halal market. According to estimates, about thirty, mainly large firms in Serbia, implemented halal standard up to the end of 2010. [12]

During the last year a number of firms from Serbia started their export to halal markets. Primarily owing to the certified standards for managing food safety (HACCP and ISO 22000), those firms have very rapidly applied the requirements of halal standard, thus meeting the basic condition for exporting their products to halal markets.

The slaughterhouse *Turković* from Sjenica signed in September 2010 a contract on the export of 600 tons of baby beef meat in the Republic of Turkey. The first tranches of 100 tons were delivered to Turkey during October and November by special flights from the airport "Nikola Tesla" in Belgrade.

The firm *Iradia* from Sremska Kamenica through its application of the internationally recognized standards, provided the preconditions for exporting a day old chicken from Serbia to the Arabic Republic of Egypt and after a long time realized its return to this large and demanding market. From Serbia up to now a million chickens were exported to Egypt, and that country is ready to purchase also larger quantities of lamb from our producers. The first export was realized in June 2010, and up to the end of that year a million chicken were exported. [13]

The dairy shop from Šabac exported at the end of 2010 the first quantities of “Šabac feta” (cheese) and “Ala kajmak” (milk product) in Libya, Azerbaijan and Egypt. This company used the HALAL certificate as an entrance to the markets of the Islamic countries. In the following year the turnover is expected to amount to 60 million Euros, and 40% of the production will be exported. [14]

The company *Zlatiborac* from Mačkat started to export the first quantities of halal products to the market of Azerbaijan. The export of 100 tons of meat products annually was contracted. This business is important since not only the market of Azerbaijan is in question, but also nine countries in the area, with approximately 200 million inhabitants, mainly participants of the Islamic world. The market of Azerbaijan is interesting also for other companies from our country, intending to do business with this part of the world. [15]

The Halal Agency of the Islamic Community of Serbia, assisted by the agency USAID organized a presentation of the Serbian food at the MIHAS (Fair in Malaysia) in June 2010. The companies which participated at the fair announced the deliveries of their products amounting to 1.1 million US dollars. The participants are very satisfied with their results, since the alimentary halal products from Serbia are almost unknown on this market. [16]

## 6. Conclusion

In the international trade, standards represent a common “language” or reference basis alleviating the introduction of better relations among the producers, buyers and suppliers. The importance of introducing halal standard is resulting in increased export as well as in the future business arrangements and joint ventures in the food industry with the foreign partners as well. The standardization allows the firms to expand their production and to provide a higher added value, influencing the trade balance and profitability of our firms.

The firms possessing HALAL certificate are certain in disposing such a quality of their products possible to meet the needs of the targeted market. The consumers, believers in the Islamic faith get the product of the expected quality also meeting their religious obligation, and in manufacturing such a product the companies provide a better market position.

The food industry of Serbia still did not benefit of the possibility to place its products on the markets of the Islamic countries, and accordingly the number of companies with halal certificate should be increased. By providing such a certificate the doors of halal markets become open to those companies.

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# Relating Technology and Social Entrepreneurship in the Context of Sustainable development

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**The overall research theme in this paper is social entrepreneurship. This is related to and motivated by the growing attention this phenomenon. The first part of the study deal with social entrepreneurship in cocept, the second – understanding of technology-based entreprenurship evelopmet processes ans preconditions. The third part initiates discussion on the role of technology transfer in social entrepreneurship in as the precondition of sustainable development pursuit.**

## Keywords

Social, entrepreneurship, technology, sustainable, development

## 1. Introduction

The term “social entrepreneurship”, it seems, more or less has a rather appropriate definition and merges mission and money filled with distaste. Unless a nonprofit organization is generating earned revenue from its activities, it is not acting in an entrepreneurial manner. It may be doing good and wonderful things, creating new and vibrant programs: but it is innovative, not entrepreneurial. Only earned income will ever allow a nonprofit to become sustainable or self-sufficient. It's one thing to design, develop and implement a new program - and quite another to sustain it without depending on charitable contributions and public sector subsidies. The accumulated tacit knowledge and culture of the entrepreneur are the resources essential to create wealth from research commercialization leading to technological innovation. New, technologically-based firms have had, in the aggregate, substantial economic impact but the biggest challenges actively developing forms of technology transfer that will directly benefit the people that need it mostly, as practice shows, highly at the regional level. However, looking from the perspective of sustainable social entrepreneurship, technology creation and transfer is the process by which technical knowledge moves within or between institutions and is applied in address key challenges faced mostly by developing countries. Despite years of investment by developing countries in technology transfer are testament to the importance of aligning the priorities of the nourished with decision-making over which technologies to import and promote. However, local communities' knowledge and skills go unrecognized and they are given little or no role in choosing, controlling and assessing the impacts of the import technologies [3]. The purpose of this paper is to construct the comprehensive approach and present the theoretical insights of the interaction between the correlative and at the same time distictive phenomenons: the promotion of social entrepreneurship through technology based development processes, through the introduction of the methodological framework of the diagnosis the succes factors of the phenomena fostering. Methodology – this article utilizes existing knowledge on this topic introducing the systemic theoretical analysis, practical construction method of theoretical perspective. To solve the described problem the interpretative – constructive methodological approach was chosen, which enabled to reveal the estimation of the subjective phenomena and to develop the researcher's attitude to the researched problems.

## 2. Technology- Based Entrepreneurship as a Catalyst of Economic Development

The 1960s began an unprecedented period of science and technology development, which has continued throughout the remainder of the 20th century [4] perhaps with the rise of research-based new ventures emerging from Silicon Valley and the Boston Area companies [5]. Technology based entrepreneurship is a phenomenon that become increasingly important during the last decades. One of the most important reasons for this is the role played for industrial renewal and economic growth. While nature and traditional industrial sectors have witnessed a declining importance, new technology and other knowledge-based sectors have been expanding rapidly [2]. The academic studies also witness, that the transformation from industry and manufacturing to creative knowledge-based activities arguing it to be the great industrial revolution. The academic research from early 1969 extensively analyzing successful US, Swedish firms allowed to jump to the conclusion that today technological development has a major role in international trade and economic development [1], [2] despite the fact that technology-based entrepreneurship was mainly conducted in the US. Europe the subject has gained in importance during the last 20 years. Although academic interest in technology entrepreneurship appears to have growth alongside the economic importance of the phenomenon, scholars have understood entrepreneurs as efficiency-inducing change agents in the economy [5]. However, is important to state, that in the social context it might be necessary to have a lot of experimentation in business ventures to discover the right ones as well as organizational failure in such a system may be enhanced by entrepreneurial experimentation efficient socially [5], [6]. It is also believed that technology entrepreneurship distinguished from other forms of entrepreneurial entry by being innovation-based, which may be constructed as a barrier to entry. Anyway, because of the limited amount of the paper, top elements not only characterizing the *technology-based entrepreneurship*, but also significant in the context of social entrepreneurship maintenance are presented below:

- It is a style of business leadership based on the process of identifying high-potential, technology-intensive business opportunities, gathering resources. An attractive business opportunity consists of a great value proposition, technically feasible products, strong intellectual property, a sustainable competitive advantage, a large potential market, and a proven business model. It can be based on either a revolutionary breakthrough in technology or an evolutionary advancement; and it can target an existing market or create an entirely new one;
- involves identifying and reducing four major types of risks over time: people, technology, market, and financial. This is accomplished by the right combination of vision, strategy and execution. Although a compelling vision (e.g., core values and mission) and a set of strategies (e.g., product and market) are important, it is often execution that differentiates great companies from good ones. An A+ team and adaptable leadership can guide a venture through its challenging journey of growth and adversity where everyone works diligently on clear goals;
- positioning forces a hightech entrepreneur to clearly identify what the product or service is, who the customers are, what benefit it delivers, and how it differs from the competition. Great entrepreneurs use every asset (e.g., vision and intellectual property) to create mutually beneficial social networks;
- sources available include traditional venture capital, angel investors, corporations, incubators, bank loans, personal funds, cash is a critical resource for reaching each funding milestone, which is defined by the reduction of some particular set of risks. Great startups always spend their cash wisely on the current "white hot risk". It gives stability and strategic flexibility to a venture as opportunities and problems arise. For startups, financing events are strategic and require substantial discipline, effort, and foresight;
- successful innovation is a function of both creativity and teamwork. Developing an outstanding team requires setting a coherent and compelling vision, hiring and retaining people better than oneself, using proper recognition and compensation strategies (e.g., cash, stock options, and other rewards), enabling proper autonomy and delegation, and creating a culture where success is recognized and failure is allowed;
- the ability to gain the support of many different types of stakeholders (e.g., revenue and endorsements from real customers) is important for building momentum. Basic negotiation, influence and persuasion skills are critical;

- is not all about personal financial gain. It concerns crafting a lifelong plan to make a positive impact on society. Character does matter. Failure is OK; unethical behavior is not. True wealth requires the creation of enduring value, which requires integrity and ethics [7].

Technology transfer begins with an idea for applying an existing technology in new ways (supply push), or with an idea for improving the features and functions of an existing product by acquiring an existing technology (demand pull). It ends with a new or improved product available in the marketplace. This process spans a wide range of activity, with much of the initial and final stages thoroughly studied. However the crux of the matter—the transformation from technology invention to product innovation—is not well documented or understood. What is technology transfer? Despite the dearth of rigorous analysis and the absence of consensus on a single definition, one can readily focus discussion by identifying the unique value of “technology transfer” that differentiates it from related activities and initially prompted coining the phrase [5]. In the management literature, technology transfer is usually considered within or across firms, such as the dissemination of information through transfers of employees from one division or country to another. Anyway, technology transfer does and should continue to represent a value-added process that encompasses a continuum of related activities from laboratory innovation through market consumption. The phrase “technology-base” is operationally defined here as:

- **(what)** the novel application of existing technologies or prototype devices,
- **(who)** by members of multiple stakeholder groups,
- **(where)** operating through research and development facilities,
- **(when)** collectively viewing transfer as a feasible, attractive option,
- **(why)** to commercialize an innovation,
- **(how)** through the synergistic matching of capabilities to needs [5].

All kinds of external forces impact entrepreneurship and reinforce the need to understand the entrepreneurial process. For instance, economic cycles can fluctuate dramatically, fostering periods of extreme optimism as well as those of deep concern and fear. And in some industries, political and government influences are the primary market drivers. A venture’s location also plays a role, as attitudes toward entrepreneurship are different everywhere. Places like Silicon Valley, for example, offer infrastructure, networks, and talent in an environment that accepts failure in the pursuit of innovation. Other factors influencing the creation of new technology-based firms, are generalized in Table 1.

**Table 1** Complex of factors of technology-based entrepreneurship development  
(authors own representation, basing on [5],[7])

<b>Factor</b>	<b>Author</b>
University	Casstells and Hall
People with ideas	Florida and Gates
Capital	Florida and Gates
Source availability	Miller, Porter
Balance between the countercyclical high technology and more cyclical manufacturing sector	Thomson
Availability of venture funding, experienced entrepreneurs, skilled labor, supplier’s access, market access, supportive government policies, logistics, receptive population, support services and living conditions.	Bruno and Tyebjee

As the tehatod above testimony, not all money has the same intrinsic value. For example, professionally managed venture capital contributes both strategic counseling and a network of contacts in addition to cash. Another key point is that valuation an subsequent dilution are not the only important issues. Understanding the venture finance process requires fully appreciating such concepts as multi-stage financing, valuation criteria, risk reduction, employee stock pools, deal structure and terms, corporate governance and control, and the role of liquidity events for stakeholders such as

IPOs and M&A transactions. The IPO is foremost a financing event (albeit one with special characteristics) and certainly not the final destination for a startup.

Findings in the economic research show that the number of technology-based new firms corresponds to a small share of general entrepreneurship. Technology-based entrepreneurship is a highly regional phenomenon, where local large firms are important for the training and breeding of future entrepreneurs. Spin-off processes are likely to enhance regional knowledge development and learning processes because it involves the diffusion and sharing of technological and managerial expertise [4] despite the fact that it offers a “win-win” situation for the participants. By implementing an already developed (and already financed) technology in a new and novel application, the originators gain returns from a new market and the appliers meet a need while avoiding the cost of development [5], [8], [9], [10]. Technology developers in Federal, corporate and university laboratories—as well as those working in their garages and basements—are working toward an explicit goal. Whether they succeed or fail in attaining their goal, the process of discovery and invention yields new technologies offering novel capabilities.

### 3. Social Entrepreneurship as a Phenomenon

The idea of “social entrepreneurship” has struck a responsive chord. It is a phrase well suited to our times. It combines the passion of a social mission with an image of business-like discipline, innovation. The time is certainly ripe for entrepreneurial approaches to social problems. Many governmental and philanthropic efforts have fallen far short of our expectations. Major social sector institutions are often viewed as inefficient, ineffective, and unresponsive. Social entrepreneurs are needed to develop new models for a new century [9]. Defining what social entrepreneurship is not an easy task. This is in part because the concept is complex, and in part because *the literature in the area is rather new* that little consensus has emerged on the topic [9], [10], [11], [12]. The word “social” simply modifies entrepreneurship. If entrepreneurship doesn’t have a clear meaning, then modifying it with social won’t accomplish much, either [4]. Contemporary writers in management and business have presented a wide range of theories of entrepreneurship [3], [4]. But the common among them is that *entrepreneurs have a mind-set that sees the possibilities rather than the problems created by change*. As most authors notice, We should build our understanding of social entrepreneurship on this strong tradition of entrepreneurship theory and research. *Social entrepreneurs are one species in the genus entrepreneur*. They are entrepreneurs *with a social mission*. However, because of this mission, they face some distinctive challenges and any definition ought to reflect this. One argument for this is that only founders of socially beneficial organizations that primarily rely on earned *income from paying consumers are social entrepreneurs: ‘problem-solving nature’ of social entrepreneurship is prominent, and the corresponding emphasis on developing and implementing initiatives that produce measurable results in the form of changed social outcomes and/or impacts*.

With its emphasis on problem-solving and social innovation, *socially entrepreneurial activities*

- tackle major social issues, from increasing the college enrolment rate of low-income students to fighting poverty in developing countries;
- operate in all kinds of organizations: innovative nonprofits, social purpose ventures such as for-profit community development banks, and hybrid organizations that mix elements of non-profit and for-profit organizations;
- generate social value-not wealth-is the central criterion of a successful social entrepreneur. While wealth creation may be part of the process, it is not an end in itself. Promoting systemic social change is the real objective.
- see and act upon what others miss: opportunities to improve systems, create solutions and invent new approaches that create social value. And like the best business entrepreneurs, social entrepreneurs are intensely focused and hard-driving-even relentless-in their pursuit of a social vision [4];
- change agents in the social sector: they attack the underlying causes of problems, rather than simply treating symptoms;
- recognize and relentlessly pursuing new opportunities: the key element is persistence combined with a willingness to make adjustments as one goes. Rather than giving up when an obstacle is encountered;
- engage in a process of continuous innovation, adaptation, and learning: Entrepreneurs are innovative: they break new ground, develop new models, and pioneer new approaches. Innovation can take many forms. It does not require inventing something wholly new; it can simply

involve applying an existing idea in a new way or to a new situation. Entrepreneurs need not be inventors. They simply need to be creative in applying what others have invented [3].

Summarizing it is concluded that social entrepreneurship is exercised where some person or group: (1) aim(s) at creating social value, either exclusively or at least in some prominent way; (2) show(s) a capacity to recognize and take advantage of opportunities to create that value (“envision”); (3) employ(s) innovation, ranging from outright invention to adapting someone else’s novelty, in creating and/or distributing social value; (4) is/are willing to accept an above-average degree of risk in creating and disseminating social value; and (5) is/are unusually resourceful in being relatively undaunted by scarce assets in pursuing their social venture [9]. The single most important of these criteria is the first in that it serves, conceptually, to distinguish social entrepreneurship from other forms. There is no exact way of fixing the border below which the importance of social goals fails to qualify something as social entrepreneurship. It is a commitment to providing social value that marks the divide between social and their forms of entrepreneur. As in the case of the social aspect of the target concept, this list represents a catalogue from which particular users of the notion will choose somewhat selectively both as to what they include and how they weight the factors. All these characteristics preserve the distinctive status of social entrepreneurs whom we need to help us find new avenues toward social improvement as we enter the next century. However, these new avenues might be easier found and driven not only by single technologically innovative leaders, but also these ideas admitting actors.

#### 4. Sustaining in Technology-Based Economic development: Is There a Niche for Social Entrepreneurship?

The term “sustainable development” was first mentioned at the United Nations Conference on the Human Environment in 1972. Later it was gained prominence by way of a report to the United Nations by the World Commission on Environment and Development chaired by Norwegian Prime Minister Gro Harlem Brundtland (henceforth referred to as The Brundtland Report). In this 1987-th the definition emphasized the dynamic aspect of sustainability and emerged from The Brundtland Report: “Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs”. Review of socioeconomic literature has shown that there is believed, that in order to sustain something it may well be necessary to integrate ecological, social and economic issues, but this is not what sustainability is “about”. These pragmatic requirements are not the focus of the concept. The point is that that it is not possible to **achieve** a desired level of ecological **or** social **or** economic sustainability (separately) without achieving at least a **basic** level of all three forms of sustainability (Figure 1).

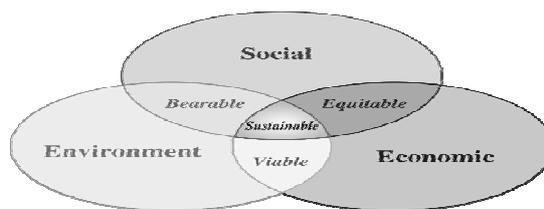


Figure 1 Forms of sustainability (authors’ own presentation)

It means maintaining a balance between the human need to improve lifestyles that means -feeling of well-being. Secondly, preserving natural resources and ecosystems– develop sustaining (Figure 2).

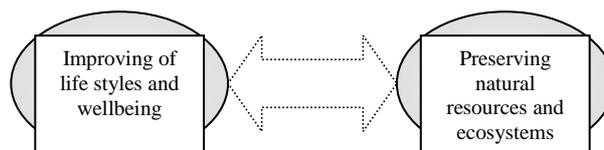
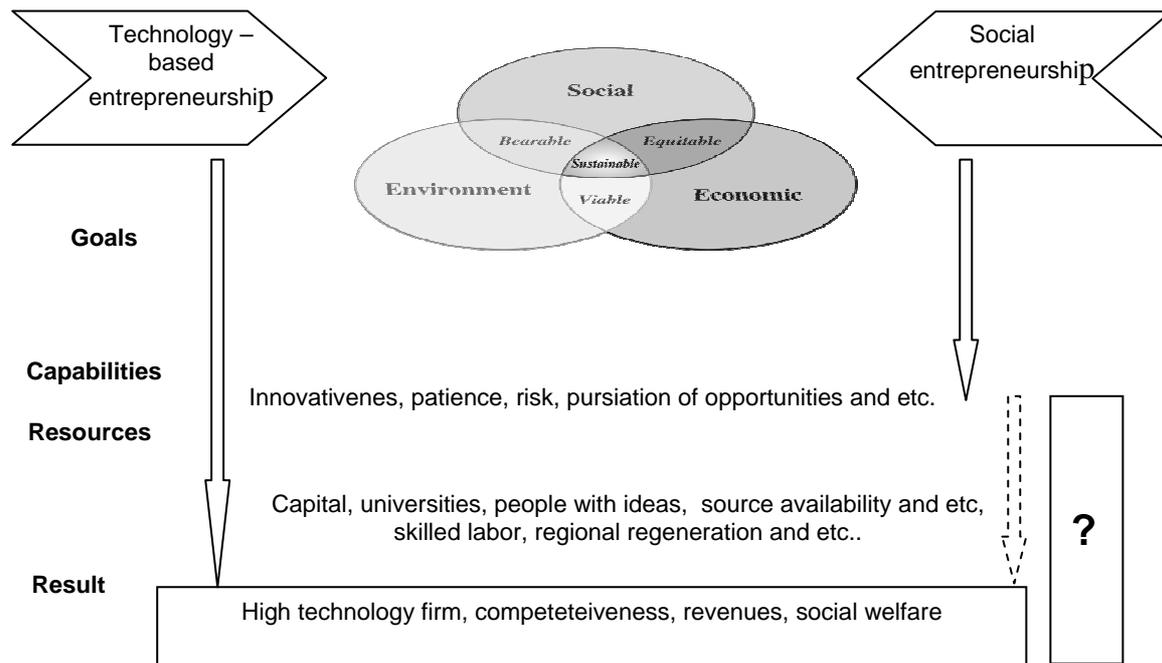


Figure 2 Principal understanding of sustainable development (adopted from [www.gdrc.org/sustdev/definitions.html](http://www.gdrc.org/sustdev/definitions.html))

The term refers to achieving economic and social development in ways that do not exhaust a country's natural resources. The essence of this form of development is a stable relationship between human activities and the natural world, which does not diminish the prospects for future generations to enjoy a

quality of life. Social entrepreneurship corresponds in most of the goals. It is seen as a field of experimentation and innovation, has the potential to contribute new insights to the discipline of entrepreneurship, and also to the wider social sector. The interfaces between corporations, universities and public institutions offer great potential for discovering new forms of collaborative value creation in support of sustainable development [3] and creation of social value. The outcomes of social entrepreneurship are social value creation. The implications of social value creation are that while a for-profit enterprise operating in aged care would be able to identify its total outcome as superior value creation. However, the authors assume that entrepreneurs working in high technology environment are by definition driven by self-interested profit-seeking motives. That means that entrepreneurs can *be motivated to contribute to sustainable development by making it profitable to do so, despite the fact that most motives and principles of social and technology based entrepreneurship do coincide, however, there some aspects that separate the development of these two phenomenon (Figure 3):*



**Figure 3** The divide between two forms of entrepreneurship (authors' own representation)

There is, therefore, a need for researchers to recognize that the above discussed principles are more of theoretical than practical manner. Theoretic, analysing resource-based theory entrepreneurial economic development state, focus not only on “founders” unique awareness of opportunities and ability to acquire resources needed to exploit the opportunity. The are tended to think that a communities economic development effort has a similar relationship to the development of sustainable competitive strategy. Despite the fact that most mentioned above factors and resources fostering technology-based entrepreneurship may have value to the community only as far as they can be mobilized in such a manner that new ventures find them more attractive than those found in another competing community. Thus communities compete for new business development relative to other communities by leveraging theirs resources. We suggest that the same question regarding how unique resources enable new firms to come into being can also be asked about how new sustainable entrepreneurs come into being. The creation of heterogeneous resources in communities in combination with the imperfect mobility, and substitutability of their resource positions can lead some communities to be more successful than other[5]. Extending this point we do conclude that a higher level of technology based start-up activity will also require new types of legal and accounting services that address their unique needs. With a higher level of start-ups activity **human resource dimension take on added significance**. Communities must assist in this process by sponsoring educational programs, such as Fast'Trac'Tech to help individuals learn more about starting a technology-based business. If a research university does not exist nearby, communities might consider leveraging the presence of existing technology firms and workers to establish strategic research partnerships. Finally, local authorities in Incipient communities must work with local real estate developers to create flexibility in physical workspaces. Entrepreneurial hot spots will develop unless the usual staple of

formal financial and infrastructure elements are supplemented by the development of informal resources in order to attach creativity class that characterizes technology workers. The question here is whether social entrepreneurship is able to induce the preconditions? The active fighters for the technology transfer will only help eradicate poverty when the realities of the poor inform decision-making and investment. Poor people's basic technological needs are generally overlooked in this process. Local communities' knowledge and skills go unrecognised, and they are given little or no role in choosing, controlling and assessing the impacts of imported technologies [3]. Seeking to overcome the aforementioned obstacles for technology transfer the author also concludes [3], that:

- Decision-makers should be identifying the most vulnerable groups of society, and determining how their existing knowledge could be strategically used to overcome poverty-related challenges;
- they should also be assessing how such individuals will be affected by the introduction of technologies, and how they can use these citizens' creative abilities to contribute to technology transfer decision-making and monitoring processes;
- but most decision-makers do not harmonise technology choices with their commitments to poverty eradication - technology is not an area where the poor's involvement is desired or expected. They are seen as passive recipients rather than as active and competent stakeholders able to analyse and choose the technology they want and need. Rather, technology transfer remains the professionals and technicians' prerogative - consideration of its sustainability and impact takes second stage.
- despite evidence from decades of development work worldwide that top-down approaches do not lead to sustainable solutions and can create dependency on external resources, most technology transfer targeted at the poor is still centrally managed through government or academic extension services; In this way, decision makers can favour the interests of more powerful stakeholders involved in distributing and promoting technologies over strengthening poor people's livelihoods ensuring ecosystem resilience and agricultural biodiversity. Instead of contributing to the public good, technology then becomes a commodity for those who can afford it.

The perception of technology transfer as being an exchange of hardware or knowledge only between specialists must be altered to also include recognition and strengthening of the poor's knowledge and skills to produce relevant products and services. This will be a challenging, but not impossible, task. Decision-makers' lack of understanding about poverty dynamics often results in little support for research agendas and technologies that respond to vulnerable communities' most pressing needs. But by building alliances between communities, development practitioners and researchers, they could bring diverse levels of expertise and knowledge together to create platforms for dialogue and decision-making that ensure viability, ownership and sustainability. The expertise developed in participatory processes can provide a solid base for developing pro-poor technology transfer and should be seriously considered in technology transfer agendas or discussions.

## 4. Discussion

In this paper, it was drawn the corruption, economic development, and entrepreneurship and innovation literatures to advance the hypothesis that better involvement of technology based business making in social entrepreneurship would allow to obtain so pursued goals of sustainable development and regeneration. It gives the managers of global corporations a unique opportunity to learn and create new collaborative efforts that are in the corporations' own economic interest, while at the same time creating social value for those who need it most. But experts of entrepreneurship believe that there are broad array of resources that must exist in communities that might establish technology-based competitive ventures. The academic research has shown that many communities even those undernourished may be only marginally successful in their efforts to combine these two strains of entrepreneurship. Despite the fact that activist of social entrepreneurship deeply believe in the ability of wide public of finding inerrable groups of society, and determining how their existing knowledge could be strategically used to overcome poverty-related challenges. It is also believed that decision makers can favour the interests of more powerful stakeholders involved in distributing and promoting technologies over strengthening poor people's livelihoods ensuring ecosystem resilience committing the technology as a commodity for those who can afford it. However, the question of developing unique bundles over time and that the development of these bundles in a particular even sustainable growing geographic areas in neither linear nor easily replicable what allows the statements concerning the merge of social and technological entrepreneurship treat to be of a open ground discussion.

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# Entrepreneurial Alertness: Turning Innovation into Economic Benefit

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This article is an investigation into Kirzner's concept of entrepreneurial alertness and its causes. Entrepreneurial alertness is the important link between innovation and economic benefits. Without alert entrepreneurs to discover potential applications and market needs, innovations can contribute very little to the economic benefit of regions and nations. Reaping full benefit from investments in innovation and R&D requires both that there be sufficient numbers of prospective entrepreneurs to commercialize the innovations and, more importantly, that these entrepreneurs be alert to the market potential of innovations as they emerge. By drawing from the decision theory of Simon and the schema theory from the cognitive psychology literature, a model is developed to show how the effects of innovations are mediated by entrepreneurial alertness to be recognized by entrepreneurs as opportunities for new businesses. Entrepreneurial alertness is seen to be the application of unique cognitive schemata that allow the entrepreneur to see potential in innovations that would not be seen by other managers. This entrepreneurial ability to see the market potential of innovations arises from differences in schematic richness, schematic association, and schematic priming. These three antecedents may therefore form a basis on which enhanced entrepreneurial alertness can be developed. From this it is argued that an important strategy for regional development must be the provision of regional programs that teach prospective entrepreneurs to develop different schemata. Recommendations for such programs are provided, based on the literature of schematic learning.

## Keywords:

Entrepreneurial alertness; Entrepreneurship education; Innovation; Opportunity spotting;

## 1. Introduction

Innovation is widely believed to be the path to the improved economic development of nations. As a result many countries invest large portions of their economic and human capital into fostering greater innovation. Collectively, these investments result in the creation of a knowledge infrastructure that supports innovation and creates new growth opportunities [1]. But innovation alone is insufficient to achieve significant economic benefits; many countries obtain little return on their investments as ideas sit unused or are exploited by other countries. The necessary second ingredient for growth of a nation is the presence of alert and motivated entrepreneurs, individuals who recognize the economic potential of the innovations and take action to turn this potential into market realities [2].

Individual people can differ widely in their ability to see new business opportunities within a given environmental situation. The social and economic impact of these differences is enormous, as the economic actions taken by entrepreneurs can have wide-ranging effects. These many benefits are contingent upon an individual entrepreneur noticing changes in the environment and discerning an opportunity for profit. Our current best understanding of this discernment is "entrepreneurial alertness". According to Kirzner, entrepreneurial alertness refers to "a sense of what might be 'around the corner', i.e., the sense to notice that *which has hitherto not been suspected of existing at all*" [5 pg. 12]. While arguing persuasively that entrepreneurial alertness is the critical economic driver of a dynamic and competitive entrepreneurial process, Kirzner did not attempt to explore the determinants of this alertness. He explicitly indicates that the antecedents of entrepreneurial alertness remain

unclear, although the prospect of profits is assumed to be the underlying motivation for alertness [5]. Early investigations into possible determinants of entrepreneurial alertness have suggested individual cognitive or psychological aspects of the entrepreneur, such as locus of control [6], psychological disposition [7], personality traits [4], and self efficacy [8]. But to-date there has been little work done towards a theoretical foundation for the antecedents of entrepreneurial alertness [9]. This gap in our understanding is important precisely because the effects of entrepreneurial alertness are so large. The primary contribution of this article will therefore be to suggest a theory for entrepreneurial alertness and to use this to identify determinants and educational approaches. The article will first discuss cognitive and structural influences on the attention of entrepreneurs and their ability to interpret changes in the environment, and then introduce schema theory as an explanation for the differences in their ability to notice environmental changes. Finally, it will use this theoretical basis to identify specific antecedents and educational strategies.

## 2. Alertness and Attention

The alertness perspective on entrepreneurial behaviour begins with the occurrence of changes in the environment, such as technological or economic shifts that have potential to change the value of products and resources in some market [5]. Some of these changes are of sufficient magnitude or salience to be noticed by individuals who are paying attention and are immersed in the corresponding knowledge corridors [10]. These individuals are able to discover opportunities within these changes, and to pursue these opportunities through entrepreneurial business actions.

The key role that is played by individual attention suggests an approach based on the psychology of strategic management, and particularly Herbert Simon's [11] view that the challenge of matching of problems, solutions, and actors within an organization is constrained by the limited attention capacity of individual decision-makers, and that organizations therefore allocate and channel environmental stimuli to the attention of individual decision-makers. While this view was developed in the context of strategic management in large organizations, it is also the essence of the challenge faced by entrepreneurs trying to evaluate new opportunities [12, 13] and to match available means with market ends [14].

This allocation is constrained both by limitations in cognitive capacity and by structural influences. Of these, the role of cognitive-capacity constraints is relatively well-understood. The allocation of attention is primarily constrained by bounded rationality and the routines of individual actors [15]. In a social context, the allocation of attention is also influenced by enactment of social scripts [16] and the loose coupling of the "garbage can" model of organized anarchy [17].

### 2.1 Structural Constraints to Attention

In contrast to the cognitive-capacity constraints of decision-makers, structural constraints are much less well-understood. Ocasio [18] presents an initial argument wherein structural influence follows three steps: (1) the existing allocation rules of the organization (both formal and informal) influence the distribution of the attention of actors among potential channels, (2) this organizational allocation combines with contextual factors to instantiate a "situated" attention, and (3) this results in a specific focus of attention for each actor, ready to notice and respond to environmental changes. Employing a more precise terminology, Barnett [19] then improves upon this model by revising the steps: (1) contextual structures (e.g., culture and informal rules) influence whether opportunities are enacted, (2) these enacted opportunities are then processed through concrete structures (e.g., business processes and tools) which allocate the opportunities to specific attention channels, and (3) actors within those channels use their situated attention to evaluate the opportunities and determine the appropriate organizational response. Figure 1 provides the representation of a combined Ocasio-Barnett perspective on structural influence.

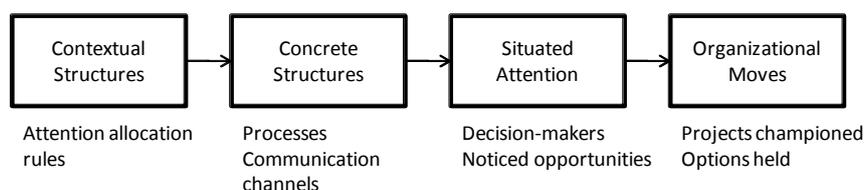


Figure 1 Structural influence

The enactment of situated attention is the key organizational requirement for noticing environmental change; the organization is dependent on a situated or contextualized attention to bring the environmental change forward for evaluation by the constrained cognitive capacity of the decision-makers. It is at this point that attention provides the foundation necessary to recognize any opportunities latent in the change [20, 21]. Thus, it must be at this point that entrepreneurial alertness somehow comes into play. But this approach does not yet clarify the exact nature of this entrepreneurial alertness, nor the mechanism by which it mediates the relationship between environmental change and the attention of decision-makers. For this, we turn to the theory of schema.

### 3. Schema Theory

Human beings use a variety of strategies for dealing with the volume and complexity of sensory information streaming in from the world. One powerful technique is the use of rules, scripts, and categorizations (called "schemata") to interpret incoming information and make sense of it [22]. These interpretations are combined with task requirements to create the mental models that we use to solve problems. A schema is a mental framework with "slots" to represent some set of real characteristics and relationships of a situation, which shapes or directs our interpretation of sensory phenomena. The invoked schema causes us to apply a particular mental image or model that ascribes meaning to what is happening, which we can then use to guide our subsequent reactions or behaviours.

When faced with a novel situation in the world, we invoke schemata to make meaning and understand relationships among the various sensory stimuli. For example if a stranger is strolling in a park with a furry mid-sized animal on a leash, these characteristics are sufficient to invoke a "dog-walking" schema – we recognize the animal must be a dog even if it is of some exotic breed that we've never encountered before. We can then use schemata to make predictions about future behaviours, as we can expect this novel dog to wag its tail and give us a sniff or to react in very predictable ways if we extend our hand towards it. The invoked schema stipulates the relationships among its elements (it is the person who is responsible for the well-being of the dog, and not the reverse) and the range of actions that can be expected (we know that the owner will likely be pleased if we pet the dog, but not if we free it from its leash). These schemata are particularly useful to us because they reduce the attentional burden of making sense of the world, as this sense-making and prediction of future behaviour can happen automatically without conscious effort [22, 23].

Different people may interpret and react quite differently to the same situation, depending on their surrounding contexts and on the content of the schema they apply to the situation. For example, your schema and mine may differ significantly based on our own prior experiences with dogs, so our actions might also differ. If you happen to have been a dog breeder or trainer before, your schema is also likely to be more complex and developed than my naive pet-owner version, making you aware of a greater range of relationships and possible actions. We might also differ in how a given set of observable characteristics invokes one particular schema and not another. The approaching dog in the park might invoke in me a schema in which I am likely to pet the dog and compliment it to the owner. But if you have recently been victim of a dog attack, the approaching dog might invoke a self-defence schema in which your action is to flee. The invocation of a "threat" schema, rather than "pet the dog", has been primed by your experience.

Our schemata are constantly being updated in the face of new information about the world. In particular, when some phenomenon does not accord with our existing schema we must make some changes to incorporate this new reality, the extent of which depends on how fundamentally the new phenomenon disagrees with our existing schemata [22]. If the change is very minor, it can be assimilated through simple accretion of new attributes of a schema (if, on meeting a new dog in the park, I am surprised that this one has no tail to wag I adjust my schema to indicate that "tail" is a frequent yet merely optional attribute of a dog). If the change is more substantial it may be necessary to make a more substantial accommodation or tuning of schemata (perhaps it is a "working" dog assisting a disabled person, such that the relationship of who is looking after whom is no longer simply unidirectional, and their appearance in the park cannot be assumed to be simply recreational). And if the change goes to the root of my schema a complete restructuring of it and related schemata might be necessary (perhaps something bizarre occurs, like the human is wearing the collar and leash and is being "walked" by the dog, which forces me to completely re-examine many of my preconceptions about the behaviours of humans, the capabilities of dogs, and the different possible relationships between them).

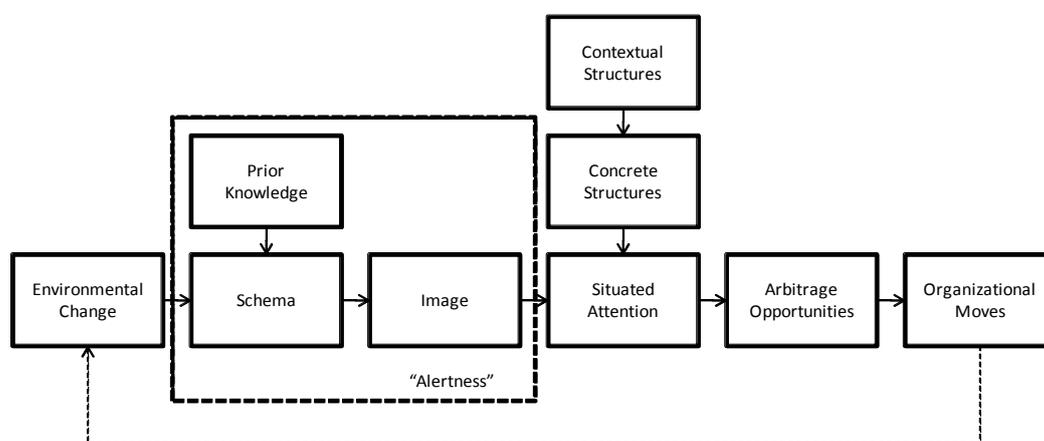
Because schemata are subject to this constant updating and refinement as we learn new things, they broadly reflect the prior knowledge, experience, and culture of individuals. In the case of

entrepreneurs, this may dispose them to schemata that differ from other people. This potential for schematic difference may be viewed as a significant example of entrepreneurial information asymmetry [24] and may explain the influence of their being embedded into specific information corridors [14].

### 3.1 Schemata and Entrepreneurial Alertness

Kirzner's theory of the alert entrepreneur attempts to explain how it is that some individuals are able to see and exploit entrepreneurial opportunities. But it is silent on exactly how these entrepreneurial individuals are able to make the leap from a noticed change in environment to a recognized opportunity for present or future arbitrage. This is the gap that schema theory is able to fill. Since individuals can differ in the schemata they employ and they can differ in the context and priming effects of specific environmental stimuli they may encounter, they can therefore impute very different meanings to the same observed phenomena. For example, two people both observe a long queue of people waiting for the cashiers at a grocery store. One invokes a customer-service schema and interprets the situation as a retailer who does not care enough about customer service to pay the cost of providing additional cashiers. The other, however, invokes a problem-solving schema and interprets the situation as a non-optimal resource dependency in the business. The second individual therefore is more likely to recognize the latent opportunity in this phenomenon, and therefore to see it as evidence of a market opportunity for alternative retail payment resources (e.g., self-serve technology). Schemata do not sit passively in the mind; they actively influence the filtering and detection of sensory stimuli – the selection of which changes in the environment become noticed, and what magnitude of change is required to be noticeable. For example, two individuals driving past a neighbourhood street sale may see people walking past the displayed goods without buying anything after checking pockets/purses and discovering that they are not carrying any cash. The first observer, lacking a schema for retail selling, may not consciously be aware the situation at all. But the second, having a finely developed retailing schema, is more likely to notice the passers-by as being lost sales, and to interpret the situation as a need for alternative payment mechanisms (such as an ability for homeowners to rent wireless credit-card POS terminals for the day). This means that individuals having different schemata will notice different environmental changes, and will be alert to different things. From this perspective, variation in entrepreneurial alertness is a manifestation of individuals having different schemata.

Figure 2 presents a model of how the application of schemata combines with the structural influences of the Ocasio-Barnett view to create a situated attention that is alert to entrepreneurial opportunities. The alert entrepreneur, having formed a contextualized intent to seek new opportunities, and by participating in concrete activities such as gathering market intelligence or assessing available resources, presents a situated attention ready to investigate and evaluate the opportunity potential of any phenomena that are brought to it. The alert entrepreneur also, by virtue of prior knowledge and the priming effects of experience, possesses schemata that relate various types of environmental changes to various types of potential opportunity. The alert entrepreneur is thus able to form mental images of the environment that are rich in potential opportunities. When these mental images are brought to the situated attention their latent opportunities are recognized and can then become the basis for entrepreneurial actions.



**Figure 2** How entrepreneurial alertness supports opportunity spotting

## 4. Discussion

The model presented above is an attempt to provide a theoretical mechanism for the effects long attributed to entrepreneurial alertness, and to thereby suggest some antecedents for heightened entrepreneurial alertness. It provides a much more detailed and specific description of the cognitive nature of entrepreneurial alertness and its relationship to the attention-channelling of Simon and others, one which integrates prior theoretical perspectives of entrepreneurship, prior knowledge, experience, environmental scanning, and entrepreneurial cognition. From this model three potential antecedents of entrepreneurial alertness can now be identified:

*Schematic Richness.* A single schema can differ between individuals by having representation of more attributes or more complex relationships, and in particular by whether it includes representation for business opportunities that are commonly associated. This difference is sometimes used to explain the differences in how experts and novices perceive situations [e.g., 25, 26]. If a schema for “malfunctioning business process” has representation for “weakest link” then the individual will be specifically attuned to notice the weak link and to consider whether replacing it constitutes an opportunity. But if the schema lacks such an attribute, then that individual will fail to notice the weak link and any associated opportunity. Similarly, an individual is more likely to see opportunity in a new social fad if their schema for fads includes representation for how money was typically made from previous fads. As a result, two individuals exposed to the same environmental change and ascribing the same meaning to it may still differ dramatically in the opportunities they perceive and in the subsequent actions they take.

*Schematic Association.* Individuals can differ in the schemata that they possess and how those schemata are associated with external stimuli such as environmental changes. It is therefore possible that a shared stimulus will invoke a different schema in one individual than in another. Moreover, a schema that is habitually used may become automated to the degree that it is activated without choice by the individual, in response to key attributes of the environmental situation [27]. In the earlier example of a grocery store with long cashier queues, the two observers differ in the degree to which they possess schemata associated with retail payments. These two individuals, on being exposed to the same environmental change, differ in the meaning they ascribe to it and the actions they could take in response.

*Schematic Priming.* Individuals can also differ in the availability and ease of activation of the various schemata they possess. Two people may be walking in a shopping mall and entering into the food court area. Although they possess identical schemata, their responses may be very different. A hungry person will be acutely aware of this environmental change and may perceive it as an opportunity to satisfy their hunger, while a person who is not hungry but is desperately searching for a replacement mobile phone will notice only that this part of the shopping mall is annoyingly devoid of telephone stores. The two people differ in which schema has been primed for activation and so, in response to the same environmental stimulus, one smiles while the other scowls. Such differences are sometimes referred to as keeping your “antennae” tuned [12 pg. 483, 28], or looking at world through “opportunity-spotting glasses” – both of which underline the deliberate nature of this priming by the entrepreneur.

### 4.1 Implications for Entrepreneurship Education

The foregoing understanding of entrepreneurial alertness as the application of richer, more diverse and primed schemata, may have significant educational implications for the development of alertness and the resulting spotting of opportunities. As noted earlier, schemata are not static for an individual entrepreneur, but are subject to accretion, accommodation, or restructuring the face of new non-conforming information from the world. An individual schema can be expanded or changed based on the individual’s experience with the application of that schema (e.g., new attributes can be added, exception cases can be noted). And sets of related schemata can also be changed through experience (e.g., boundaries among schemata can be redefined, and relationships such as generalization/specialization can be modified). In particular, an entrepreneur can learn to develop and apply schemata that are richer in their attributes and connections, or can learn to associate and habitually invoke new and different schemata in response to environmental stimuli, or can deliberately take steps to prime particular schemata for activation.

On all three antecedent dimensions, it appears possible for the entrepreneur to learn, develop, and enhance entrepreneurial alertness through strategies of schema modification. The objective of the modifications is to make the shift from the schema of the novice to the schema of the expert – a mental shift that is well-understood in cognitive science [29]. The schemata of experts can differ

substantially from that of novices, by being more complex, more parsimonious, or more abstracted (and certainly the schemata of experts have more accurate data). It is the goal of entrepreneurship education therefore to assist novices in changing their schemata to be more like those of expert entrepreneurs.

But herein lies the paradox for entrepreneurship educators. Learning to accommodate new information generally involves applying an existing schema and making accommodations or adjustments where new facts do not fit the existing framework – so the learner must have some pre-existing schema that can be reasonably be applied to the situation. But new entrepreneurs face the tasks of seeing opportunities and potential of *things that do not yet exist*, for which there may be no applicable schemata. So, teaching alertness and opportunity-spotting to prospective entrepreneurs has the unique challenge of trying to impart information to students when those students may not have any applicable schema on which to anchor it. As Carey [30 pg. 1123] explains it, the paradox is “that to understand something, one must integrate it with already existing knowledge schemata... [and yet] to impart new schemata to replace the student’s extant ideas, which differ from the scientific theories being taught”.

Research in educational psychology can suggest several methods of approaching and resolving this paradox, based on exposing students to analogies and inductive reasoning that encourages them first, to acquire new and relevant schemata, and second, to automate the invocation of these schemata in new entrepreneurial situations [31]. Following this approach, students would be exposed to several diverse examples of entrepreneurial problem solving (e.g., case studies of successful opportunity spotting) and explicitly told that the examples share underlying similarities. This approach enables them to transfer learning in one case to other cases, and thereby to begin to abstract a generalized new schema [32-34]. Testing and validation of this approach to schema acquisition has yielded some useful guidelines that may be adopted by entrepreneurship educators [31]. First, the process of induction and transfer, by which new expert schemata are learned, happens very slowly over a great many examples. So, it may take very much practice before novice entrepreneurs begin to develop the schemata to allow them be significantly more alert to new opportunities. Secondly, the learning of how to appropriately invoke these new schemata happens by repetition and observation of simple cases that do not involve significant cognitive loads. The practical implications for entrepreneurship educators interested in developing greater entrepreneurial alertness in their students may be summarized as follows: *Greater entrepreneurial alertness can be taught through extended repetitive practice of opportunity spotting and through observation of simple cases of opportunity spotting by others.*

Such an approach can be expected to be successful because it facilitates the acquisition and use of new expert schemata. The prospective entrepreneur thereby obtains schemata that are richer (through abstraction across diverse cases), more associated with environmental stimuli and changes (through inductive invocation), and primed for activation (through repetitive practice). These three attributes are the fundamental determinants of increased entrepreneurial alertness.

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# Financial sector in B-H and microcredit organizations in B-H

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The goal of the paper is the analysis of financial and micro-credit industry in B-H. The expansion of micro-credits is evident through an increase in placed micro-credits and the number of micro-credit users. Indicators of the growth in micro-crediting may include: the percentage of new clients per year, percentage of lost clients, percentage of clients who gave up further use of micro-credit, and percentage of clients who announce the repeated use of the credit. Reasons for high-quality ranking of B-H micro-credit organizations derive from the fact that they accomplished the set goals: employment, increase in household income, reduction of poverty, starting business, etc.

The characteristic pictures of economically dismantles systems led to the development of a specific supply of financial services. The key factor of the development of this form of supply has been conceived and designed at the level of international community and WB activity focused on the aid in development. The specific form of resources placement required a specific solution for the issue of the supply beneficiaries. Micro-credit organizations have a significant role in the B-H credit market, and one of the basic reasons for their great share in the overall financial market is the fact that a great number of persons that need such a kind of financial services do not meet credit-rating requirements required by commercial banks. The B-H micro-financial sector with its activities and overall assets is becoming increasingly significant for the development of small and medium-sized businesses that cannot access commercial loans so easily. In his way, the micro-financial sector boosts employment, reduces poverty, and contributes to the development of the entire society.

Primary and secondary research among service users was used for the purpose of the research. Scientific analysis studied the number of clients and the number of credits by years, average term of the credit, average loan amount and the percentage of suspicious and external credits.

## Key words

financial sector, microcredit sector, microcredit clients, microcredit organizations

## 1. Introduction

A more significant development of microcredit organizations and microcrediting in Bosnia and Herzegovina [1] started in 1996. War activities in B-H resulted in huge destruction of industry, appearance of a great number of refugees and disabled war veterans. War activities and additional effects of war activities led to sudden impoverishment of almost all population categories in B-H. The fact that a great number of community members was left jobless and thus without permanent income significantly contributed to this situation. All these had a strong effect on the development of poverty.

Microcredits are (a form of) financial services created in countries and regions with a high share of poor population, as a rule unemployed and without a permanent source of income. The development of such a form of offer was conceived at a level of international community and WB (World Bank) activities focused on aid in development. It is a mode of creating a system of investing available resources in the form of loans, in an accessible and acceptable way, and thus allowing a multiple use of available funds.

## 2. Development of microcredit organizations in B-H

The expansion of microcredits is particularly visible through the growth of the number of granted microcredits and the number of microcredit users. For illustration purposes, we will list only data for five microcredit organizations among twelve microcredit organizations that cover 98% microcredit market; thus the sample is representative since it includes data for 42% large microcredit organizations. [2] Data were collected through direct research and primary data collection. Research produced the following results. [3]

In 1996, at the start of microcredit organizations' activities, the number of clients amounted only to 1,350, in order to grow to 102.300 in 2008. Every year the number of clients registered a high growth rate. A similar growth trend was also registered in the growth of the number of credits. From the initial 1,350 credits, as many as 108,000 credits were granted in 2008. The percentage of new clients registers a fairly high growth, between 24% and 63% compared to the previous year. The percentage of lost clients registers a high percentage of clients lost for various reasons (move, disease, death, old age, etc.) and ranges from 16% to 26% in various years. The percentage of clients who gave up using microcredits is also fairly high. It ranges from 17% to 39% in different years. Reasons for giving up

**Table 1** Data from 5 MCO

DESCRIPTION	1996	1997	1999	2000	2001	2002	2003	2006	2007	2008
NUMBER OF CREDITS	1,350	6,620	9,100	22,300	38,000	56,100	74,200	95,400	98,000	108,000
NUMBER OF CLIENTS	1,350	6,400	8,700	19,300	32,000	44,100	55,500	84,500	92,400	102,300
PERCENTAGE OF NEW CLIENTS	38	63	36	29	33	38	32	27	26	24
PERCENTAGE OF LOST CLIENTS	26	24	18	23	24	26	18	22	16	19
PERCENTAGE OF CLIENTS WHO GAVE UP	28	33	39	28	21	31	33	19	18	17
PERCENTAGE OF CLIENTS THAT ANNOUNCE REPEATED USE OF CREDIT	65	66	58	59	63	61	59	65	52	56
PERCENTAGE OF SUSPICIOUS AND DISPUTABLE CLIENTS	1.8	1.6	2.1	2.2	1.9	1.8	2.2	2.1	2.4	2.5
PERCENTAGE OF SUED CLIENTS	1.7	1.7	2	2.1	2.1	1.9	1.8	1.9	2	1.9
PERCENTAGE OF CLIENTS WHO TOOK THE SECOND CREDIT	52	48	22	39	44	48	51	59	51	52
PERCENTAGE OF CLIENTS WHO TOOK THE THIRD CREDIT	29	31	23	29	35	32	28	33	29	31
PERCENTAGE OF CLIENTS WHO TOOK MORE CREDITS	15	17	16	14	19	18	17	14	18	19
AVERAGE TERM OF OAID-OFF CREDITS	9	11	15	19	21	20	22	23	22	20
AVERAGE CREDIT AMOUNT	1,400	1,620	2,000	2,100	2,400	3,100	3,200	4,600	5,100	5,350

**Source:** Vujic S (2010), own data collection

(based on their own decision) vary, for instance closing business, shift to bank loans, no need for new microcredits etc. However, the percentage of clients who are announcing repeated use of credits is high and ranges from 51% to 66% every year. The percentage of suspicious and disputable claims expressed the volume of clients that are two or more installments overdue. The percentage between

1.5% and 2.5% is fairly low and tolerable, which suggests that clients are regularly paying off their microcredits. The indicator of sued clients is also fairly low and ranges from 1.7% and 2.1% in different years. Based on the collected primary indicators, the percentage of clients who are taking the credit for the second time is very high and ranges between 39% and 59%. The percentage of clients who are taking a credit for the third time is fairly high and ranges from 27% to 35%. Finally, the percentage of clients who are taking a credit for the fourth or more times is comparatively high and ranges between 14% and 21%. The percentages reveal that clients are satisfied and loyal to MCO since they repeat credit cycles. Indicators of the average length of payment of paid-off credits are also interesting for microcredit analysis. Starting from the initial, nine-month period in 1996, the duration of payment period has been increasing. In 2006, it was 23 months, and 20 months in 2008. Clients who move to a new cycle have the possibility to increase the term of payment. The average amount of credit reveals the increase of microcredit amount. From the initial average of 1,400KM in 1996, the average grew to 5,350KM in 2008. The data that the average credit amount constantly increased is interesting, since it related to the increase in term of payment. The average credit amount was 5,350Km, and payment term was 20 months. [4]

### 3. Financial sector in B-H and microcredit organizations

The financial sector in B-H includes the activities of the microcredit sector. Financial sector in B-H includes activities of banks, investment funds, leasing companies, insurance companies and microcredit organizations. "Financial markets include all the institutions and procedures that link customers and issuers of financial instruments. [5]

Although the structure of B-H financial sector is fairly simple compared to some countries in the region, sources of potential future risks can be identified. Capital connection between different financial market segments is increasing, and it is necessary to shift the focus from banking to the entire financial sector in the future. Leasing companies are most often part of foreign banking groups, and the number of insurance companies that are part of foreign groups which also include commercial banks is also increasing. Besides, commercial banks have separate divisions or legal persons within the group that have the role of intermediary in capital markets. Besides, The growth of bundling products of different parts of financial sector is obvious, most often within the same group (e.g. commercial banks that granted mortgages together with real estate insurance policies with the insurance company that operates within the group).

Same as in previous years, the increase in credit growth is one of the main characteristics of B-H financial sector. [6] Further restructuring and enlargement of banks results in better capitalization, banks that have a larger credit potential and that attempt to increase their market shares in B-H. Banks continue developing and introducing new banking products that better satisfy client needs. Thus clients need to finance their activities and mainly rely upon bank loans which is, among other things, a results of a lack on alternative financing sources. If the demand structure is observed, the greatest part pertains to households (47.5%), private non-financial enterprises (44.2%), while only a small percentage (less than 1%) of demand for loans pertains to the government sector. The largest part of credit growth pertains to two sectors: households and private enterprises. These two sector together make up over 95% of the overall credit growth. It is obvious that commercial banks still consider these two sectors as the most reliable clients, while other sectors have low capacity dor indebtedness. B-H banking sectors includes 30 banks (21 mostly forign-owned, seven mostly locally, privately owned and two mostly state-owned).

B-H microfinancial sector with its activities and overall assets is becoming increasingly important for the development of small and medium-size businesses, which have a difficult access to commercial loans. In this way, the microfinancial sector encourages employment, decreases poverty and helps the development of entire society.

According to the data by Microfinance Information Exchange (MIX) [7], as many as seven B-H microcredit organizations were among the first hundred ranked microcredit organizations in the world. [8] By the number of microcredit organizations, B-H shares the second place with Ecuador, while India is the first ranked, with nine MCOs among the best hundred.

B-H microcredit organizations business has been regulated by law since early 2007, when Entity laws on microcredit organizations [9], came into effect. In 2008, a few additional regulations were passed that regulated MCO business in more detail. Entity laws on microcredit organizations assigned the role of microcredit sector supervisor to the competent Entity Banking Agencies. Pursuant to these laws, microcredit organizations had to conduct the transformation into one of the legally offered forms, non-profit microcredit foundation or a microcredit company, as a form of for-profit organization. Thus, by

the end of 2008, out of 27 licensed B-H microcredit organizations, 23 were registered as microcredit foundations and four as microcredit companies.

MCO sector finished 2010 with lower rates of return on capital and assets compared to previous years. Profitability indicators are still at a higher level than those in banking and other financial sectors. When MCO business indicators are observed and compared to the previous year, microfinancial sector in 2010 was more significantly affected by the global financial crisis. The effect of financial crisis is mainly evident through a more difficult access to foreign capital, Institutions that provide loans to this part of B-H financial sector limited their investments, increased interest rates and shortened terms of payment, and thus MCOs were also forced to start a serious risk control and make stricter conditions for granting credits.

B-H leasing sector [10] - besides a significant increase in the volume of financing through leasing in previous periods, B-H leasing market is still a lower-developed segment of the financial sector. Law on Leasing in RS was passed in November of 2007, and in FB-H, where most leasing companies are based, Law on Leasing was adopted only in late December of 2008. Pursuant to these laws, supervision over the leasing companies' business was assigned to Entity Banking Agencies, while the division of leasing market by Entities creates difficulties for leasing companies that operate across the country. Additional problems in B-H leasing market were created by the unconfirmed other regulations with leasing operations, so that in case of financing through leasing there is double taxation based on the Law on Real Estate and Law on VAT. Besides, the problem resulting from provisions of Law on Road Transport of FB-H has not been resolved yet. In 2010, there were nine leasing companies operating in B-H, seven of which were members of Association of Leasing Companies. Leasing companies have also been affected by the global economic crisis.

The insurance segment as part of the overall financial system has a significant share in the B-H financial market. In 2010, 26 insurance companies were operating in B-H. The new Law on Insurance and established insurance agencies at Entity levels and Insurance Agency of B-H allowed the unique implementation of law in the area of insurance and insurance companies' activities in whole B-H.

## 4. Conclusion

Microcredit organizations operate in the area of banking services. "Microcredit organizations base their goals on the combination of banking and social causes. [11] The basis of financial services is the sales of money whereby the supplier achieves its goals, particularly profit, through interest, while the customer (user) uses it to perform its entrepreneurial activity and achieve its business goals, including the business profit. Microcredit organizations operate by banking principles: they collect financial resources for their crediting potential, sell credits with interest, insist and achieve payment of credits – principal and interest, and usually achieve a surplus income above all the business costs.

In the B-H credit market, [12] microcredit organizations have a significant place, and one of the basic reasons for their great share in the overall financial market is the fact that a great number of persons who need this type of financial services do not satisfy pre-requisites required by commercial banks.

Result of MCOs as non-profit organizations, after their establishment and initial results, show that they achieve significant results through a very high growth of the number of clients, as well as the value volume of sold microcredits. The goal of microcrediting growth is the achievement of self-employment, starting own small business, which in turn leads to increase in income and reduction of poverty. Discovering, understanding and anticipating changes in the environment must be oriented to recognizing and developing opportunities that vary from obvious to "unthinkable" and should be brought to the surface". [13].

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# Decision making on Innovation process

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**Any process of innovation must define and describe the actions and outcomes that result from the application of specific methods and tools (and the reasons behind these methods and tools). The actions of people following the process take place over time and, therefore, have a time linear nature that, if described strictly by a linear sequence of activities and events, belies one of the most important aspects of the innovation process itself - it is not linear! The process of innovation relies on the non-linear methods of iteration and abstraction. Iteration because that is how we learn things and obtain new knowledge, by going back, refining and maturing what we know to gain insight and understanding of the things we see and learn. Abstraction because that is how we synthesize knowledge, sees patterns and makes connections to new things. Both of these activities, iteration and abstraction, are inherently non-linear, yet must necessarily take place over time as a series of concrete actions by people using a process for innovation.**

The process described here is laid out as a sequence of Process stages that unfold over time. These stages can happen, however, at different levels of abstraction or generalization and there are many, many iterative elements within each stage and between stages. These iterative and generalization components are an inherent part of the process and methods employed

## Key words

Decision making, Innovation

## 1. Innovation process

The best approach is to have a comprehensive innovation process management (IPM) structure that treats innovation as a series of cycles that run within a grand, enterprise innovation process cycle. The cycle starts with a problem or goal which needs to be formulated into an innovation challenge. Once this is done, the challenge is presented to the problem solving group. This may be done in the form of a brainstorming event, ideas campaign or other activity. The group problem solving group may be a team, all employees in the firm, the public or any other group of people.

## 2. Collaboration

In order to maximize the creative potential of the problem solving group, the idea generation activity should be collaborative in nature. This can be accomplished in many ways. Idea management and innovation process management software often provides on-line collaboration tools, while facilitators of brainstorming and other ideation events should promote collaborative idea development.

## 3. Combination

Because an innovation process cycle starts with a challenge, ideas tend to be interrelated and many are complementary. Hence, before going further, it is best to combine such complementary ideas into larger, more sophisticated ideas so that they can be handled as a single package. This makes the next steps in the cycle more efficient.

## **4. Scientific Peer Review Evaluation**

Here is where a lot of innovation initiatives break down: choosing the best ideas. Many poorly thought out approaches use voting, which is a good way to identify the most popular idea, but an appallingly ineffective method for identifying the most potentially innovative idea. I have also seen organizations put a great deal of effort into idea generation, leaving the final decision to a manager who basically picks out her favorite idea. Assuming the manager has suitable business expertise, such an approach is better than voting – as it is based on expertise rather than popularity – but it is typically far from perfect.

## **5. Testing and Development**

Ideas identified as being potential innovations are now ready to be tested and developed. Here is where typical business tools come in useful. A business case is a useful means of hypothetically implementing an innovative idea and projecting the potential results. Of course it is not perfect, but it indicates possible issues in the implementation of the idea, as well as benefits that may not have been obvious to the original idea developers.

## **6. Decision making on Innovation process**

Prototypes are an excellent means for testing ideas. Not only do they allow you, your colleagues, customers and others to see how an idea would actually look in implementation, but building and playing with a prototype is a good method of further improving upon the core idea. Prototypes are, of course, ideally suited towards material ideas such as new products. But more abstract ideas, such as new services, process improvements and other concepts can often be prototyped through role-play, building structural models and making diagrams.

## **7. Implementation**

Ideas that make it through testing and development are ready to be implemented. Unless the idea is a radical change from your usual activities, you don't need me to tell you how to do this!

## **8. Review**

Once ideas have been implemented, they need to be reviewed, probably against an ongoing series of milestones. If an implementation does not achieve a milestone, it needs to be modified or killed. Moreover, even the most spectacularly effective and profitable breakthrough innovations need to be improved on a regular basis.

## **9. New Needs and Inspiration**

Hence, reviewing the implementation of new ideas should indicate new needs which can be transformed into challenges which, in turn, start a new innovation process cycle. Likewise, implementations can inspire new corporate goals. Again, these can be turned into new challenges and new cycles.

Any process of innovation must define and describe the actions and outcomes that result from the application of specific methods and tools (and the reasons behind these methods and tools). The actions of people following the process take place over time and, therefore, have a time linear nature that, if described strictly by a linear sequence of activities and events, belies one of the most important aspects of the innovation process itself - it is not linear! The process of innovation relies on the non-linear methods of iteration and abstraction. Iteration because that is how we learn things and obtain new knowledge, by going back, refining and maturing what we know to gain insight and understanding of the things we see and learn. Abstractions because that is how we synthesize knowledge, see patterns and make connections to new things. Both of these activities, iteration and abstraction, are

inherently non-linear, yet must necessarily take place over time as a series of concrete actions by people using a process for innovation.

The process described here is laid out as a sequence of Process Stages that unfold over time. These stages can happen, however, at different levels of abstraction or generalization and there are many, many iterative elements within each stage and between stages. These iterative and generalization components are an inherent part of the process and methods employed. The methods used are:

- Iterative Deepening (Iterative development and refinement of knowledge)
- Searching & Exploration (Evidence-based search and discovery)
- Knowledge Synthesis (Pattern Recognition and inductive reasoning)

Mastering these two techniques allows the innovator to gain the necessary knowledge, and to use it in the right ways, to discover those new things that are unknown and valuable.

Innovation, according to Schumpeter (1934), covers:

1. The introduction of a new good or a new quality of the good
2. The introduction of a new method of production
3. The opening of a new market
4. The conquest of a new source of supply
5. The carrying out of the new organization of an industry

The “newness” need not necessarily involve “new” knowledge thereby effectively implying that the “newness” may also concern advancement or modification of existing knowledge. Innovation, according to Rogers (2003), is “an idea, practice, or object that is perceived as new by an individual or other unit of adoption”.

The innovation process encompasses several systematic steps, beginning from problem/requirement analysis to idea generation, idea evaluation, project planning, product development and testing to finally product marketing.

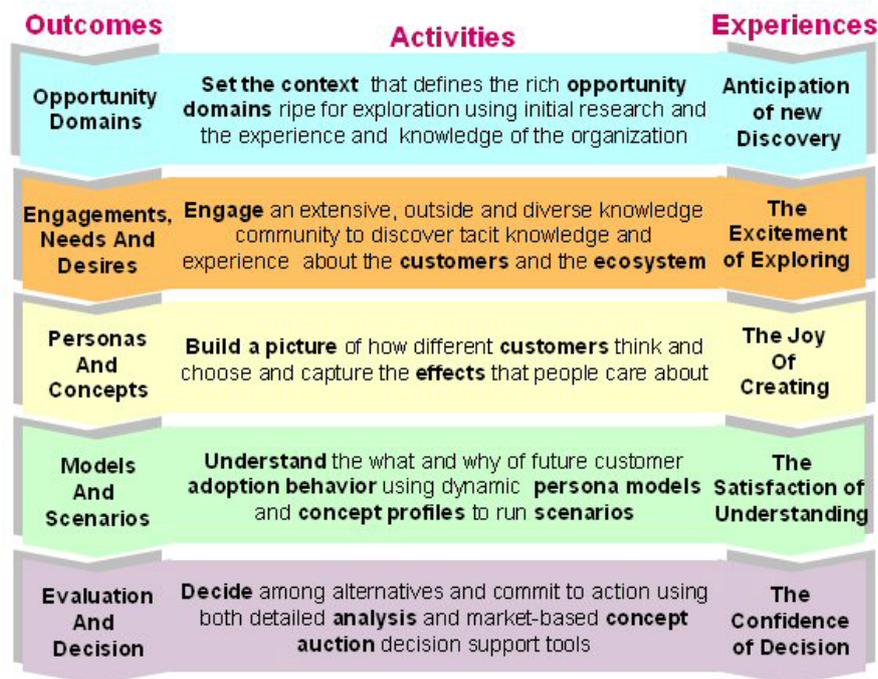
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Mastering these two techniques allows the innovator to gain the necessary knowledge, and to use it in the right ways, to discover those new things that are unknown and valuable. One of the most important processes in any effort to innovate is to discover new opportunities to go after. This Opportunity Discovery Process focuses on finding specific unmet needs and desires that can be the basis for new and practical solutions. The focus of this process is on people and what they want, rather than on technology and what it can do. Mastering this process results in an on-going, continuous, front-end 'engine' that drives all innovation effort. These are shown in the following diagram which depicts the stages from the perspective of the outcomes, the activities and the experiences of those involved.

Figure 1 [graphic from Process Framework] Tools



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# Personal values and goals of young entrepreneurs in Macedonia

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**Promoting entrepreneurship is considered one of the most effective ways to address and reduce the problems of joblessness and poverty in developing countries in the world. Each country should develop its own model of entrepreneurship and promote entrepreneurial behaviors as a key factor of the economic development, growth and prosperity. Educational system is one of the most important in building of entrepreneurial society, to enhance the entrepreneurial spirit and culture as a common value. Entrepreneurial learning and life long learning are considered to be most effective ways of promoting creativity and innovations.**

**We usually assume that entrepreneurial traits are universal. But survey results from all over the world show that there are specific differences between entrepreneur's personality and their personal values.**

**Therefore, our research looks into psychological values that motivate Macedonian young people to become business owners. We examined the values of Macedonian young entrepreneurs because values drive attitude, which may eventually drive behavior. Thus, knowing the value priorities of business owners will help us know how the choice of establishing their own business is formed. Second, we investigated the linkage between value priorities and firm performance and survival. Our results would help to promote entrepreneurship in R. Macedonia by identifying and investing in aspiring entrepreneurs.**

## **Keywords**

Entrepreneur, Entrepreneurship, Entrepreneurial learning, Personal value system, Young people

## **1. Introduction**

Entrepreneurship, as a process of business organization, management and risk-taking, has introduced significant changes in the national and world economy. The entrepreneur has a vision and exercises judgment; the entrepreneur is decisive, motivated, optimistic, courageous, dedicated, willing and skilled to create the optimal combination of production factors in the realization of an idea. Entrepreneurs are small business managers who never rest; they always create and introduce quality, demand and seek changes, innovations and idea realizations. They are competent in sensing the market needs and react quickly upon them, ready to take risk. An entrepreneur realizes ideas; an entrepreneur has a vision and goals to be achieved. Entrepreneurship, as an immeasurable factor of business development, manifests its prime through the growth of small businesses. The small business is oftentimes described as the backbone of entrepreneurship. It constitutes the ideal environment which enables the exposure of the entrepreneurs' real talents and the realization of envisioned ideas. The freedom of self-employment offers an unlimited range of opportunities for economic prosperity and development. An essential factor of successful work – the ability for decision-making to reach a goal – is a vital characteristic of entrepreneurship. The capital and the natural resources remain passive developmental factors and only the active role of the human factor with its creative capability can act as the force towards the creation of new wealth and economic and social welfare. In all successful economies, entrepreneurs are viewed as essential and dynamic factor for

economic growth, as driving factors towards the creation of new jobs, and the advantages of small businesses are by now almost universally accepted". [1]

## 2. Definition of Entrepreneurship

Entrepreneurship is a process of initial business risk, organization of resources and taking into account future risk and gains. An entrepreneur is a person capable of recognizing and executing sustainable business ideas. Entrepreneurs are idealists but they are also persistent, hard-working and energetic persons. They don't waste time; rather, they use their talent and knowledge, their skills, their time and energy. The term "entrepreneurship" originates from the French verb "entreprendre" which means attempts, takes on; the noun "entrepreneur" denotes a person who attempts, undertakes, an entrepreneur. The phenomenon of entrepreneurship must be nurtured and developed as it creates new values and develops the creativity in people.

Despite the multitude of varying theoretical standpoints in respect to the treatment of entrepreneurs in modern economic theory, a question arises as to whether entrepreneurs are predestined for their business activities or whether their excellent organizational skills and creative and innovative characteristics are a direct result of adequate environments and the solid academic background in management, marketing, IT etc., all of which influence the personality of an entrepreneur. The latest work of Thomas L. Harrison titled "Instinct" [2] suggests the genetic preordainment of entrepreneurs to be creative, active and innovative. We hold this to be very true, but a certain dose of creativity resides in every person and needs stimulation and guidance. The entrepreneur is future-oriented with constantly new ideas and production innovations, which makes entrepreneurship a dynamic development factor, given the strong correlation between the development and entrepreneurial function. With the creation of a favorable business environment for the development of entrepreneurship, with no administrative and legal barriers, through the active operation of marketplace legalities, with the elimination of the monopolistic role of certain large enterprises and commercial groups, and of course with the active policy of support for entrepreneurial activities, the conditions for economic development ripen. Therefore, entrepreneurship stands for the undertaking of business activities, a philosophy of business functions which enable the expression of creativity, innovation, and the creation of new values through the realization of advanced business ideas.

### 2.1 Types of entrepreneurship

Entrepreneurship, as a philosophy of business activity in the marketplace (given the nature of the marketplace being one of greatest freedom of activity) is characterized by creativity and innovation in all spheres of economic and social life.

Thus, entrepreneurship manifests itself in:

- Large corporations (intrapreneurship) – otherwise known as internal entrepreneurship and employee innovation, specifically in the production function with the invention of new technological solutions and practices by individual entrepreneurs;
- New Technologies Entrepreneurship – which is also called technopreneurship;
- Information Technology Entrepreneurship – also known as infopreneurship;
- Social entrepreneurship – a reflection of the active role of the non-governmental sector and all institutions and individuals who introduce change in the social environment of life and work, in conjunction with the active government policy of social prosperity and wellbeing.

### 2.2 Characteristics of entrepreneurs

The basic characteristics of entrepreneurs include:

- Self-confidence
- Talent
- Creativity
- Challenge
- Dynamism
- Vision
- Initiative

- Realism
- Optimism
- Ability to take criticism
- Wit
- Persistence
- Risk-taking
- Independence
- Polyvalence
- Need for realization
- Flexibility
- Envisioning
- Energy
- Non-conformity
- Profit-orientation [3]

Without delving into too deep an analysis of whether these characteristics are a result of the psychophysical personality of someone (in other words, genetic) or a direct result of the educational and learning system of continuous education and experience, we can presume that only with a reciprocal correlation (i.e. with constant nurturing, with the knowledge of the brave economic visionaries) can excellent entrepreneurs evolve and jumpstart entrepreneurship.

Other authors accentuate the desire to create large companies, the capacity for large deals and the feeling of moral and legal responsibility to finish what has been started, as main personality traits of entrepreneurship. They are optimists, perfectionists, excellent organizers; they are profit-oriented – not at any cost, but as a direct result of their efforts. Entrepreneurship is of course one of the largest social and economic forces of our days. This force has an incredibly strong influence on all economic activities within a society.

### 3. Personal values

Rokeach [4] defined a personal value as an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to its opposite. A value system is an enduring organization of beliefs concerning preferred modes of conduct or end-states along an importance continuum. Two kinds of values-instrumental and terminal-were defined as a person's beliefs concerning desirable modes of conduct and desirable end-states of existence respectively.

Grunert and Scherhorn [5] identified five features of personal values. Values were described as:

- concepts or beliefs,
- about desirable behaviors and/or end states,
- that go beyond specific situations,
- guide the selection or evaluation of events and behaviors, and
- are ordered by a certain hierarchical importance.

The conceptualization of personal values in terms of social adaptation theory posited that personal values are the most abstract type of social cognitions that function to facilitate adaptation to one's environment. The concept of regarding personal values as mediators in the social adaptation process implies that value differences between cultures can be traced back to different ethnic background and the social, economic, political, and technological environments.

The original version of the Rokeach Value Survey consisted of 18 instrumental values or ideal modes of conduct and 18 terminal values or ideal end-states of existence that were rank ordered in terms of their importance as guiding principles of the respondent's life. To facilitate the ranking task, each value was contained on a pressure sensitive gummed label and respondents were instructed to re-arrange the labels until the best ordering of the relative importance of each value was achieved.

The major limitations of the original version of the RVS include:

- subjects are forced to rank one value at the expense of another which may actually be equally important to them,
- the presentation of the 36 value items may exceed the respondent's ability to accurately process information and thus distort the ranking procedure,
- the ranking nature of the data precludes the use of a wide variety of useful statistical analysis techniques that might otherwise be used [6]

**Terminal Values** refer to desirable end-states of existence. These are the goals that a person would like to achieve during his or her lifetime. These values vary among different groups of people in different cultures. The terminal values in RVS are true friendship, mature love, self-respect, happiness, inner harmony, equality, freedom, pleasure, social recognition, wisdom, salvation, family security, national security, a sense of accomplishment, a world of beauty, a world at peace, and a comfortable life and exciting life.

**Instrumental Values** refer to preferable modes of behavior. These are preferable modes of behavior, or means of achieving the terminal values. The instrumental values are: cheerfulness, ambition, love, cleanliness, self-control, capability, courage, politeness, honesty, imagination, independence, intellect, broad-mindedness, logic, obedience, helpfulness, responsibility and forgiveness. [7]

### 3.1 Hypotheses Development

We examined the value system of Macedonian entrepreneurs, because values drive attitude, which may eventually drive behavior. Thus, knowing the value priorities of Macedonian entrepreneurs will help us know how the choice of establishing their own business is formed. For further investigation we can explore the linkage between value priorities and firm performance and survival. The results will find will help us to promote entrepreneurship in Macedonia and investing in aspiring entrepreneurs.

Our hypotheses were based on Fagenson's [8] findings of American entrepreneurs using Rokeach's value measure. Surveying 168 owners of small businesses in New York, New Jersey and Connecticut, Fagenson found that American entrepreneurs ranked three terminal values (self-respect, freedom, and a sense of accomplishment) and seven instrumental values (honesty, ambition, being capable, independence, courage, imagination and being logical ) as the most important values to them and the ranking was in this particular order. In other words, American entrepreneurs wanted to be free to strive for achieving and actualizing their potential. Americans also valued terminal goals more highly than instrumental techniques. Fagenson attributed her sample's entrepreneurial aspiration to these specific values.

Hypothesis 1. Macedonian entrepreneurs' most important terminal values will reflect both collective and personal orientation.

### 3.2 Method

1. **Participants.** We utilized a convenience sample of 45 business owners from Macedonia. Typical demographic information of business owners was collected (e.g., gender, age, and education level). In terms of gender, 70% of respondents were male and 30% were female. Their average age was 23.6 (min = 18; max = 35). In terms of educational attainment, the majority of participants held a college degree or higher (65%); some held an associate college degree (15.4%) or a high school diploma (15.4%).
2. **Procedure and Measures.** Data were collected during the summer and fall of 2010. Entrepreneurs were contacted and asked to be interviewed by one of five trained researchers. Macedonian entrepreneurs' personal value system was assessed with the Rokeach's Values Survey. The RVS consists of 18 terminal and 18 instrumental values listed in alphabetical order. Terminal values are concerned with "end states of existence" or the priority of life goals or motives; instrumental values are concerned with "modes of conduct" or behavioral techniques used to execute goals. [8] Examples of terminal values include "a comfortable life (a prosperous life)" and "a world at peace (free of war and conflict)"; examples of instrumental values include "ambitious (hard-working, aspiring)" and "honest (sincere, truthful)". Macedonian entrepreneurs were asked to arrange the terminal values first, then the instrumental values, "in order of importance to *you*, as guiding principles in *your* life".
3. **Results.** Terminal versus Instrumental Values. Hypothesis 1 stated that Macedonian entrepreneurs' most important terminal values would reflect both collective and personal orientation. The results of value rankings were reported in Table 1. As shown in the table, in terms of terminal values, Macedonian entrepreneurs pursued life goals that were somewhat similar to American entrepreneurs' key terminal values (e.g., self-respect, freedom, and a sense of accomplishment). Specifically, Macedonian top five life goals included happiness, a sense of accomplishment, a comfortable life, family security, and national security, values that are both personal and collective in orientation.

**Table 1** Mean Rankings for Macedonian Entrepreneurs' Terminal Values

Terminal Value	Ranking
happiness	1
a sense of accomplishment	2
a comfortable life	3
family security	4
national security	5
social recognition	6
wisdom	7
a world at peace	8
freedom	9
self-respect	10
equality	11
true friendship	12
pleasure	13
an exciting life	14
inner harmony	15
mature love	16
a world of beauty	17
salvation	18

**Table 2** Mean Rankings for Macedonian Entrepreneurs' Instrumental Values

Instrumental Value	Ranking
intellectual	1
capable	2
responsible	3
self-controlled	4
honest	5
independent	6
ambitious	7
loving	8
courageous	9
helpful	10
broadminded	11
logical	12
polite	13
cheerful	14
forgiving	15
imaginative	16
clean	17
obedient	18

Life goals such as a world of beauty (beauty of nature and the arts), mature love (sexual and spiritual intimacy), inner harmony (freedom from inner conflict), and an exciting life (a stimulating active life) were ranked as the least important, similar to the rankings of the same values by American adults. Taken together, our findings replicated those found by Fagenson to some extent. Therefore, Hypothesis 1 received support.

## 4. Conclusions

In this survey we found that, to a certain extent, Macedonian entrepreneurs did uphold values similar to those of American counterparts in the literature. The findings provided evidence for the notion that some personal values of entrepreneurs are universal across countries or cultures. For example, whereas our findings in the present study showed only the value of a sense of accomplishment as an exact replication of Fagenson's study, the rankings of happiness and family security values were similar to the rankings of those values by American adults. Further, although not being ranked among the top five terminal values by Macedonian entrepreneurs, freedom and self-respect did receive the ninth and tenth rankings respectively.

Although not studied in the scope of the present research, future investigators may want to extend the findings to examining how values may be managed, socialized and promoted in Macedonia. Regarding entrepreneurial motives of Macedonian entrepreneurs, our content analysis of the information gathered revealed the emergence of a fascinating, multi-dimensional pattern of motives. Besides apparent and popular motives such as the desire for earning a better income than what they had earned in previous jobs, the desire for more meaningful or challenging work, and the desire to meet market demands, some Macedonian entrepreneurs in our sample also went into business because of other non profit-related reasons such as creating jobs for their family and taking care of family business.

However, we felt that our respondents could have been probed for further elaboration of:

- what motives they would prioritize when they reported a range of motives;
- whether such priorities shifted over time, and if yes, how so.

To establish a multi-dimensional conceptual framework of Macedonian entrepreneurial motives, we would need additional in-depth data collection.

Some limitations of this study should be noted. The convenience sample utilized here limits the extent to which the findings can be generalized to other business owners in other cities and/or provinces in Macedonia. However, we would like to say that until Macedonian entrepreneurs are more comfortable with formal research methodology, convenience sampling is the only feasible way to conduct research in the private business sector.

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# Entrepreneurship and entrepreneurial developments with special emphasis to the Republic of Macedonia

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One of the most difficult and complex issues that researchers are faced with is finding the proper definition and meaning of the word “entrepreneurship” and the proper explanation as for which type of activities may be considered as entrepreneurial activity and which are the main characteristics of entrepreneur and entrepreneurship, although there seems to be a consensus between researchers when it comes to treating innovations and readiness to undertake risk as the main features of entrepreneurship.

The purpose of this paper is not just to give an intensive description on entrepreneurship and its creation and emergence as a discipline, but rather to analyse the development and importance of entrepreneurial activity in the Republic of Macedonia. The paper is divided in two parts. The first part contains basic information on entrepreneurship and entrepreneurial developments in different parts of the world. The second part of the paper is dedicated to entrepreneurship in the Republic of Macedonia. The paper is based on descriptive analysis of the main events regarding the development of entrepreneurship in the Republic of Macedonia and the results of an empiric survey on entrepreneurship in the Republic of Macedonia.

## Keywords

Entrepreneurship, entrepreneurial activity, republic of Macedonia

## 1. A variety of views and definitions on entrepreneurship

One of the most difficult and complex issues that researchers are faced with is finding the proper definition and meaning of the word “entrepreneurship” and the proper explanation as for which type of activities may be considered as entrepreneurial activity and which are the main characteristics of entrepreneur and entrepreneurship, although there seems to be a consensus between researchers when it comes to treating innovations and readiness to undertake risk as the main features of entrepreneurship.

The word “entrepreneur” itself derives from the French word “entreprendre” which was widely used as a designation for an organizer of an entertaining activity. It appears that one of the earliest uses of the term “entrepreneur” in an economic point of a view was Richard Cantillon in the 1700. In fact he is considered to be the first author ever to separate the entrepreneur from the capitalist and the entrepreneurial activity from the capitalist activity. By the end of the 1700s, the French economist Jean-Baptiste Say used the term “entrepreneur” as a description for people that are in permanent search for opportunities to move the factors of production from the point of a lower economic usage to a point of higher economic usage. Even Adam Smith in his book “The Wealth of Nations” talked about the entrepreneur and entrepreneurship, but failed to make a distinctive difference between entrepreneur and capitalist. For many authors and researchers of this field Joseph A. Schumpeter is considered to be the founding father of entrepreneurship. In his book “The theory of economic development” published in 1934 he considers entrepreneurs as people who are in permanent search for finding new combinations, thus the main element of his definition is innovation. In fact he introduced the Five innovations leading to a new production function: The introduction of a new good, the introduction of a new method of production, the opening of a new market, the conquest of a new

source of supply of a raw material and the carrying out of a new organization of an industry. In yet another definition Kirzner remarked that the essence of the entrepreneurial decision consists of grasping the knowledge that might otherwise remain unexploited. Kirzner perceived the entrepreneur as an equilibrating force; he identified and smoothed-out market imperfections by performing creative arbitrage activities. Kirzner's concept of an entrepreneur was an arbitrager who was able to anticipate when the next imperfections and imbalances would occur and take advantage of them by employing his creative imagination. Table 1 shows the earliest usages of the term 'entrepreneurship' in an economic sense.

**Table 1** Timetable for Early Economists Using the Term "Entrepreneurship"

Year	Economist	Contribution
1725	Richard Cantillon	Separated activities of capitalist from entrepreneur
1776	Adam Smith	Discussed entrepreneur but associated activities with the capitalist
1803	Jean-Baptiste Say	Defined entrepreneur as improving the state of resources used in production
1871	John Stuart Mill	Associated capitalist and entrepreneur together through risk
1934	Joseph A. Schumpeter	Defined entrepreneurs as sociologically distinct individuals; separated entrepreneurship from the role of the capitalist

Source: McDaniel B.A (2005): *Entrepreneurship and innovation: An Economic Approach*, M.E. Sharpe, New York, 32

Davidson over the years of entrepreneurial research came to the conclusion that although the many definitions on entrepreneurship seem to be very different from each other, still they all address two main phenomena, social issues. "The first of those is the phenomenon that some people, rather than working for somebody else under an employment contract, strike out on their own and become self-employed, or team owner-managers of an independent business. This implies a radically different risk/reward structure with a much wider span of possible financial outcomes, and a more fluid border between work and leisure. Often these new economic entities involve some element of innovation at start-up, and some degree of innovativeness may be needed in order to survive in this capacity over time. However, it is a well-known fact that the majority of independent businesses are relatively stable operations in mature and low to medium value-added industries. Some of those independent businesses will grow in size, which implies that the owners will face different types of management challenges and transitions over time. Often other family members than the original founder are involved in the business, and eventually the transfer of the ownership and management of the business either within or outside the family will become a major issue for the founders. When the concept "entrepreneurship" is used for this social reality, topics like self-employment, small business management, stages-of development models, and family business issues become aspects of entrepreneurship. In short, entrepreneurship is anything that concerns independently owned (and often small) firms and their owner-managers. The second social reality that emerges as a major underlying theme in entrepreneurship definitions is that the development and renewal of any society, economy or organization requires micro-level actors who have the initiative and persistence to make change happen. Institutions as well as market and organizational structures may facilitate or hinder change and development. However, those structures do not create any change—and they certainly do not change themselves—in the absence of human actors. In the end, it is the unique knowledge, perceptions and goals of individuals equipped with the drive to take action accordingly that initiate novelty. In order for those new initiatives to have lasting impact, however, they need to create value or save resources." (Davidsson,2004,4 [1]). Table 2 contains several definitions on entrepreneurship.

**Table 2** Definitions on entrepreneurship

Author	Contribution
Gilbraith	<b>An entrepreneur must accept the challenge and should be willing hard to achieve something</b>
Drucker	<b>One who always searches for change, responds to it and exploits it as an opportunity. Innovation is the basic tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or service.</b>
Weber	<b>Entrepreneurs are a product of particular social condition in which they are brought up and it is the society which shapes individuals as entrepreneurs.</b>

In practice entrepreneurship is closely connected to the creation and functioning of small business. Data research reveals that all over the developed world most companies are small companies with a very limited percentage of them becoming medium or big business. But, having in mind the way how modern national economies function we might say that entrepreneurship is of great importance not only for the creation of wealth at an individual level but also for its contribution to economic growth and development at a national level. This is very obvious having in mind that entrepreneurial activity as a major source for opening new jobs, creation of new technologies and of course finding new approaches towards solving the main problems in contemporary live regarding better usage of limited resources and finding solutions to the increasing environmental problems.

Part of the divide between the economics and business studies approaches to entrepreneurship is attributable to the different definitions of entrepreneurship they utilize. Economists are often content to utilize business owners (in industrial organization and macroeconomics), the self-employed (in labour and microeconomics) and small firms (in industrial organization) as working definitions. All these definitions rely implicitly on residual-claimant and risk-taking aspects of entrepreneurship, and facilitate the analysis of incentives, investments, resource allocation decisions and occupational choices. In contrast, many business studies researchers feel there is nothing entrepreneurial about merely being an owner-manager of a small business. They usually prefer to study behaviours entailed by starting a new business, and speculate about cognitive and perceptual constructs entailed with it. Economists tend to eschew this approach as overly subjective, insisting instead on inferring motives only from actual observed behaviour. This is the so-called 'revealed preference' principle (Parker, 2009, 6 [2]).

Regardless the definition one of the main questions that arises when it comes to entrepreneurship, entrepreneur and entrepreneurial behaviour is: "What are the main characteristics and patterns of behaviour that a successful entrepreneur should have?" Different authors have different points of view when it comes to the answer of this question. But, perhaps one of the approaches that we all must have in mind is the one given by Carsrud and Barannback (as shown in illustration 1).

**Figure 1** Strong entrepreneurial characteristics and behaviour



Source: Carsrud A.R., Brannback M. E (2007). *Entrepreneurship*, Greenwood Press, London, 17

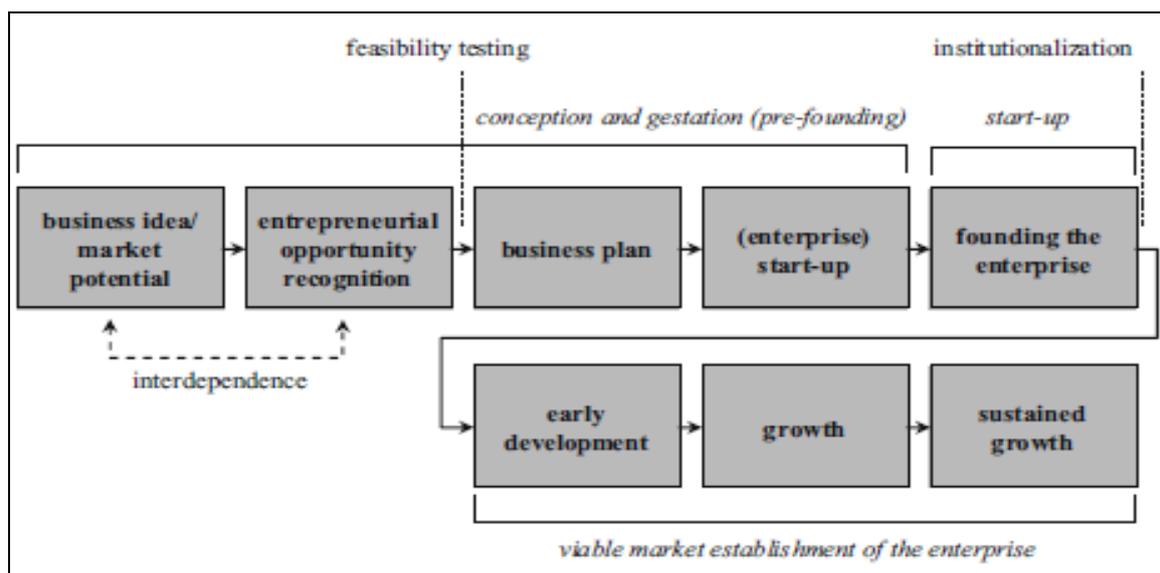
When talking about entrepreneurs and entrepreneurship a distinction between four different types of entrepreneurs should be made (Harvinal, 2009, 102 [3]):

- Innovative entrepreneur: This category of Entrepreneur is characterized by smell of innovativeness. This type of Entrepreneur, sense the opportunities for introduction of new ideas, new technology, discovering of new markets and creating new organizations
- Adoptive or imitative entrepreneur: Such entrepreneurs imitate the existing entrepreneur and set their enterprise in the same manner. Instead of innovation, may just adopt the technology and methods innovated by others.
- Fabian entrepreneurs: Fabian entrepreneurs are characterized by great caution and scepticism, in experimenting any change in their enterprises. They imitate only when it becomes perfectly clear that failure to do so would result in a loss of the relative position in the enterprises.
- Drone entrepreneurs: Such entrepreneurs are conservative or orthodox in outlook. They always feel comfortable with their old fashioned technology of production even though technologies have changed.

Perhaps one of the greatest examples in the entrepreneurship in the USA is Fordism that is Ford's approach in the production of the T-Model, based on Adam Smith's pin factory example and job specialization. The innovations in the automotive industry which occurred parallel ore almost parallel with the great innovations in the steel industry and the oil industry are considered to be the main factors which led to the great economic expansion in the early 1990's. After the great depression, and the Second World War, the very famous "Baby Boom" happened in USA. But at the same time perhaps even a more visible boom occurred, that is the "Innovation Boom" and "Entrepreneurial Boom" which lasted for a few decades and led the American national economy to a position of world economic dominance.

Entrepreneurship and the resulting rapid development of innovations became a worldwide phenomenon in the 1980s as market capitalism became the ideology espoused by Margaret Thatcher, prime minister of England, and Ronald Reagan, president of the United States. This movement was enhanced by the declining acceptance of socialist-based economies worldwide. Exact reasons for the timing and fervour of this movement remain unclear, but in the United States the drive to regain recognition as a world trading power, the downsizing of inefficient plants, opportunities for small start-up firms, and the need for innovations leading to better efficiencies have certainly helped propel this movement. Innovation has become a necessity as well as the hallmark of any quality business venture. (McDaniel, 2002,10 [4]). Many authors talk about the process of entrepreneurship. An example of entrepreneurship process is presented in figure 2.

**Figure 2** Entrepreneurial process



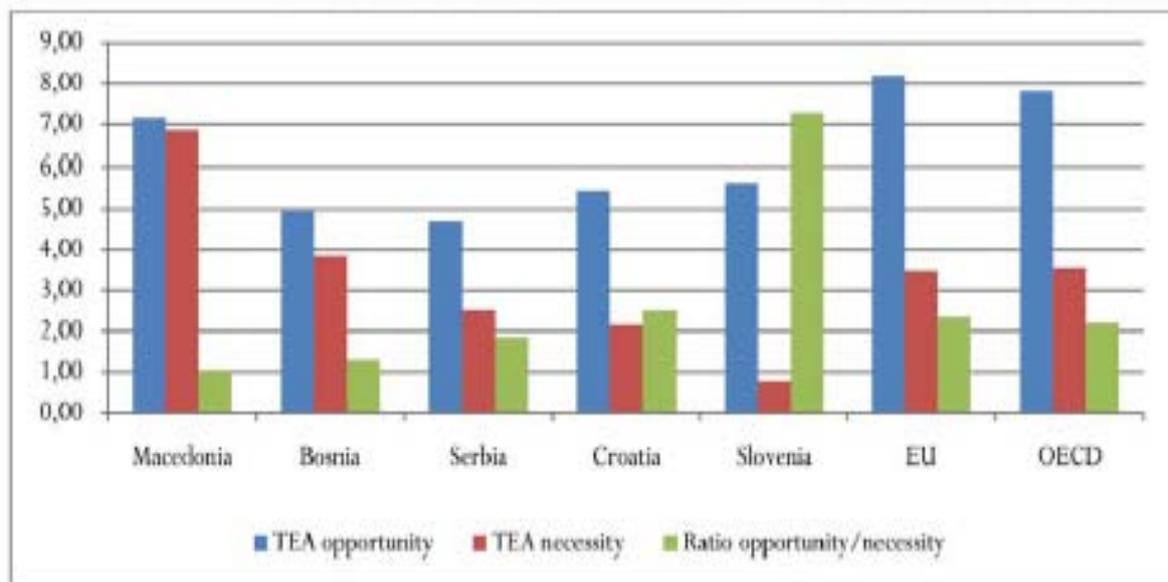
Source: Volkmann Ch. K., Tokarski K.O., Grünhagen, M (2010): *Entrepreneurship in a European Perspective: Concepts for the Creation and Growth of New Ventures*, Gabler, Berlin,68

## 2. Entrepreneurship and entrepreneurial activity in the Republic of Macedonia

The Global Entrepreneurship Monitor Macedonia report for 2008 showed that there is a general positive perceptions regarding entrepreneurship in Macedonia. The data presented in the following text are used from this report.

Usually the entrepreneurial activity in Macedonia belongs to the category of necessity-motivated entrepreneurship rather than opportunity-motivated entrepreneurship. In fact the report proved a 1.5 ratio coefficient between these two types of entrepreneurial activity in Macedonia a result that is in full compliance with the economic reality with Macedonia being a country characterised by high unemployment and low economic growth. A comparative analysis of Macedonia and other countries is presented in Figure 3.

**Figure 3** Opportunity and necessity motivated entrepreneurship

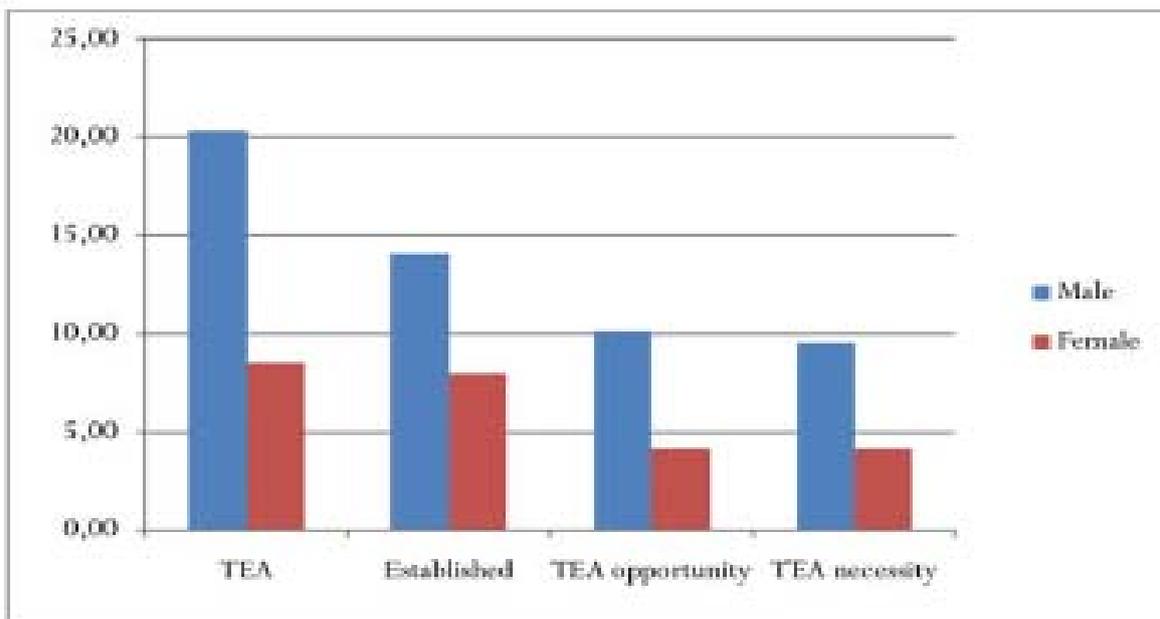


Source: *Global Entrepreneurship Monitor Macedonia report for 2008*

Data presented in Figure 3 show that Macedonia has the highest degree of necessity motivated entrepreneurship compared to all other countries. In fact it can be noticed that Macedonia has almost twofold higher coefficient of necessity motivated entrepreneurship compared to EU and OECD and almost around five times higher degree of necessity motivated entrepreneurship compared to Slovenia. It's obvious that less developed countries have a higher degree of necessity motivated entrepreneurship compared to more developed countries, but even besides this the fact remains that Macedonia has a relatively low coefficient of the ration between opportunity motivated entrepreneurship and necessity motivated entrepreneurship.

In Macedonia entrepreneurship is more typical for male entrepreneurs compared to female entrepreneurs (Figure 4).

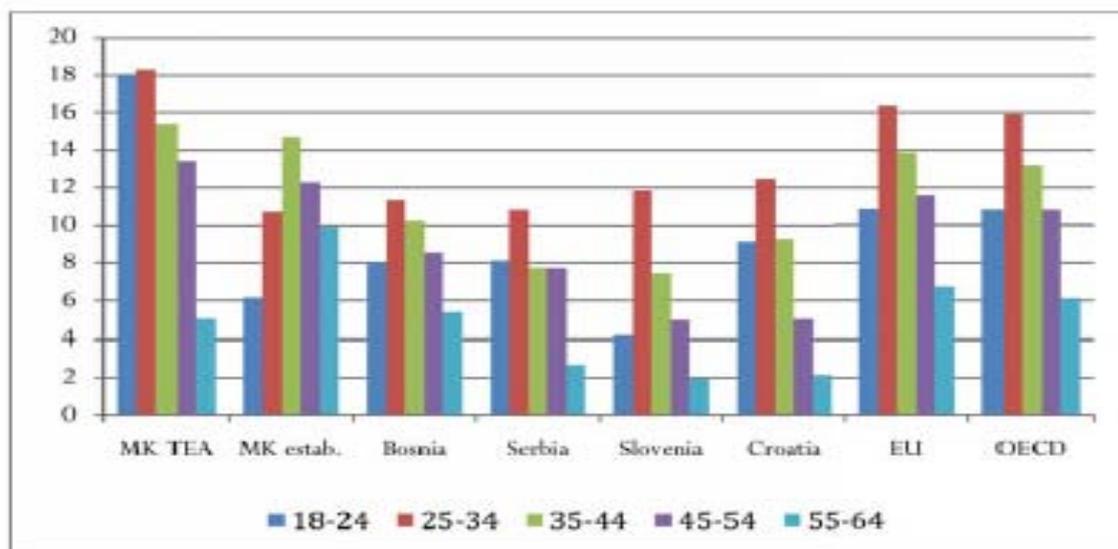
**Figure 4** Gender based entrepreneurship in Macedonia



Source: Global Entrepreneurship Monitor Macedonia report for 2008

The report revealed age differences of entrepreneurs in Macedonia compared to other countries as represented in Figure 5.

**Figure 5** Entrepreneurs according to age in Macedonia and selected countries

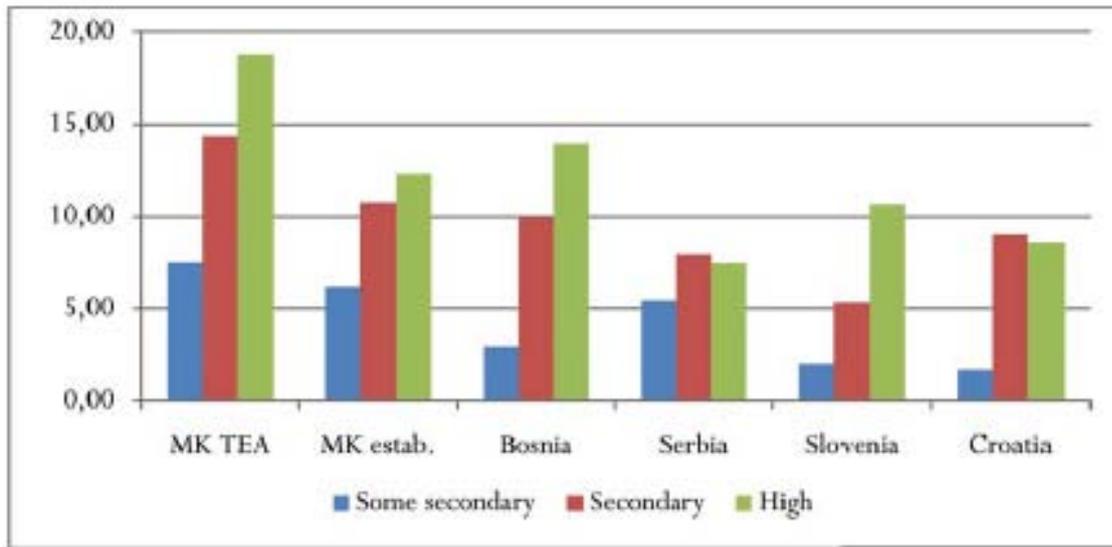


Source: Global Entrepreneurship Monitor Macedonia report for 2008

Data shown in chart 3 reveal that in Macedonia the younger population has a higher positive attitude towards entrepreneurship compared to other countries from the region.

Regarding the influence of education of entrepreneurship the GEM report reveals that people that have a higher level of education have more positive attitudes towards entrepreneurship as can be seen from Figure 6.

**Figure 6** Entrepreneurship according to level of education



Source: *Global Entrepreneurship Monitor Macedonia report for 2008*

Data presented in chart 4 reveal that regardless which country is analysed the level of education seems to have a high impact on entrepreneurial activity.

When talking about entrepreneurship in Macedonia a special emphasis should be made for the National Agency for the Promotion of Entrepreneurship in Macedonia which is a state owned institution that deals with measures and activities for the promotion of entrepreneurship and creation of competitiveness of small business in the Republic of Macedonia. Its basic duties include:

- Creating favourable economic environment and legislation
- Creating and developing institutional infrastructure for support and development of entrepreneurship and competitiveness in small business
- Implementation and coordination of state and international support for micro, small and middle businesses
- Promoting entrepreneurship through financial and non-financial forms of support
- Implementing the Program on measurements and activities for support of entrepreneurship and creating competitiveness in the small business of the Republic of Macedonia

### 3. Conclusions

This paper is based on literature review regarding entrepreneurship with special emphasis on entrepreneurship in the Republic of Macedonia.

In Macedonia, in general, there are positive perceptions on entrepreneurship. 80% consider entrepreneurship to be a good carrier choice and 66% that the media provide appropriate attention to entrepreneurship. Macedonia has the highest entrepreneurial activity from the European countries in which GEM was conducted. In Macedonia the typical entrepreneur is male, at age from 25 to 34, with higher educational level and higher income. The youngest population (18-24) has significantly higher aptitude towards entrepreneurship, compared with the countries in the region.

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# The Role of Universities in the Triple Helix: A Multi-Country Comparison

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The Triple Helix innovation model (Etzkowitz and Leydesdorff, 1997 [1]) proposes that inter-relations between three spheres – government, university, and industry – are key factors influencing universities' entrepreneurial performance. This paper compares the impact of these inter-relations on universities in three selected countries: the U.S., the UK, and Sweden. A key finding was that the role of government, university mission statements, and industry profiles all impacted differently on the extent of entrepreneurial activity of the universities in each country. In the U.S., government has encouraged interaction between universities and industry and, as a result, many university innovations are further developed by industry. In the UK, although there is quite a strong research base in pure science by international standards, British business is not research intensive and scientific inventions from academia are left underexploited. In Sweden, a dozen companies are responsible for the majority of domestic R&D activities but industrial R&D is generally conducted in-house or through corporate collaboration. Swedish universities, which are funded primarily by government, focus strongly on curiosity-driven research. This study recommends that there is a need to consider a wider context (such as the Triple Helix) when understanding questions like the Swedish Paradox (Edquist, 2010 [2]) and makes recommendations for increasing the entrepreneurial performance of universities.

## Keywords

Entrepreneurial University, The Triple Helix, University-Industry linkages

## 1. Introduction

During the last three decades, significant changes have taken place in universities, especially since the development of the concept of a “knowledge society” or a global “knowledge-based economy” [3]. The increasing importance of knowledge now receives much more attention from government, who see investment in knowledge as a key source of technological innovation and national competitiveness in the global market. Jones-Evans (1998 [4]) has investigated the relationship between rapid technological change and competitive advantages in the markets and found that advances in technology lead to increased industrial output, employment and prosperity.

Universities and other higher education institutions have always been regarded as the most important source of knowledge, as confirmed by their teaching and research activities. Given the new position that knowledge has become a source of industrial competitiveness, one emerging crucial issue is to convert scientific breakthroughs into industrial and commercial success. To achieve this, exchange and absorption of knowledge between industrial firms and universities is critical. Jones-Evans (1998) has examined university-industry linkages in Europe and found that Europe's research and technology base lacked the capacity to make this conversion successfully.

Social changes call for transitions in the roles of universities, from pure research to more applied orientations; from highly autonomous positions to greater connections with other institutions; and from a predominant emphasis on teaching and research to making a significant contribution to economic development. The Triple Helix innovation model, proposed by Etzkowitz and Leydesdorff (2000), has identified these needs and argues that universities are currently undergoing a ‘second revolution’, that is incorporating economic and social developments as part of their missions, while their first academic

revolution was incorporating research as an academic function alongside teaching [5]. Universities well adapted to this transition are regarded as entrepreneurial universities. The model proposes that inter-relations between three spheres – government, university, and industry – are key factors influencing universities' entrepreneurial performance.

However, universities in different countries perform at quite dissimilar levels in terms of being entrepreneurial. In this study, case histories for three countries are compiled and compared: the U.S. (with a large scale higher education sector), the UK (with a medium scale higher education sector) and Sweden (with a small scale higher education sector), and the impacts of government and industry on universities' entrepreneurial performance are analysed. A Triple Helix analysis is applied to each of the three selected countries and recommendations are proposed for policymakers aiming to increase universities' entrepreneurial activities.

## 2. The U.S. Case

As early as the beginning of the twentieth century, an American method for knowledge commercialisation, based on an entrepreneurial university model, occurred at MIT [6]. This method was later defined as technology transfer through patents and the formation of companies. University-industry linkages, although with a long-standing history, were not the norm prior to the 1940s or even later. Harloe and Perry (2004) found that this trend, first emergent in New England in the 1930s, did not become a national feature until the 1960s and 1970s [7]. The Second World War (WWII) has been identified by many researchers as a turning point for stronger links between the three sectors in the U.S. and this was further reinforced in the context of the Cold War [8][9].

The U.S. higher education sector is the largest in the world and Mowery and Sampat (2005) have described its distinct features as follows:

“The US higher education was significantly larger, included a very heterogeneous collection of institutions (religious and secular, public and private, large and small, etc.), lacked any centralised national administrative control, and encouraged considerable inter-institutional competition for students, faculty, resources, and prestige.”[10]

Mowery and Rosenberg (1998 [11]) have described how the “internationally unique” R&D system in the U.S. developed in the 1940s whereas previously it had only “resembled those of other leading industrial economies of the era, such as the UK, Germany, and France.” It involved a decentralized American university system, based mainly at a State level, with inter-university competition for research funds from both the federal government and industry. This on the one hand gave universities significant autonomy but, on the other hand created a dilemma as they lacked the protection of government support.

The National Science Foundation (NSF) has mapped the changing nature of research and development funding from federal government and industry in the U.S. between 1953 and 2004 [12]. Although the proportion of federal funding decreased from over 50% in the 1950s to just 30% by 2004, the total amount of funding did not fall below that contributed by industry until the late 1970s. More significantly, in the first decade from 1953 federal support increased steadily, achieving a peak at nearly 70% of total funding in R&D. It was therefore not industry, but the expansion of federally funded R&D from the 1940s onwards, that sparked the proliferation of research teams within American academia. This led to the strong need for researchers to organize themselves into teams and formulate a research agenda capable of garnering external funding, which is core to an entrepreneurial university [13]. Gittelman (2006) has remarked that,

“Perhaps the most entrepreneurial feature of the careers of American scientists is the emphasis on raising grants to further one's standing in the scientific community.”[14]

The later increase in industry funding of R&D in universities and colleges in the U.S. may have been due to three reasons: Firstly, a large amount of the federally funded R&D programmes in the post-war years were for primary research, described as ‘research as the motor of progress.’[15] Even as late as the 1990s, universities, and their associated R&D centres, carried out about 60% of all basic research in the U.S. and well over half of this research was funded by federal agencies. In earlier years this percentage was probably even higher. By 1970s, however, the ability of science to deliver social and economic benefit was in question. Gradually, focus shifted to a way in which science could be directly

applied to 'solve' national problems and to foster economic growth. This, in theory, required that universities placed greater emphasis on social responsibility.

Secondly, in part due to the growth of electronics, biotech, software and other high-tech industries, a high demand for R&D developed within companies. Multinational firms strengthened this trend as they developed their businesses worldwide and R&D became a core strategy for creating competitive advantage in the global market. On the one hand, research work in certain industries, such as pharmaceuticals, was already quite advanced and so cooperation with the most abundant research reservoir – universities – became a necessity. On the other hand, the increased pace of technology – due to more participants and input – in turn increased the need for collaboration with other research institutions in order to maintain competitive advantage.

Industry's practical needs contributed only partly, however, to the stronger linkages with universities. Another reason was increased incentives for university researchers to join in commercial activities alongside their teaching and research work due to influential legislation which encouraged, or at least, did not hinder, this. The Bayh-Dole Act of 1980 was the most important legislation in this area as it enabled universities and small businesses to own and manage patentable inventions developed with government funding. Prior to this, federal agencies like the Department of Defence had normally taken intellectual property rights away from the creating organizations and inventors and this decreased incentives for universities in knowledge commercialisation.

The Economist Quarterly (2002) famously stated that,

“Possibly the most inspired piece of legislation to be enacted in America over the past half-century was the Bayh-Dole Act of 1980...”[16]

After the passage of the Act, U.S. university patents made up an increasing proportion of all domestic-assignee U.S. patents. The sharp increase started in the early 1980s with universities increasing their share of patenting from less than 0.3% in 1963 to nearly 4% by 1999 [17]. Prior to the passage of the Act only 10 U.S. universities were engaged in technology transfer activity but this number increased to over 40 within the first decade of the Act. Licensed patents, resulting from government-sponsored research, improved the financial situation of universities as they became able to receive royalty income. In its 2000 Survey, the Association of University Technology Managers (AUTM) showed that 156 U.S. university respondents reported \$1.24 billion in royalty income and cashed-in equity, net of unreimbursed legal fees, meaning the average income per respondent was almost \$8 million [18].

### 3. The UK Case

The ineffectiveness of the translation of science into business innovation has historically been a problem in the UK. As early as 1919, in his work *Industry and Trade*, Alfred Marshall pointed out that:

“...the small band of British scientific men have made revolutionary discoveries in science; but yet the chief fruits of their work have been reaped by businesses in Germany and other countries, where industry and science have been in close touch with one another.”[19]

However, increasingly universities have been playing a more active role in the economy. The introduction of the 1993 *Realising Our Potential Awards Report* shows an increasing focus by the UK Government on interactions between university and business [20]. Later, in the 1998 White Paper *Our Competitive Future* the government committed to supporting business by encouraging knowledge-based competition and made specific reference to the roles of universities [21].

The comparative international research performance of the UK was described in the report *Funding Research Diversity* in 2003. The report selected a group of G8 member countries (USA, UK, Canada, France, Germany, Japan, Italy and Russia), other European countries with a strong research culture (Switzerland, the Netherlands, Belgium, Denmark, Finland and Sweden) and four Asia-Pacific research economies (China, Singapore, South Korea and Taiwan). Two generally accepted measures of the influence of scientific research – research publications and their citations – were the comparative indices used. Results showed that UK output of publications had increased over a long period but was 'reaching a plateau.' With only 1% of the world's population, the UK typically produces 9% of the world's scientific publications and over 10% of citations. This proves the strong academic science base in the UK and also makes it second only to the USA. However, although the UK's research performance has increased in real terms, the difference between it and various other countries is diminishing, e.g. Germany is now close behind [22].

In contrast to having a leading place in international academic science output, the interaction between university and industry in the UK has been disappointing. Firstly, total research spending in the UK represents only a small percentage of GDP. In the early 1980s, both the UK and the U.S. spent around 2.4% of their GDP in research but by 2007 their paths had diverged sharply with the U.S. percentage increased to 2.68% of GDP, while UK spending had declined to 1.79% [23][24]. Regarding investment in R&D within higher education, the UK again lags behind, ranking only 14<sup>th</sup> out of 29 OECD countries. In 2007 it input only 0.46% of GDP into higher education R&D [24].

Secondly, UK industry only accounts for a small proportion of university research funding. The *Lambert Review of Business-University Collaboration* listed five main sources of funding in UK universities between 1990 and 2001. The Higher Education Funding Council (HEFCE) and Research Councils UK (RCUK), a strategic partnership of the UK's seven Research Councils, are both government funded and make up the two largest funding streams. Funding from HEFCE is based on the quality of research as measured originally by the Research Assessment Exercise (RAE) and now the Research Excellence Framework (REF). The RCUK supports universities in the form of project grants allocated to particular researchers in response to future research proposals. In 1990-91, UK industry spent £114m on research in UK universities – equivalent to 6% of universities' total research income. This amount went up to £259m in 2000-01 – 7% of total research income [23]. But the percentage decreased gradually again since then to 4.8% in 2006-07 [24].

However it is difficult to apportion blame for this situation. Some argue that universities should do more to attract industry funding for research while others suggest that businesses should take responsibility for the decline in spending on research and development in the UK. The *Lambert Review of Business-University Collaboration* has drawn up a detailed map of the expenditure of major UK industries on R&D between 1987 and 2001. It suggests that part of the expenditure decline is due to a sharp cut in defence R&D spending, which is similar to other developed economies. Yet, in the UK, many other industry sectors such as chemicals also have low investment while other countries show increases. In an OCED comparison, the UK is close to the bottom of the scale in terms of average annual growth in business R&D as measured by 1995 purchasing power parities dollars [25]. A third factor is that, although UK universities have made significant improvements in knowledge commercialisation activities in the last few years, they still lag far behind their US and German counterparts in relative terms. However, amongst European countries, the UK is a pioneer in assigning ownership of intellectual property (IP) rights to academic institutions. Denmark, Germany and France did not pass legislation for such assignment until the late 1990s, whereas the UK enacted this a decade earlier.

The gap in commercialisation activities between the UK and U.S. is highlighted in HEFCE's HE-BCI Survey 2007-08 [26] – see Table below. The data for U.S. universities is collected by the Association of University Technology Managers (AUTM), which has published a dozen annual reports on US universities' commercialisation activities. Although there are many possible explanations for the differences shown in the Table, it is obvious that U.S. universities receive far greater research investment. Other factors may be that U.S. universities have been engaged in third stream activities (revenue-raising activities alongside the more traditional two streams of teaching and research) for a longer period, and have therefore built more experiences in this area, as well as the more established US venture capital market and other specific industry characteristics.

**Table 1** Commercialisation activities in the UK and US, 2007-08

	<b>US AUTM Survey</b>	<b>UK HEIs HE-BCI Survey</b>
Number of institutions	157	160
Total research expenditure (£million)	21,623	4,854
IP income including sales of shares in spin-offs (£millions)	1,039	66
IP income as percentage of total research expenditure	4.8%	1.4%
Spin-off companies formed	502	219
Research expenditure per spin-off (£million)	43	22

Source: HEFCE, 2009.

## 4. The Swedish Case

The capability of Sweden in transforming R&D investment into innovation has been questioned for a long time. Edquist and McKelvey formulated the idea of the Swedish Paradox, expressed as:

“A relation between high research and development (R&D) expenditures and a low share of high-tech (R&D intensive) products in manufacturing (and exports) as compared to the average of the OECD member countries.”[27]

Sweden is at the top of the OECD rankings in terms of R&D expenditure and the number of people engaged in R&D in relation to the size of its population [28]. Even in international comparisons the country is second only to Israel in R&D when expenditure is expressed as a percentage of GDP. Having undergone a severe banking crisis in the early 1990s, total Swedish R&D expenditure increased rapidly for the next ten years, and this moved it from fourth place to its current top ranking.

In Sweden, a very large share of R&D spending is accounted for by around ten multinational industrial groups, led by Ericsson and AstraZeneca. Swedish SMEs have not shown high investment in R&D and innovation activities. For example, from 1994 to 1996, Danish SMEs spent 4.9% of their turnover on innovation while in Sweden the spend was just 2.7%. However large Swedish companies scored much higher than their Danish counterparts with spends of 8% compared to 4.8%.

The impact of the business sector on total Swedish R&D expenditure is significant. During the early 1980's and in the 1990's, R&D activities grew considerably and in both these expansion periods, the business sector was the sole contributor. University R&D remained at a stable level, while R&D performance in other organisations also remained quite small. One consequence of the high dependence of Swedish R&D activities on a limited number of large companies has been their susceptibility to economic changes. For example, Ericsson and ABB, two of Sweden's leading funders of R&D, made large cuts to their R&D investments when faced with financial problems in 2003. This caused Swedish business sector R&D expenditure to fall from 3.3% in relation to GDP in 2002 to 3.0% in 2003. To change this situation there is an urgent need to expand investment in SMEs, providing support for their research and development and other innovation activities.

Swedish universities, as the second largest sector in R&D expenditure, focus largely on 'blue-sky' curiosity-governed basic research and have only a modest interest in needs-oriented research as compared to their Finnish counterparts. It is considered that Swedish public resources are heavily allocated to research that 'leads to international publications and to academic careers for the researchers.' Although only accounting for 20% of total R&D expenditure, Swedish university R&D finance still represents a high level in relation to GDP by international standards.

Granberg and Jacobsson (2006 [29]) have reviewed studies on the main features of Swedish university research and report that it is generally the researchers themselves, rather than other potential users, who appear to determine the direction of academic research. Swedish universities also have outstanding academic output in terms of publication in international journals. In fact Sweden's worldwide ranking is second only to Switzerland in terms of the number of publications in internationally acknowledged scientific journals in relation to the size of the country's population. During 2000-1 over 1,600 scientific publications were published per million Swedes, which accounted for around 2% of the world total. Measured as the number of articles in relation to GDP, Swedish research is also world-leading [30]. A further finding was a gap between academic research and industry which may be explained in two ways: on the one hand, government policy has been built on the view that universities should be 'the major performers of research and advanced learning in society', while on the other hand university-industry collaboration – although it has achieved some progress in real terms – is still at a low level and industry only provides very moderate funding for university R&D.

Scientific co-operation between firms and universities has been found to be predominantly restricted to large multinational groups. Goldfarb and Henrekson (2003 [31]) also reported that large Swedish firms discourage incentives for researchers' involvement in entrepreneurship and prefer to keep contacts between each other informal. The authors also compared policies towards commercialisation of university intellectual property in the U.S. and Sweden. Whereas in the U.S. universities usually own the IPRs, in Sweden, academics retain the entire rights of their inventions, according to a law passed in 1949. However, this has not translated into incentives for academics to engage in technology transfer due to a lack of support.

## 5. Discussions and Conclusions

It has been shown that universities in the three countries described vary in terms of their entrepreneurial performance and, more importantly, the Triple Helix inter-relational roles of government, university, and industry for each are completely distinctive.

Firstly, governments have different levels of influence on universities' activities in each country. The U.S. central government has relatively loose control over American universities, partly due to special features of its political system. Heavy governmental funding on defence and basic sciences, during WWII and the next two decades, improved the research capabilities of many universities. Policy changes from the late 1970s led to a strengthening of university-industry linkages and showed the government's intention to increase industrial applications for scientific research.

In the UK, the government has not consistently supported university involvement in third stream activities since the early 1990s and has decreased expenditure on R&D, which has negatively impacted on university research. Furthermore the award of HEFCE funding based on RAE, and now REF, research assessments tends to encourage pure rather than applied research. While in the US the impact of lower governmental research funding was reduced due to increases in industry funding this has not been the case in the UK as industry research funding has not bridged the gap.

In Sweden, government policies have encouraged universities to focus on primary research and academics have high autonomy as well as ownership of IPRs. This has led to outstanding achievements in terms of patents and publications but it has also stifled the commercialisation of academics' findings as universities have no incentives to provide support.

Secondly, the higher education systems of each of the three countries have different histories, traditions and processes. U.S. universities have a long history of working together with companies. With advantages in scale of funding, they are able to attract top-level researchers and scientists from around the world to produce more world-leading scientific advances. Competition for funding (either from the Federal Government or the business sector) provides impetus for universities to conduct research projects that can contribute to society. Positive attitude towards technology transfer in universities is also significant.

British universities have an outstanding history in terms of output of science publications in international journals. However their participation in collaborative projects with industry has been at a relatively low level, partly due to the funding system in the UK and partly due to British industry indifference towards collaboration. Since the 1980s, UK universities have made significant progress in technology transfer activities and spin-off firms but still lag far behind the U.S.

Swedish universities receive a high level of government R&D finance in relation to GDP by international standards but only a modest amount of industry input. As already mentioned, the Swedish Government have set a clear goal for universities to focus on curiosity-governed basic research. Considering this background, it is not hard to understand why the "Swedish Paradox" exists.

Thirdly, industries have different profiles and attitudes towards university-industry collaboration. U.S. industry has a high dependency on university research in a globalised market and fast-changing technology domain. American business culture welcomes risk-taking and entrepreneurial spirit and this has led to a better environment for SMEs, including spin-off firms from universities. The venture capital market is also well developed in America and supports the development of such small firms.

In the UK industry has not been keen to cooperate on research projects with universities and this has contributed to the low levels of R&D expenditure. Furthermore finance, including banking services, are a predominant industry sector in the UK, whereas in the U.S. high-tech industries have a more prominent role. In the UK greater support for high-tech SME's is needed as it is from such businesses that most university spin-offs emerge.

The same could be said for Swedish industry where the sector is controlled by a limited number of large multinationals like Ericsson and Volvo. Industry contributes only a small proportion of university R&D expenditures and large firms also discourage academics from entrepreneurship, preferring to keep contacts informal.

To conclude, the way in which governments set policies for universities, how industry approaches collaboration with universities and how universities have developed historically all have an important influence on universities' entrepreneurial status. Universities cannot simply be criticised for not being entrepreneurial enough or for not transforming fast enough. The wider context has to be considered and a Triple Helix analysis for each country can be used to show advantages and disadvantages in the three sectors as well as their inter-relationships. This may facilitate policymakers trying to encourage university entrepreneurship.

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# Innovation triggering factors in university research environment

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**Innovation capabilities of companies depend on a variety of factors, such as R&D expenditure, knowledge management processes, culture, organization structure, management systems etc. In search of new, innovative ideas and solutions the undertakings tend to co-operate more and more often also colleges, universities and other public research institutions, in which research is actually one of their basic missions. If once the purpose and the pinnacle of scientific research work of scientists, employed at the universities and research institutes, was publication of research results in scientific magazines and presentations at the conferences (result of basic research), today the results of research are conveyed through patents, trademarks and other forms of commercial application to a much greater extent. In the research, presented in this paper, our aim was to identify the strongest factors influencing the patent activity of the Slovenian researchers, employed at the universities and research institutes as the organizations of which the fundamental purpose and mission is research and scientific work as the source of innovations. We asked the researchers which factors either as incentive or as obstacle influence most their scientific research work and in this regard the patent activity in different phases of research process. Based on the results obtained through the research we can conclude that the Slovenian universities and research institution have still a lot of work to do in the field of increase of efficiency of the scientific research activity. However obstacles, which we have recorded in the research, are not to be understood and taken only as problems, preventing universities and other research organisation greater commercialisation of the scientific-research achievements and know-how, but also as a new opportunity, which is offered to them in this field.**

## **Keywords**

Innovation and R&D, obstacles to innovation, patent activity, university research

## **1. Introduction**

Business performance and innovation are believed to be closely linked. In general there is clear evidence that innovation play a crucial role to long term profitability and growth in firms [1] [2] [3] [4] [5]. Innovation abilities constantly fuel and renew competitive advantage as firms grow and mature [6] [7]. There is little dispute that innovations are important for prosperity of firms, industries and society. Innovation capabilities of companies depend on a variety of factors, such as R&D expenditure, knowledge management processes, culture, organization structure, management systems etc. and on people. People are the main source of innovations within companies and other organizations. Studies show that a large majority of all innovations are created by company employees [8]. Employees' innovation behaviour is therefore crucial for companies, that wish to increase their business

performance and is determined by both the employees' proactivity and organization's desire for employee innovation behaviour [9].

Considering the aforementioned it is of the key essence for the undertakings to establish an appropriate environment within the undertaking in order to encourage innovation or to implement measures increasing innovation of employees. Thereby, they should pay attention to the fact that encouraging innovation and only innovation resulting in inventions, is not sufficient. Innovation in an undertaking has to be such that inventions are also efficiently implemented in the undertaking (e.g. if the invention improves work processes, there should be energy savings or material savings or similar) or commercially utilized. Innovation consists of successfully implementing creative ideas within an organisation [10]. In addition to systems of encouragement and implementation of the innovation within an undertaking, the outsourcing of inventions is becoming more and more important. The undertakings tend to cooperate with colleges, universities and other public research institutions, in which research is actually one of their basic missions.

If once the purpose and the pinnacle of scientific research work of scientists, employed at the universities and research institutes, was publication of research results in scientific magazines and presentations at the conferences (result of basic research), today the results of research are conveyed through patents, trademarks and other forms of commercial application to a much greater extent.

In the research, presented in this paper, our aim was to identify the strongest factors influencing the patent activity of the Slovenian researchers, employed at the universities and research institutes as the organizations of which the fundamental purpose and mission is research and scientific work as the source of innovations.

## 2. Changed role of universities and research organisations

Traditionally, the research at the universities and other research institutions has been distinctively scientific, i.e. directed toward discovering important scientific achievements and less intended for solving specific issues, which the undertakings, economy and society face in practice. This trend has been changing more and more. The scientific research work has been more and more application focused also at the universities and other research organisation and there is more cooperation with the economy. We can say that the gap between creating a scientific achievement and its applicability in practice is narrowing. Consequently, the number of academic inventions, presenting immediate commercial potential, is growing. Thus, the university know-how presents new source of industrial inventions. However, it is true that the problem of absence of links between the university and economy remains since research results are far more often recorded than the practical use of this knowledge in companies. Nevertheless, the recent researches in the Western World detect changing roles of universities and institutes. The researches at universities are more market-oriented; furthermore, the organisation of universities and institutes has been changing into the direction of »undertaking organisation«.

The changing roles of universities and institutes reflects in the entire research process – from the initial idea to the dissemination and consequently implementation of results. As aforementioned, today the pinnacle and the purpose of scientific research work is no longer only publication of research results, but the universities and institutes are more and more aware of possibilities, importance and opportunities, arising from different forms of commercial application of research results. To certain extent, the researchers attribute these changes to the competitive manner of financing and to some extent to the change of teaching process at universities, i.e. from learning to researching. Some [11] however, state that the adjustment of universities is a consequence of greater and greater competitiveness among universities. It is interesting information that there are more and more research institutions deciding to patent their inventions. In 2001 in Slovenia there were five patents awarded to the Slovenian researchers, registered at the ARRS, while in 2005 they were awarded 69 patents.

## 3. Research on factors, influencing the patent activity of the Slovenian researchers

For the purpose of our research the patent process has been, first, divided into three separate phases, i.e. phase of discovering knowledge, phase of dissemination of knowledge and phase of application or transfer of knowledge (commercialisation). We have divided the factors, influencing the patent process, into internal (internal satisfaction, acknowledgement of peers, prize money etc.) and external

(state, culture of work, entrepreneur thinking etc.). Internal factors can be further on divided into the factors, influencing the scientist, and factors, influencing field of work or research. Into the first sub-group fall motivators (positive factors) such as internal satisfaction of the scientist, acknowledgment of peers or academic colleagues and prize money. In this group there are also obstacles (negative factors), which obstruct the scientists' way to the desired results, represented by time (spending of own, free time) and costs (own costs), which a research demands. The factors (motivators and obstacles) influencing the field of work and research are more specific and differ materially among professions.

The following step in our research was drafting a questionnaire for the comparison of patent activities of the Slovenian researchers whereby we assisted ourselves with the questionnaire, developed within the questionnaire of a wider European research of patent activity - PATVAL. The questionnaire has been divided into four separate sets according to the content, namely: inventor's process, inventor's benefits, road from an idea to an invention, value and effect of the patent. On the sample of the Slovenian researchers, who have registered at least one patent in the data base COBISS, we have conducted the quality research on scientific research activity in Slovenia with the emphasis on patent inventions and commercialisation of patents.

The invitation for participation in the research has been submitted to 338 researchers, for which it was possible to obtain contact details (there were 476 registered researchers in the data base COBISS, who had at least one patent on 24 February 2010) and 72 valid questionnaires have been returned. The average age of respondents in the research amounted 42.8 years, among which there were 56 men and 16 women.

## 4. Research results

In order to reach results regarding the impact of certain factors on the patent activity of Slovene researchers, the first part of the questionnaire, as Table 1 illustrates, examined the employment status of the participants in the time of innovation process that concluded with patent application. Almost half of participants were employed in companies (48,6 %), then at university (26,4 %), research institutes (16,7 %) and public entities (4,2 %).

**Table 1** Employment status of the participants

		Frequency	Percent	Cumulative %
Valid	Employed in company	35	48,6	48,6
	Employed at university	19	26,4	75,0
	Employed at research institute	12	16,7	91,7
	Employed in public entity	3	4,2	95,8
	Other	2	2,8	98,6
	Self-employed	1	1,4	100,0
Total		72	100,0	

Table 2 below illustrates the patent activity of participants. It indicates that almost half of the participants (45 %) registered one patent and 54 % of participants registered more than one patent. All together, 72 participants filled 180 patent application, meaning that the average of patent applications per scientist is 2.5 application. The comparison of sub-samples, formed based on the criteria of employment, has shown that the average of patent application per employee is half lower at universities and institutes compared to the average of applications of researchers, employed elsewhere. The average patent applications per researcher, employed at universities and institutes, are 3 applications/researcher, while the average of patent application per researcher elsewhere is 6 applications/researcher.

**Table 2** Number of patent applications

	Frequency	Percent	Cumulative %
1	33	45,8	45,8
2	10	13,9	59,7
4	8	11,1	70,8
3	6	8,3	79,2
5	5	6,9	86,1
6	2	2,8	88,9
7	2	2,8	91,7
8	1	1,4	93,1
9	2	2,8	95,8
14	1	1,4	97,2
17	1	1,4	98,6
20	1	1,4	100,0
Total	72	100	

From the responses to the question of commercialisation of patents it follows that almost a fifth of respondents (16.7% that is 12 respondents) has not even tried to commercialize their invention, for which they filed a patent application, whereby 34 respondents replied affirmative to the question on the actual applicability of the patent application for commercial or industrial purposes (in the widest sense).

**Table 3** The attempts to commercialize the invention

	Frequency	Percent	Valid %	Cumulative %
Valid	0	12	16,7	16,7
	1	40	55,6	72,2
	2	5	6,9	79,2
	3	2	2,8	81,9
	4	4	5,6	87,5
	5	3	4,2	91,7
	6	1	1,4	93,1
	8	2	2,8	95,8
Unknown	3	4,2	4,2	100,0
Total	72	100,0	100,0	

The most important part of our research were questions on factors which influence most their work either as a motivation or as obstacles in different phases of research process. In the period of generating the idea and research, "the satisfaction of working what I like" and "curiosity" were on the first place among the motivators. On the other hand, i.e. factors, which hinder the work of researchers to the greatest extent, are reporting manner (on results and means use), constraint and the pressure of the institutions and administrative and bureaucratic support of institution. As motives, which deviate most positively in case of employed at universities and institutes compared to others, the following are expressed: »Possibility of future references«, »Possibility of publication activity« and »Ensuring salary through research projects«. The employed at universities and institutes see a much stronger obstacle compared to others in »technical«, »professional« and »administrative and bureaucratic« support of their home institution.

During the period of patenting and invention the work of researchers has been most motivated by the references, gaining self-value and good connections with the industry; thus, mostly personal factors. The most restrictive factors were: knowledge of writing the patent application, access to capital market and regulation of relations between the innovators and institutions with regard to awards, arising from patents. The employed at universities and institutes state »Restriction of publishing before the publication of the patent« as the greatest obstacle. The results also show that universities and institutes support their researchers essentially worse from the administrative perspective compared to the economy. The employed at universities and institutes differ in a positive way compared to others in the category of »Marking of the patent in Cobiss«, »Gathering points for habilitation« and »References«, which is not surprising.

During the implementation of the patent in practice or its commercialisation the researchers (the entire sample) were most motivated by pleasure to participate and work with the economy and practice, presentation of knowledge and personal work in industry and realisation of own inventions in industry. Among those factors, which were the most hindering, were (besides the small size of the Slovenian market) also: financial pretentiousness, access to capital market and initial capital. Relating to the differences between the employed at universities and institutes and others the least motivating factor among the employed at universities and institutes was »Founding of own company«, »Realisation of knowledge in the form of cooperation with industry«, »Realisation of research capacities«, »Transfer of knowledge between the educational sphere and economy«, »Sale of patents to multinational companies«. The desire to commercialize academic know-how and opportunities for that is obviously much smaller by the researchers at universities and institutes compared to others.

The main reason for patenting (whole sample) is in the order: commercial exploitation (acquisition of exclusive right for economic exploitation of the invention), prevention against imitations (protection of present and future inventions with patenting the »coincidental inventions«) and reputation (patents as element of assessment of successfulness (evaluation) of inventors or research group).

At the end we took a closer look on relation among different motives for patenting an invention. Based on correlation analysis we can conclude two inter-related groups of motives and third independent motive.

In the first group there are significant and strong relations among three variables:

- E5\_1 Commercial exploitation (acquisition of exclusive right for economic exploitation of the invention)
- E5\_2 Licensing (acquisition of exclusive right for licensing the invention for generating licence income)
- E5\_3 Cross licensing (improving own negotiation position in the trading with patent rights with other companies)

In the second group there are significant and strong relations among five variables:

- E5\_3 Cross licensing (improving own negotiation position in the trading with patent rights with other companies)
- E5\_4 Prevention against imitations (protection of present and future inventions with patenting the »coincidental inventions«)
- E5\_6 »Blocking patents« (prevent that others would protect similar inventions)
- E5\_7 Preventions to be sued by others for application of the invention, created by us, but patented by others
- E5\_9 Time (we have filed the patent application in order to "buy" time for preparing the European patent application or to prepare successful commercialisation)

Third motive represents the variable, which is only weakly related or non-related to other variables:

Reputation (patents as element of assessment of successfulness (evaluation) of inventors or research group).

First group of motives, which lead the Slovenian research toward patenting, is strictly commercial: economic exploitation of results of invention. Second group of motives is also of economic nature, but more indirect – the author does not expect from the patent direct economic benefit, but it should strengthen his "strategic market position" – by blocking competition, decreasing risks, related to intellectual property and gaining time for competitive positioning. Both motives show distinctive »entrepreneur« relation of researchers to results of their work. The last motive – reputation – is, however, related to public service, performed by most of researchers and their role in society: patenting has a greater reputation in this case, visibility among the professional public and last but not least easier access to public means, in case of which previous achievements, including patents,

present one of the criteria for selection. These findings present an interesting basis for a more in-depth research and analysis in the future.

## 5. Conclusion

Inventiveness is no longer important only in the economy, but presents an important activity also at universities and other research organisations. The pinnacle of scientific research work is no longer only publication of results but also economic exploitation of these results. Innovation and patenting of inventions is becoming more and more important activity of universities and research institutions as such and the income from sold patent license presents more and more important item in their accounting items and financial reports.

In our opinion the results of this research are very important for drafting and applying research politics at universities and other research organisations especially in the part in which we identify factors, that have shown to be most restrictive in the procedures from birth to commercialisation of an invention. Based on recorded obstacles these institutions will be able to direct their policies and measures into removing or lessening these obstacles in the future, which will contribute importantly to a greater effectiveness of scientific research work.

First the result, according to which the average of patent application per employed is half lower at universities compared to average of applications elsewhere employed researchers, has to be stressed. These results can be explained by the fact that research at universities is still primarily focused toward publication of scientific achievements, which are basis for promotion in the academic career and not into commercial exploitation of the academic know-how. The research has shown also other important differences between the researchers, employed at universities, and those employed in other research organisations (in our case these were mostly research institutes).

In the phase of generating the research idea the most hindering factor turned out to be "technical, professional and administrative support of the home institution". The employed at universities and institutes see much greater obstacle compared to others in the reporting manner (on results and means use), constraints and the pressure of the institutions and administrative and bureaucratic support of institution. During the patenting and invention the most restrictive factors turned out to be: writing a patent application, access to capital market and regulation of relations between the inventors and institutions with regard to awards arising from patents. During the period of implementation of a patent in practice the most hindering factor turned out to be financial pretentiousness, access to capital market and initial capital. With regard to the differences between the employed at universities and institutes and others the least motivating factors among the employed at universities and institutes are »Founding own company« and »Realisation of know-how in cooperation with industry «.

Based on results, acquired through the research, we can conclude that the Slovenian universities and research institutions have still a lot of work to do in the field of the increase of scientific research activity. Obstacles, which we have recorded in the research, are not to be understood and taken only as problems, preventing universities and other research organisation greater commercialisation of the scientific-research achievements and know-how, but also as a new opportunity, which is offered to them in this field.

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# Human capital – a driving force of regional development: challenges and possibilities in Latvia

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The article deals with the tendencies of human capital development and its effective use in the regions of Latvia, where the greatest attention is paid to Latgale region. The author evaluates and analyses the situation to search for the common and different as regards the use of the human capital in regions having low and high socio-economic development indicators. As positive examples the author mentions several activities, which at the moment are implemented for increasing the value of the human capital, as a result of which the region would become a more attractive place for inhabitants and investors. There have been searched several solutions for the development of regions by using the available human capital for preservation and elimination of the human capital migration in order to attract human capital to regions with lower socio-economic indicators.

## Keywords

Human capital, human resources, Latvia regions, regional development.

## 1. Introduction

The development of a region or a state cannot be explored without effective involvement of human capital. Human capital is a set of individual's skills and abilities affecting one's potential for economic and social activity [1]. It includes person's professional knowledge, social skills, values, attitude, talents, experience, health and many other features. The competitiveness and wealth of industrial society is defined by the means of manufacturing and other tangible values, whereas the main source for wealth and development in society, which is based on knowledge, is human capital. One of the founders of the human resources concept – Gary Becker – describes it in such a manner: "New technological advances clearly are of little value to countries that have very few skilled workers who know how to use them. Economic growth closely depends on the synergies between new knowledge and human capital, which is why large increases in education and training have accompanied major advances in technological knowledge in all countries that have achieved significant economic growth" [2]. This is the reason why economy, based on knowledge and innovations, is a significant indicator in the development of human capital.

Human capital cannot create values *per se*; it cannot ensure social and economic development, i.e., an individual does not act isolated from all the society. The economic value of the human capital of each individual, one's motivation and possibilities for developing and using this capital to make goods, which can be sold, is defined by the demand in the society, state, world. In order to evaluate the human capital it is essential to clarify what skills are demanded in the particular social context.

*The aim of the research* – to explore the correlation between the human capital and regional development evaluating the challenges and opportunities.

*The tasks of the research:*

- to explore the socio-economic situation in Latvia regions and its impact on regional development;
- to conduct a research on the Latvia regional development policy in the context of human resources and human capital development;
- to identify challenges and opportunities for the human capital of Latvia regions in the long-run.

Research methods:

- economic analysis;
- content analysis.

## 2. Research of the socio-economic situation in the regions of Latvia

The territory of the Republic of Latvia is 64 559 km<sup>2</sup>; according to the information of the Central Bureau of Statistics there have been 2.235 million inhabitants in Latvia on October 1, 2010 [3]. Latvia is divided into 5 regions: Riga, Kurzeme, Zemgale, Vidzeme, and Latgale (see Fig. 1).

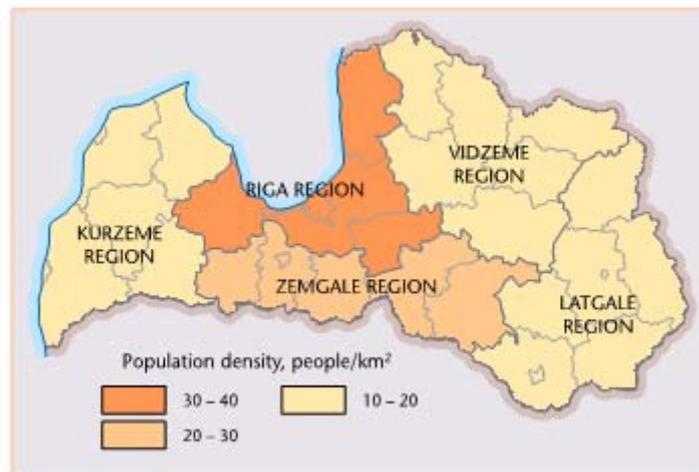


Figure 1 Latvia planning regions territories [4]

As regards the area (see Table 1) Riga region is the smallest one – it covers 16.2% of the total area of Latvia, but as regards the number of population it is the most densely populated one as almost a half (48.6%) of the inhabitants of Latvia live in Riga region; however, as regards the area Vidzeme region is the largest one – 23.6 %, but it has the lowest number of population – 10.4%. Thus, it can be concluded that the regions of Latvia are unequally populated, but the large number of population in Riga region can be explained by the location of the capital city in this region. 31.5% of the inhabitants of Latvia live in the capital city Riga [4;18].

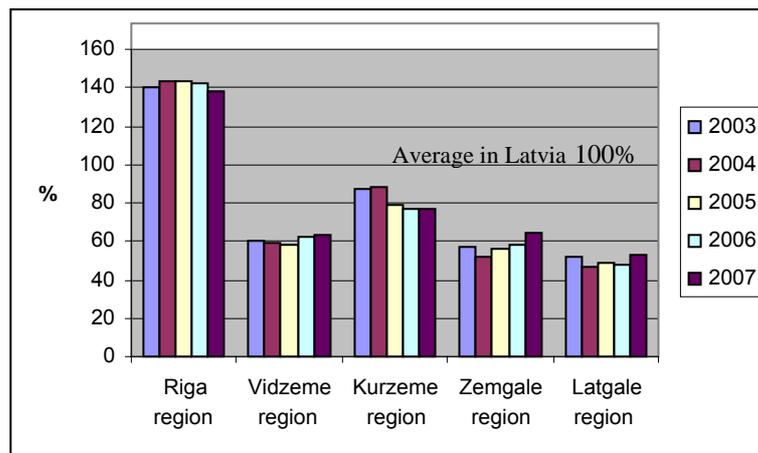
Table 1 Area and number of population in the planning regions in the beginning of 2010  
[Data from 4;17 summarized by the author]

Planning region	Area, km <sup>2</sup>	Proportion of area, %	Population	Proportion of population, %
Riga region	10 435	16.2	1 099 907	48.6
Vidzeme region	15 246	23.6	234 005	10.4
Kurzeme region	13 596	21.1	300 282	13.3
Zemgale region	10 733	16.6	280 494	12.5
Latgale region	14 549	22.5	339 965	15.2
Total in Latvia	64 559	100.0	2 254 653	100.0

Latvia has significant differences in regional development. Considering GDP per capita and assuming that the average indicator in the state is 100% in the period of time from 2003 to 2007 (see Fig. 2), it can be seen that in Riga region it exceeds the average indicator and fluctuates within the range from 138.4% to 143.5%; however, in Latgale region in the respective period this indicator significantly lags behind the average indicator and is in the range from 46.4% to 53.4%.

Due to the economic crisis GDP in Latvia, including regions, significantly reduced; the most crucial changes were observed in such branches as construction (drop by over 30 % in comparison to 2008), trade and manufacturing industry (drop by over 25% in each), transport and communications industry

(drop by over 15%). In the European Union in 2008 GDP increased on average by 0.8% in comparison to 2007 [4;27].



**Figure 2** Dynamics of GDP per capita in planning regions in 2003-2007 in actual prices, % in comparison to the average indicator in the state [4;29]

As regards the forms of business, micro enterprises (up to 9 employees) are dominating in Latvia, small enterprises (10 to 49 employees) and medium-sized enterprises (50 to 249 employees), comprising 99.7% [4;33] (2008) of all economically active units. Large enterprises (more than 249 employees) are mostly concentrated in Riga region – 297 enterprises.

The number of individual businessmen and business entities per 1000 inhabitants is used as a significant indicator of territorial development. In 2008 on average in Latvia this indicator was 30.8%, the highest indicator was in Riga region – 43.5%, the lowest indicator was in Latgale region – 15.4% [4;35].

In 2009 in Latvia there were employed 986.7 thousand people (in the age group 15-74), including 504.0 thousand or 51.1% in Riga region, in Latgale – 141.5 thousand or 14.3%, in Kurzeme – 128.4 thousand or 13.0%, in Zemgale – 118.8 thousand or 12.0% and in Vidzeme region – 94.0 thousand or 9.5% [4;36]. The number of employed people in Latvia is reducing. In the period of time from 2005 to 2009 has decreased by almost 50 thousand.

The main areas providing workplaces in all regions of Latvia are trade and services (in 2008 on average in the state there were employed 63.1%), the second largest area providing employment is industry and energetics (on average 17.6%) and the third largest area is construction (on average 11.4%) [4;36].

One of the basic indicators characterizing the economic development and population activity in the state and planning regions is the level of employment. In the period of time from 2005 to 2008 in all regions the level of employment increased, but in 2009 a rapid decline started. In 2009 the average level of employment in Latvia (it is calculated as a proportion of the employed persons in percent from the total number of populations in the age from 15 to 74) was 55.2% – considerably lower than previous years. Among regions in 2009 the highest employment level was in Riga region – 57.9%, a quite high level in Kurzeme region – 54.6%, the lowest level in Latgale region – 50.8%. Eurostat uses a different age group 15-64 years to calculate a level of employment. According to these calculations in 2008 the level of employment in Latvia was 68.6%, on average in the EU – 65.9%, in 2009 in Latvia – 60.9%, on average in the EU – 64.6% [4;37].

The level of unemployment (proportion of registered unemployed persons from the number of persons having work capacity) is used as a basic indicator characterizing the vivacity of national economy, availability of human resources and social situation in the territories. The level of unemployment in the period of time from 2005 to 2010 can be divided into 2 stages: 1) up to 2008 the level of unemployment decreased on average in the state: in the beginning of 2005 it was 6.2%, in the beginning of 2008 – 3.5%, 2) since 2009 it has rapidly increased from 5.1% in the beginning of 2009 to 12% in the beginning of 2010. In regions the level of unemployment and its fluctuations are close to the average national indicator, except Latgale region, where the level of unemployment has been high fluctuating in the range from 6.6% in the beginning of 2008 to 16% in the beginning of 2010 [4;38].

As regards employment the discrepancies among planning regions slightly decreased till 2008, but since 2009 they have increased again; overall, it can be considered as the main negative social factor

for discrepancies in territorial development. The rapid recession of economy has influenced negative processes in the labor market. According to the labor market development forecast [5] positive tendencies in the increase of the level of employment can be expected later than the economic growth. The forecasts show that the average level of unemployment in the period of time from 2010 to 2015 will remain high 10-13%.

In the period of time from 2003 to 2009 the average salary has changed due to two main reasons: 1) changes in economic activity and 2) demand for labor force. In the beginning of 2009 the average gross salary per month was 659 EUR [4;41], which is 3.9% lower than in 2008. The net average salary per month was 488 EUR was in 2009.

Thus, it can be concluded that there significant differences in the distribution of gross domestic product among the regions of Latvia, number of economically active individual businessmen and business entities, structure of employment, indicators of unemployment as well as number of employees and level of salaries. An individual and his work are the basis of these indicators. As regards all indicators mentioned above the highest results are observed in Riga region, but the lowest – in Latgale region. Such discrepancies should not be present within such small territory as Latvia. It is essential to find solutions to reduce regional differences. Otherwise the human capital flows from regions having lower socio-economic indicators to other regions having a higher level of development. It makes the regions having lower socio-economic indicators become weaker, but the regions having higher indicators – stronger. The government and its policy, including regional development policy, to a large extent are responsible for preservation of human resources in regions, formation of human capital, and its effective use.

### **3. Research of Latvia regional development policy in the context of human resources and human capital**

As regards planning of Latvia development there is worked out a medium level strategic planning document “National Development Plan of Latvia 2007-2013”. It defines the main trends and tasks of development in Latvia to reach the aim of growth – gradual increase of life quality. *Knowledge* is mentioned as the main resource for growth in the National Development Plan of Latvia. The plan emphasizes that neither Latvian natural resources, nor cheap workforce will not be able to serve as the main resource for growth in the long-run. Knowledge and wisdom, their skilful and purposeful use facilitates the quality of labor force, use of capital and development of technologies. Knowledge management, their coordinated and directed creation, accumulation, dissemination and application as a complex process in the state and society are the basis of economy and social life [6].

According to the National Development Plan of Latvia 2007-2013 each planning region has worked out a medium-term regional development program. The author has analyzed regional development programs to identify the role of human capital and human resources in the regional development plans.

*Riga Regional Development Program till 2011* [7] defines vision to become a driving force of Latvia development, a competitive European scale metropolitan region having an equally high level of life quality and attractive environment for business and investments in the whole territory. Riga region has put forward 5 aims in its development: 1) high quality and development of human resources, 2) convenient international and local access to the region, 3) competitive national economy, diverse and active business, 4) life environment of high quality, 5) increase of the role and influence of Riga region on the national and international scale. In order to reach the first aim there are put forward the following fields of action: 1) improvement of the demographic situation, 2) development of health, social, education and culture infrastructure and services, 3) better housing provision, 4) creation of favorable pre-conditions for employment, 5) formation of information society, 6) creation of civic society.

*Kurzeme Regional Development Strategy till 2013* [8] defines the following regional priorities: 1) to stimulate and diverse regional economy and develop manufacturing, 2) to improve the possibilities provided by regional multimodal transport and infrastructure, 3) to invest in human resources and develop culture of innovations, 4) to create high quality life environment, preserve natural environment and facilitate development of remote areas. Taking into consideration regional priorities to invest in human resources and develop culture of innovations there are put forward the following aims: 1) to improve the quality and diversity of education and training as well as ensure access to lifelong learning, 2) to develop business support infrastructure, stimulate business and facilitate use of innovations, 3) to stimulate employment and increase competitiveness of regional workforce.

*Vidzeme Planning Region Development Program 2007-2013* [9] has defined the following strategic priorities: 1) development of infrastructure and services, 2) economic development, increase of competitiveness and orientation to knowledge-based economy, 3) development of human resources and increase of employment, 4) rural development. In order to implement the second and the third priority there are put forward the following fields of action: 1) provision of qualitative education and development of innovations, 2) creation of a direct link between knowledge-based manufacturing and business. The strategic priorities are set taking into consideration the needs of a specific region and balance between industries creating resources and using resources.

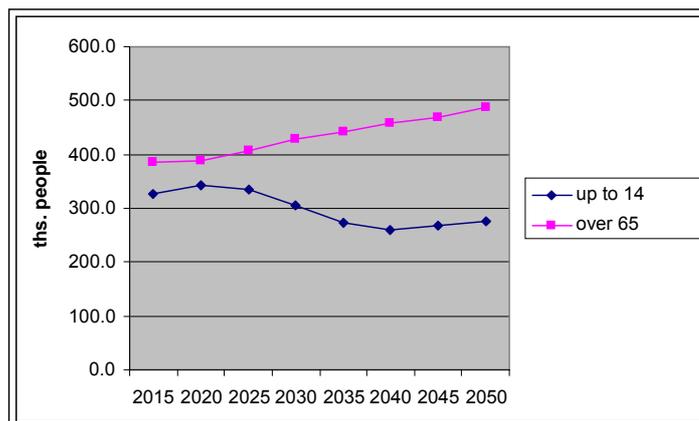
*Zemgale Planning Region Development Program 2008-2013* [10] has defined a strategic aim – ensuring life quality in Zemgale. The following priorities have been put forward: 1) an educated, creative and competitive individual, 2) development of knowledge-based economy, 3) qualitative life environment. For the first priority there are set the following fields of action: 1) development of human resources, 2) creation of information-based society, 3) creative of active civic society. For the second priority there are set the following fields of action: 1) development of business environment, 2) forming public understanding about the role of innovations for increasing the level of welfare.

*Latgale Planning Region Program 2010-2017* [11] has defined the following strategic aims: 1) to facilitate stopping negative demographic and migration processes and preserving at least 320 thousand inhabitants in the region, 2) to increase the proportion of the private sector in creating the added value in the region up to 76% and increase the proportion of a high added value, 3) to increase the income of inhabitants in the region reaching 40% of the EU average gross salary. There are put forward the following priorities: 1) connections – creation of transport and communications infrastructure in Latgale region, 2) skills – support to increase the knowledge and practical skills of individuals, companies and authorities to facilitate economic competitiveness of Latgale region and employment and learn enterprise and initiative, 3) wise management – measures to improve administrative and project capacity of public and municipal authorities, as well as quality and availability of public services, 4) effective companies – actions to increase business and economic activity in the region.

Assessing the strategic aims and priorities put forward in the regional development plans it can be concluded that in all regions human resources and human capital are among the priorities of regional development. It coincides with the standpoint of Latvia National Development Plan 2007-2013 – individual-centered Latvia growth model. In regional development plans of Riga region and Zemgale region as the main strategic aim there are mentioned human resources and human capital, their quality, competitiveness and development. In Kurzeme and Vidzeme regions as the main aim there is put forward the development of the branches of national economy, in Kurzeme region – development of manufacturing, in Vidzeme region – development of services. Investments in human capital have the third place among strategic priorities in these regions. However, in Latgale region preservation of human resources is the main aim put forward. Currently, when the period of implementing these medium-term plans mentioned above is approaching to its end (in 2013), it is envisaged that it is difficult to reach the aims put forward [12] due to the following reasons: 1) emigration of population, 2) aging of society and increase of demographic burden.

#### **4. Challenges and opportunities for human capital of Latvia regions in the long-run**

Currently in Latvia the main challenges put forward to the Latvian human capital in the long-run is based on the demographic situation are: 1) natural increase of population, which has been negative since 1991 [13] and 2) negative migration balance as comparatively more individuals emigrate than immigrate. The Sustainable Development Strategy of Latvia till 2030 [14] also envisages that in 2030 the society of Latvia will significantly differ from the one currently living in Latvia. It is envisaged that till 2030 the number of inhabitants will not exceed 2 million. A majority of them will be older than 45, but already in 2020 the number of individuals of pension age will exceed the number of children and youth in the age till 18. Forecasting the number of inhabitants in the long-run, currently there is reason that the situation will change after 2030, vice versa, the aging of the society in Latvia will continue (see Fig.3).



**Figure 3** Forecast of the number of inhabitants in Latvia in various age groups in the beginning of 2015-2050 according to the basic version of forecasts [15]

The basic standpoints of national and regional development policies worked out up to now envisaged equal and balanced development of regions; however, in the future it can be difficult to implement. It is foreseen that the number of inhabitants will reduce in the regions of Latvia, except Riga region. The larger the distance from the capital, the more the average age of population will increase. It should be taken into consideration that the aging dynamics of Latvian population is more rapid than on average in the EU states, and at the moment there is already observed decrease of the number of children in several age groups [16]. Aging of society creates new challenges, for example, for the educational system, changes of household consumption, work productivity and changes in the workforce structure. As regards the use of human capital Latvia is one of the leading countries in Central and Eastern Europe. Unfortunately, in case of Latvia high employment does not mean higher productivity of human capital [17].

Solutions to these challenges are also searched in the Sustainable Development Strategy of Latvia till 2030. Essential changes in the educational system are envisaged: reduction of the number of schools, increase of lifelong learning development. Changes are also envisaged in the social sphere: pension system, increase of the number of old people's homes and their maintenance. There must be found solutions how to use effectively the human capital which will be available in remote areas, but it shall be taken into consideration that they will be older people. One of the solutions could be remote employment of these people in e-environment. Thus, there should be foreseen opportunities for population to have active old age and developed health care system.

On the other hand, there is a possibility that regions with rural territories located further from cities will not become underpopulated. In Europe there is observed a tendency that some competitiveness-oriented rural areas attract prosperous pensioners as well as well-paid self-employed people from overpopulated cities [18]. There is observed some 'exchange' of inhabitants – less prosperous rural inhabitants move to adjacent cities, but more affluent inhabitants 'take their place'. Higher demands for life quality and solvency attract better and more expensive services and thus let maintain and develop the existing infrastructure [19].

The researches conducted in other countries as well as modeling show that the negative impact of aging on the pension system can be solved in three ways: increasing the contribution rate, reducing pension-salary substitution rate or increasing contributions of workforce. The first solution makes workforce more expensive, facilitates unemployment and reduces competitiveness of companies. The second solution lowers the life standard in households and promotes poverty. From the point of the sustainability of the labor market the third solution is easier to be accepted in society [19]. The author considers that the third solution would be the most suitable in the situation of Latvia.

Developing medium-term national and municipal development plans these challenges and possible solutions shall be envisaged to make the development policy by using resources effectively and foreseeing possible changes in the long-run – in the educational system, health care system, labor market and social sphere.

## 5. Conclusions

- The development of a region or a state cannot be explored without effective involvement of human capital. Human capital is a set of individual's skills and abilities affecting one's potential for economic and social activity. An essential factor for development of human capital is economy based on knowledge and innovations.
- The territory of Latvia is divided into 5 planning regions: Riga, Kurzeme, Zemgale, Vidzeme, and Latgale. The regions of Latvia are unequally populated. The large number of population in Riga region can be explained by the location of the capital city in this region.
- In Latvia there are observed discrepancies in regional development. They are observed in the distribution of the gross domestic product among the regions of Latvia, number of economically active individual businessmen and business entities, structure of employment, indicators of unemployment as well as number of employees and level of salaries. An individual and his work are the basis of these indicators. As regards all indicators mentioned above the highest results are observed in Riga region, but the lowest – in Latgale region. Riga region is a driving force of development in Latvia, economy and development of other regions are to a large extent dependant on it.
- If regional discrepancies are observed in the long-run, human capital flows away from regions having lower socio-economic indicators to other regions having a higher level of development. It makes the regions having lower socio-economic indicators become weaker, but the regions having higher indicators – stronger. The government and its policy, including regional development policy, to a large extent are responsible for preservation of human resources in regions, formation of human capital, its effective use.
- Assessing the strategic aims and priorities put forward in the regional development plans it can be concluded that in all regions human resources and human capital are among the priorities of regional development. It coincides with the standpoint of Latvia National Development Plan 2007-2013 – individual-centered Latvia growth model.
- In regional development plans of Riga region and Zemgale region as the main strategic aim there are mentioned human resources and human capital, their quality, competitiveness and development. In Kurzeme and Vidzeme regions as the main aim there is put forward the development of the branches of national economy, in Kurzeme region – development of manufacturing, in Vidzeme region – development of services. Investments in human capital have the third place among strategic priorities in these regions. However, in Latgale region preservation of human resources is the main aim put forward. It is envisaged that it is difficult to reach the aims put forward due to the following reasons: 1) emigration of population, 2) aging of society and increase of demographic burden.
- The main challenges put forward to the Latvian human capital in the long-run is based on the demographic situation are: 1) negative natural increase of population and 2) emigration. It is envisaged that till 2030 the number of inhabitants will not exceed 2 million. A majority of them will be older than 45, but already in 2020 the number of individuals of pension age will exceed the number of children and youth in the age till 18.
- Balanced development of regions in Latvia will be impeded in the long-run because it is foreseen that the number of inhabitants will reduce in the regions of Latvia, except Riga region. The larger the distance from the capital, the more the average age of population will increase.
- Aging of society creates new challenges. Essential changes in the educational system are envisaged: reduction of the number of schools, increase of lifelong learning development. Changes are also envisaged in the social sphere: pension system, increase of the number of old people's homes and their maintenance, household consumption structure.
- Developing medium-term national and municipal development plans these challenges and possible solutions shall be envisaged to make the development policy by using resources effectively and foreseeing possible changes in the long-run – in the educational system, health care system, labor market and social sphere.
- Provision of opportunities for lifelong education and training is an essential precondition for the development of knowledge-based economy in regions. Increasing the quality of education and training the enterprises in regions would get more qualified and competitive workforce having the necessary skills.

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# Serious games and virtual worlds in the context of entrepreneurial skills development

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Nowadays business environment is becoming increasingly complex. Globalization, resource scarcity, climate change, demographic issues, and economic crises are expected to become part of the daily agenda for the next generations. In these new realms, entrepreneurial education and training has to build a new set of skills and competences, enhancing future entrepreneurs to run organizations and set goals in even more challenging environment. The present paper aims to research the new opportunities, provided by serious games (SG) and virtual worlds (VW) for development of business and entrepreneurial skills and their added-value for education of future entrepreneurs. In the first part of the paper there will be outlined some of the emerging concepts for development of entrepreneurial and business skills. Then, there will be made a short analyzes of SG and VW characteristics and components for entrepreneurial education and training. In the last part of the paper there will be analyzed some entrepreneurial- and business-SG examples and discussed the key benefits of SG and VW for entrepreneurial training.

## Keywords

Entrepreneurship skills, management skills, serious games, virtual worlds.

## 1. Introduction

Managerial and entrepreneurial skills and competences have been admitted as important not only for professional business experts, but also for wider groups of professionals. The role of entrepreneurship and SMEs for economy ecosystem is recognized for triggering employment, innovations and GDP formation. Entrepreneurship became part of the public priorities and is promoted on various instances. With emergence of new technologies and innovations in communication and business services give opportunity for wider group of people to create companies, lowering start-up and operating costs. Moreover, many professionals become free-lancers, trading with their own knowledge and competences. Thus management and leadership skills and competences should be examined in a broader form, taking into account multiple applications and contexts of entrepreneurship. As a consequence creating and building managerial and leadership skills and competences play increasing role within the knowledge-based society.

While games have been largely used in education since centuries, nowadays computer games propose new challenges and opportunities for high-order training. On the other hand, Game Theory was explored in economics and business as a tool for process optimization and mathematical simulations of models. However, the main purpose of Game theory is to discover and study mathematical models, that mimic real economic situations, finding optimal behaviour and equilibrium between rational players [1].

Serious games and virtual worlds emerged recently as promising new ICT tool for development of complex and soft competences and provide unique opportunity for people to learn in safe and amusing environment. With development of new technologies, hardware applications and visual effects, computer games increasingly gain popularity among different age groups and become complex, immersive and sophisticated entertainment platforms. Moreover, in the last years, computer

games industry become one of the leading entertainment industries, outreaching other medias' popularity as TV, radio, movies and broadcasting industry.

Thus computer games-based learning can become an efficient way to reach new generations and to encourage them to develop new set of complex skills and competences in more appealing form, providing them the opportunity to enrich educational and learning context, with simulated environments beyond physical, geographical and economic limitations, suitable for experiments, interactions, group-work, skills testing, learning-by-doing and explorative research.

The current paper aims to investigate more in details how serious games and virtual worlds can be implemented in the context of development of entrepreneurial skills. The first part of the paper will investigate managerial and leadership skills from various main perspectives, exploring various approaches for identifying key entrepreneurial skills. The second part of the research will identify specific characteristics of serious games and virtual worlds. Finally there will be explored various perspectives how serious games and virtual worlds can contribute for development of new set of business skills and competences.

## 2. Theoretical overview

In the beginning of the analyses of skillset for future entrepreneurs and business professionals there will be made a short overview of key skills and competences for the new generations. In the last years, taking into account on one side the changing needs of the economy and increasing requirements for high-skilled professionals, different political organizations have identified a new concept of key skills and competences. OECD in 2005 [2] has selected a small set of key competences in its DeSeCo Project, determining that each of them must contribute to some valuable outcome for societies and individuals; to help individuals to meet important demands in a wide variety of contexts; and are important not just for specialists but for all individuals. The outlined key competences can be grouped in 3 main groups: Interact in heterogeneous groups (A. Relate well to others B. Co-operate, work in teams C. Manage and resolve conflicts ); Use tools interactively (A. Use language, symbols and texts B. Use knowledge and information interactively; C. Use technology interactively); Act autonomously (A. Act within the big picture; B. Form and conduct life plans and personal projects, C. Defend and assert rights, interests, limits and needs); EU has recently identified a framework for key competences, determining that "Key competences are those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment"[3]. These 8 core competences should be in the center of education: communication skills (in mother tongue and in foreign languages), mathematical competence and basic competences in science and technology, digital competence, learning to learn, social and civic competences, sense of initiative and entrepreneurship, cultural awareness and expression. There have been emphasized as well transversal key competencies, such as problem-solving and analytical skills, self-management and communication skills, linguistic skills, and more generally - "non-routine skills".

In parallel, the report of Metiri Foundations [4] based on the expected needs of 21st century workforce in USA, provided a list with 4 main skills and sub-skills as basic for new economy. They include: Interactive Communication (1. Team collaboration, 2. Personal and social responsibility, 3. Interactive communication), Digital Age Literacy (1. Basic, scientific, technological literacies, 2. Visual and information literacy, 3. Cultural literacy and global awareness), Inventive Thinking (1. Adaptability/managing complexity and self-direction, 2. Curiosity, creativity and risk-taking, 3. High-order-thinking and sound reasoning) and Quality, State-of-the-Art Results (1. Prioritizing, planning, and managing for results, and 2. Effective use of real-world tools).

Thus it can be concluded that these three key competence frameworks anticipate that new populations will need strong academic skills, teamwork skills, proficiency of using technology and digital literacy, inventive and high-order thinking, quality and results-orientation.

### 2.1 Entrepreneurial skills as factor for company success

Various studies highlight the competences and skills of managers and entrepreneurs as main factors for company success. For example, after detailed overview of literature [5] identify 4 key competency domains for SMEs entrepreneurs, analyzing their roles for success of the company (managerial role, entrepreneurial role and functional role). These competency domains include key 7 competences and namely: strategic (set visions), conceptual (innovative thinking), opportunity (recognize chance), organizing (mobilize resources), relationship (deal with people), technical (use tools) and personal (self-confidence, emotional intelligence) competences. According to [6] key business competences

are: initiative, communication, organizing, people management, team working, negotiation skills, ability for problem solving, confidence, creativity and financial acumen as indispensable for entrepreneurship.

## **2.2 Business education research**

Other context for research of business and entrepreneurial skills and competences is provided in business education, where different authors discuss academic approaches for developing skillset for business professionals. Presenting an interdisciplinary cross-modular assignment program in his business school, [7] formulated 13 key skills for business students, including: problem identification and problem solving, oral and written communication, information gathering, information processing, numeracy, analytical, application (of concepts and techniques), creativity, social and inter-personal competences, self-analysis and decision making. [8] propose a framework for building entrepreneurship skills via Simulated Business Enterprise and provide an exhaustive list of business and entrepreneurial skills, including social skills, professional skills, and technological skills. [9] describe 3 main areas of entrepreneurial skills, including *technical skills*: as written and oral communication, technical management and organizing skills, *business management skills*: as planning, decision-making, marketing and accounting skills and personal *entrepreneurial skills*: as inner control, risk taking and innovation.

## **2.3 Observing managers and leaders**

Another approach to identify key managerial and entrepreneurship skills and competences is to observe actual managers and leaders. A recent study of [10] among 3500 executives, identified 5 key skills for innovative and creative entrepreneurs. They include: association skills, observation skills, experimental skills, questioning and networking. Another research of [11] define the leadership skillset based on observations of 500 Canadian CEOs. Moreover, his observations discovered that leadership skillset is developed across 3 main stages, naming them "leader enabler", "leader engager" and "leader artist". The first level leaders aim to "enable" business operations, along three key competences: strong financial, cash-flow and budgeting competences (mastering financial plans and financially quantifying the business), logistics and operations (improving operational efficiency) and understanding economics (understanding complex relationships for forecasting demand). The second stage include leader "engager" aiming to strenghten business through competences for negotiations, communication, media relations and public speaking, dealing with personnel, chairing meetings, performance measurement and analytical approach for problem solving. The last group of competences characterizes leaders "artists" – inspiring and motivating others, and include balance, vision, judgement, leadership (confidence), and integrity. Another survey of [12] identify key business skills for success, rated by recent graduates of business schools. The highest rank of valuable skills for their current job have: interpersonal skills (84%), managing decision-making process (84%), generative thinking (83%), managing strategies and innovations (78%), knowledge of strategic business functions (75%). [13] formed a list with key 6 skills for effective managers in 21<sup>st</sup> century (out of 14 skills). They are derived after survey and focus groups discussions of both business professionals and business school academics. As result, the following range of skills emerged: communication and interpersonal skills, etical or spiritual orientation (act with integrity), ability to manage change (diversity), ability to motivate, analytic and problem solving skills, being a strategic visionary manager. Additional skills that have been highlighted as important are: persistence in overcoming difficulties, managing knowledge workers, hard work, and finally – be passionate about work.

## **2.4 Summary of key entrepreneurial skills and competences**

After analyzing different approaches used to identify key leadership and managerial skills, they could be summarized in three main streams. The first stream of skills and competences include ability to understand and process information in order to be able to take decisions in the professional business world. Thus entrepreneurs need skills and competences to propose quality value offering on the market, recognizing basic stakeholders and main business processes as business operations, financial, economic and business literacy, marketing and sales, logistics, quality assurance and others. As business environment is fast changing, substantial skills need to be trained as information

gathering, information processing and ability to take decisions, problem-solving and analytical skills, creativity, ability for global vision and long-term visioning, and learning to learn and to fast adapt to evolving business context.

As entrepreneurs and managers are focal point of multiple interactions inside and outside organization, they need to be good communicators: using various communication channels to receive and share information, achieving goals in the process of communication: negotiating and persuading, motivating and inspiring teams, resolving conflicts.

The last stream of entrepreneurship competences include personal confidence and sense of initiative and entrepreneurship: self-direction skills, organizational skills, planning and decision-making skills, self-analysis, global awareness, ethical and spiritual orientation, ability to manage change, strategic and visionary leadership.

### 3. Serious games and Virtual worlds

In literature there exist many definitions for serious games, often extending the terms of e-learning, edutainment (coming from education and entertainment) and game-based learning [14, 15]. Although slight variances among authors, serious games are commonly described as (digital) games used for purposes other than mere entertainment or fun. Serious games usually refer to games used for training, advertising, simulation, or education that are designed to run on personal computers or video game consoles. [16] sees the sustained imaginative immersion that computer games provide as a way for “the players to invest something of themselves in a game or learning experience as they fully engage with the role”. This ‘personal investment’ is a critical factor in achieving deep learning. [14] distinguish 3 main classes of computer games, including casual games, advergames and serious games. Casual games are developed purely as entertainment activity, and thus the learning outcome is not intentionally foreseen. Serious games are especially designed to improve some learning aspects and players expect the learning process. Advergames are identified as tools designed and delivered as promotion and marketing tool of new coming movie or TV series. [17] overview several classes of computer games - concerning idea (action games, adventure games, fighting games, puzzles, role-playing, simulations, sport games and strategy games), concerning players (individual or multiplayer game), and concerning their development (mainstream, or commercial entertainment games, commercial educational games, and research based educational games). Another classification of [18], propose to distinguish serious games according to their primary market - military games, government games, political games, educational games, corporate games, healthcare games, and political, religious and art games.

Virtual worlds are commonly up-grading the notion of computer games, as they build an open-ended virtual reality. [19] determines virtual worlds as consisting of four components: “Ultimately, real virtual worlds arise from the integration of 3D, Community, Creation and Commerce.” In literature there are used also terms as ‘metaverse’, ‘synthetic world’, MMOG and multi-users virtual environments (MUVE) in place of ‘virtual world’. [20] identified structured and unstructured virtual worlds. Although the recent problems in the field of virtual worlds development, the 3D technologies have promising applications in education, entertainment, reasearch, business and socialization. The most popular virtual worlds are Second Life@, Kaneva@, HabboHotel@ and others. Among the essential elements of a virtual world can be identified:

- The concept of presence in a space
- The notion of interaction in real time with other individuals
- The idea of persistence, environment and objects
- The representation of our online persona via an avatar

While different in nature, serious games and virtual worlds are often confused, and thus its features and elements are overestimated and thus they are not properly adopted for any particular business case.

## 4. Serious games and Virtual worlds in the context of building entrepreneurial competences;

### 4.1 Serious games

Serious games are already used in wide application areas, including education, corporate, military, healthcare, government, political games and others. Even traditional entertainment games as strategy games, simulation games, role-playing games and others can facilitate entrepreneurship competence development. However, serious games aim to combine different learning approaches and complex processes to facilitate competence building.

Usually, serious games have prewritten set of actions (scenario) that player must accomplish in order to get some positive result, following preliminary defined rules and constraints. Players can get help and instructions, receive some initial training and guidelines and is virtually "assisted" while playing the games. Moreover, many SGs provide feedback, so player can better understand its results and can improve it. SGs are often displayed in appealing graphical environment and propose a back story, which is amusing for the player and develop a context of his experience. This makes SGs easily integrated in learning process and especially in active learning (focusing on learner needs), for testing competences and skills, developing critical thinking, testing scenarios, profiling, self-learning and others. As negative side, SG cannot integrate theoretical knowledge. Thus SG can be successfully complemented within an e-learning suite or with additional instructional content (Intels@, Yentels@).

There were discovered several categories of serious games used in business (Pixel Learning):

- Business simulation/games - where the learner 'runs' a business to better understand business concepts in finance, marketing, innovation management and others.
- Situational simulations - where learners perform a role in order to gain realistic virtual experience of real world roles such as, for example: auditing; sales; or business planning.
- Role play simulations - face to face or telephone-based conversations with simulated characters e.g. for conflict negotiation or sales training.
- Technical process simulations - which feature custom embedded systems or processes such as, for example, CRM, SAP usage all set within a rich and challenging real world context;

Several examples of serious games that could be used in entrepreneurship training are provided below:

- Innov8@ is the IBM Business Process Management (BPM) simulation game that gives an introduction to BPM, from learning the anatomy of a model, to model optimization. The game explores 3 business applications – traffic, customer service and supply chain.
- Market Place@ business simulation is a platform, delivering wide range of serious games, designed for university courses. There are provided a large number of on-line games focused on different level of marketing, business planning, strategy, e-commerce, supply-chain management, integrated business management and international management.
- TangoNet@ is another business simulation game, designed to enable market focused strategy and building on their company's intangible assets (company image, employee know-how and innovation). It can be combined with learning modules on CRM, Project Management, Human Resource Management, Knowledge Management, Management Accounting and Strategy for knowledge-based companies.
- Project management – [21] presents a project management business game, aiming to improve students' abilities to plan and deal with operational management. The project consist of organization of sport tournament. The game is played for 60 minute and aims to develop skills for Project management.
- Pixel Learning@ suite – Business Game@, Enterprise Game@, Financial Game@ and Sales game@, enable virtual simulations of complete business cases.
- Yentels@ and Intels@ serious games are developed under LLL program, and enhance development of entrepreneurial skills and competences in international trade.

## **4.2. Virtual worlds**

VW applications can situate learning in unusual three-dimensional spaces, facilitating seminar activities, streaming lectures, creating cyber-campus and providing distributed and remotely located learner groups. This may add value to existing educational provision and extend new provision of learning [15]. While structured (i.e., closed) like World of Warcraft@, EverQuest@, Final Fantasy@, and Star Wars Universe@ are designed around socialization, fantasy, and role playing, unstructured (i.e., open) MUVes like Second Life@ offer these same opportunities plus an active economy where can be trained real entrepreneurial skills. While SG players are motivated by accomplishment of achievements, virtual worlds focus on 3d environment that can be used for different purposes, including socialization and collaboration. Residents are able to explore, build, edit and create objects and services [16]. Studying the motivation of users to take part in VW, [22] summarized the following main reasons, highlighting that human-human interactions are the most interesting and exciting experience:

- achievement – gaining power, understanding “how”, competing against others,
- social – interest in helping and interacting in the community, building relationships, being part of the group;
- immersion – knowing more about others, creating avatar, avoiding thinking of everyday problems.

VWs propose rich interaction, visualization and contextualization, exposure to authentic content and culture, individual and collective identity play, immersion in a 3-D environment, simulation, community presence and content production. Among the examples of applications and benefits of VW in entrepreneurial education can be enumerated as follows:

- Improved participation, collaboration and communication

In contrast to other forms of virtual collaboration such as e-mail, blogs, and webinars, a 3D virtual environment increase participation and improve retention because the addition of avatars and other 3D models helps the user to feel more immersed in learning. VW facilitate group events and activities and role-playing scenarios, facilitating educational exercises such as virtual field trips or experiments [16]. This place new dimensions for effective group work, as it can allow students to interact in 3D spaces, experiment with behaviors that they might be too reluctant or shy to try in the real world. The sense of presence encourages students to explore and engage in informal, self-directed learning, and distance learning become much more feasible and effective [23].

- Simulations and experiments

VW propose unique environment for experimentation, without physical or time constraints. Thus users can participate in complex simulations that would be nearly impossible to construct in real world. This allows lecturers and students to illustrate visually and verbally their ideas and complex systems with minimum effort. As fascinating examples of the potentials of VW for complex simulations can be cited International Spaceflight Museum, the Splash Aquatics Deep Sea Aquarium, and Aimee Weber's real-time weather visualization system in Second Life@.

- Virtual Economy

Open VW as Second Life run a functioning economy that sheds light on questions of where people find real value, even in a virtual world. The virtual economy provides many opportunities for social experiments and business skills development, as observations, marketing studies, innovations, services science and others. One example provided by Craigs University is the opening of a virtual store in Second life for its marketing classes [23].

## **4.3. Advantages and limitations of using SG and VW for building entrepreneurial competences**

SG and VW have many advantages for building complex entrepreneurial skills. They can be successfully applied within the framework of emerging demand of specific managerial competences and skills. Moreover, SG and VW respond on learning preferences of new generations and contribute to:

- Improve understanding of complex business processes and improve vision of usual problems in starting and running business. SG are designed around realistic scenarios, that facilitate future entrepreneurs to take decisions, make forecasts and develop business plans, while executing various business tasks. Thus SG can enhance trainees to develop and test real competences in finance, marketing, business planning, sales, forecast methods and others.

- Improve communication and group work– SG and VW can enhance communication skills, and enable efficient teamwork and knowledge sharing, improve intercultural interactions and limit prejudices and racism. SG and VW successfully create an immersive environment for language learning and help students to overcome foreign language barrier. Moreover, there could be simulated very complex communication situations as for example conflict management, negotiation skills and stakeholder management, social architecture (TARGET EEU FP7 Project @). Role-playing and observing situations from different points of view enhance personal abilities to cooperate with others, to understand different positions, to negotiate better in real-life situations.
- Improve information gathering, complex information processing and better decision making. SG and VW contribute for extending the use of ICT and to master rich media objects within complex learning environments.
- Improve active learning - SG and VW support creative learning activities and experiences, proposing immersive context of knowledge use and area for experimentation and exploration of opportunities.
- Improve self-improvement, planning and forecasting, ability to assess situations, high-order thinking and ability to experiment. Finally SG and VW provide the player with close-to-real experience for taking decisions and coping with complex situations, for testing knowledge and skills and improve his abilities to deal with critical incidents, that can happen in real-life.

Although the high number of advantages for application of SG and VW in entrepreneurship education, there exists as well many limitations for its widespread use. One of the constraints remain the need to adapt educational methodologies with new enhanced ICT methods as SG and simulations. The analysis proves that SG and VW can become powerful tools for educators to change traditional training methodology and to create new forms of learning experiences. However, educators will need to prepare for that change, leaving their role of knowledge providers and transforming to facilitators of complex learning and knowledge management processes, organizing and guiding unique learning experiences. Moreover initial investments for transformation of the educational process in form of money, effort and time are substantial [24]. One other difficulty is the assessment of learning in SG and VW. Traditional grades as collection of quantitative data can not be relevant for specific learning experiences, that are difficult to test, and the soft competences addressed with SG often are not part of the curriculum (collaborative work, visualization skills). Thus application of SG and VW in educational process should be carefully prepared and based on sound educational methodological principles: what is the value of technology use for educational process, what resources are needed for implementing it in class, is it fitting with the goals of the curriculum, and how can be assessed learning usability and outcomes.

## 5. Conclusions

The present paper provides an overview of entrepreneurial skills and discuss how SG and VW can be applied for entrepreneurship and business training. However, in order SG and VW to become widely accepted educational practice, there should be provided higher number of examples, SG applications and research evidences. The popularity of SG and VW and their wider application in many non-academic and business purposes will contribute as well for their further extension for training and skills building [25].

Entrepreneurship and leadership competences are crucial for development of strong business organizations. Moreover combination of skills and abilities, educational background and professional experience, make business professionals able to lead organizations in challenging times and to transform them to value-adding centers. While in the past, company management was concentrated in the hands of senior professionals with most experience and expertise in the field, nowadays, this practice become obsolete, because of two factors. On first place, flexible and competitive companies need to decentralize its decision-making processes, allowing different management levels to act as entrepreneurs. The second factor is the fast emerging new knowledge domains, requesting fast adaptation and rescoping of company strenghts and opportunities. Thus younger professionals have to make decisions and manage complex organizational relationships with less experience. Thus playing SG and VW can be successfully applied in entrepreneurship education as it propose younger professionals to survive complex practical experiences.

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# Development of Accounting Regulation and its effects on Enterprise Operation in Hospitality Industry

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**In recent years, international competition has become an increasingly important factor in many industries. Managers in the new environmental demands need more relevant cost and performance information on organization's activities, processes, products, and services. One of the most important sources of information about the efficiency of any business subject is financial statements. Financial statements are prepared according to – international, national - accounting standards, regulations.**

**Tourism became one of the most rapidly growing industry in the world. To take part from advantages more and more enterprises appear in it. The aim of this paper is to investigate the development of International Accounting Regulation and its effects on business operation, especially in Hospitality Industry.**

## Keywords

International Accounting Standards, USALI, Cost Accounting

## 1. Introduction

With the dramatic growth in global trade and the accelerated internationalization of capital markets, financial statements produced in one country are used in other countries more and more frequently. This has brought accounting harmonization to the forefront as an international business issue. Accounting experts argue that accounting harmonization has several definitions [1]. The most simply definition could be that it is the process by which differences in financial reporting practices among countries are reduced with a view to making financial statements more comparable and decision-useful across countries [2].

On the other hand, enterprises to satisfy external (investors, creditors, government, etc.) and internal (shareholders, managers, etc.) users' financial information need have to set up their financial statements according to requirements of – international, national - accounting standards, regulations. Enterprises listed on different stock exchange are required to adjust their locally prepared financial statements according to requirements of particular stock exchanges. A classical example in the literatures for the diversity in the reported results of operations under different accounting standard is a Spanish telephone company. Telefonica de Espana, whose stock was listed on a number of securities exchanges, had to prepare their financial statement according to the Spanish, the U.S. and the International Accounting Standard Board (IASB) accounting standards. Table 1 shows the reported result of operation under different accounting standards. As it can be seen from a Table 1 the reported net income of company is twice as high under the U.S. as under Spanish accounting regulation.

**Table 1** Result of Operation under Different Accounting Standards

Accounting Standard	Net Income Pesetas (Mil)
Spanish accounting standards	53,247
ISAB accounting standards	63,516
U.S. accounting standards	130,260

## 2. International Harmonization of Accounting Standards

Accounting experts stressed out that international accounting harmonization is an outcome of the globalization of financial markets and of economic integration [2]. Its objective, as explained by the Financial Accounting Standards Board (FASB) is to provide internationally comparable accounting data. As the volume of international financial and economic activities and investments continues to surge, the need for a common language of business in financial statements is increasing in urgent.

International accounting harmonization has several definitions. One of the most coherent definitions of accounting harmonization can be finding in the Barlev and Haddad (2007) work. In theirs work different definitions of accounting harmonization are determined by the level of expected comparability of accounting data. According to the lower levels of expected comparability international accounting harmonization is defined as a situation of diversity in national accounting, or in accounting methods and principles among countries, along with the knowledge and capability on the part of financial statement users to understand the statements of foreign companies. A more advanced definition states that international accounting harmonization is a state in which a group of nations agrees on a similar set of accounting standards but requires that any departure must be disclosed and reconciled with acceptable standards.

The idea of harmonization of accounting regulations is supported by accounting organizations, international business and governmental agencies. Proponents of accounting harmonization believe that harmonization can improve the quality of financial statements. Accounting scholars, Tay and Parker, draw a distinction between harmonization of accounting practices (*de jure* harmonization) and harmonization of accounting regulations (*de facto* harmonization). Financial Accounting Standards Board (FASB) stressed out that one of the way to improve comparability and transparent ability in financial reporting is to use „international” accounting standards. Some expert in his work emphasizes the quality of international accounting standards and its effects on enterprise operation, according to this view high quality accounting standards result in greater investor confidence, which improves liquidity, reduces capital costs, and makes fair market prices possible [4].

### 2.1 Pioneers of Accounting Harmonization

The greatest efforts for harmonization of accounting standards have been made by Financial Accounting Standard Board (FASB), the International Accounting Standards Board (IASB) and the European Union.

Prior to 1960, there was little effort devoted to the international harmonization of accounting standards. In 1972 the Financial Accounting Standard Board was founded with the aim to create and develop the accounting standards in the Unated States. The International Accounting Standards Board (IASB) was created in 1973 in order to set International Accounting Standards (IAS) and encourage their global acceptance. A common criticism of the early IAS was that there was too much flexibility in the standards and not enough in the way of required disclosures. Efforts were taken to minimize the differences between IAS and U.S. accounting standards (GAAP – general accepted accounting principles) and by the late 1990's supporters of IAS asserted that the IAS were of comparable quality and any remaining differences were minor. In 2002 the IASB and FASB agreed to jointly undertake a convergence project with the objective of eliminating a variety of the differences that exist between IAS and U.S. GAAP. The agreements' effects have become visible nowadays, when the Security and Exchange Commission (SEC) accepted financial statements from non-U.S. companies based on IASB accounting standards without reconciliation beginning in 2009.

The European Union drafted its expectations into the framework, which mean that the EU left Member Countries a degree of flexibility in the transposition of the accounting directives into national law by including several options within them. Figure 1 shows the hierarchical levels of regulation in EU.



**Figure 1** The hierarchical levels of Regulation

On 12th March 2002 the European Parliament approved the European Commission's proposed Regulation on financial reporting: all EU listed companies should prepare their consolidated financial statement in accordance with standards issued by the International Accounting Standards Board (IASB), starting no later than 2005.

## **2.2 Managerial Accounting and International Accounting Regulations**

In last decades, international competition has become an increasingly important factor. Managers in the new environmental demands need more relevant cost and performance information on the organization's activities, processes, products or services. In this kind of environment the rates of profitability, opportunities for growth, future prospects, and risks to investments may vary greatly among industry and geographical segments. Thus, users of financial statements need segment information to assess the prospects and risks of a diversified enterprise which may not be determinable from the aggregated data. The objective of presenting information by segments is to provide users of financial statements with information on the relative size, profit contribution, and growth trend of the different industries and geographical areas in which a diversified enterprise operates to enable them to make more informed judgments about the enterprise as a whole. [5] This information can arise from management accounting. Segment reporting is the fundamental task of management accounting and is based on the IFRS 8 and the SFAS 131.

Financial Accounting Standards Board (FASB) in the 1976 issued the SFAS 14, *Financial Reporting for Segments of a Business Enterprise*, required companies to disclose revenues, a profitability measure, and identifiable assets for lines of business and geographies areas. SFAS 14 did not provide a precise definition of geographic segment. Companies tended to aggregate on continental or multicontinental basis. In response to user concerns regarding the limitations of segment reporting under SFAS 14, SFAS 131 was issued in 1997 and became effective after 1 January, 1998. SFAS 131 requires companies to report disaggregated information about reportable segments based on the way management organizes the enterprise for the purpose of making operating decision and assessing performance.

International Accounting Standards Board (IASB) issued IAS 14 in 1981, *Reporting Financial Information by Segment*. IAS 14 followed fairly closely the requirements of US SFAS 14. According to the experts IAS 14 was criticized for its lack of prescriptive guidance in presenting segment information, its soft language, the latitude it allowed for interpretation and lack of comprehensiveness and clarity.

The result of harmonization process International Accounting Standards Board (IASB) issued IFRS 8, *Operating Segments*, which became effective from 1<sup>st</sup> of January 2009. IFRS 8 defined reportable segment as an operation segment or aggregations of operation segments. Operating segments are components of an entity about which separate financial information is available that is evaluated regularly by the chief operating decision maker in deciding how to allocate resources and in assessing performance. Financial information is required to be reported on the same basis as is used internally for evaluating operating segment performance and deciding how to allocate resources to operating segment.

**Table 2** Segment Reporting according to the IASB and US GAAP

IFRS 8	SFAS 131
"Operating Segments"	"Disclosures about Segments of an Enterprise and Related Information"
The reported revenue is 10% or more of the combined revenue of all reported segments The absolute amount of its reported profit or loss 10% or more of the combined Its assets are 10% or more of the combined assets of all operating segments	

Each of them, the U.S. standard (SFAS 131) and IASB standard (IFRS 8), subscribe segment as a component of an enterprise. It is not a separate entity, but has ability to financial reporting. Standards based on company's structure defined the operating segments.

Both of them set up the same requirements to reportable segments. An enterprise report separately information about a segment that meets any of the following quantitative thresholds:

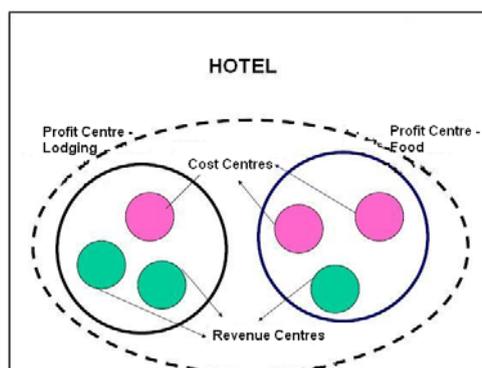
- its reported revenue is 10 percent or more of the combined revenue,
- the amount of its reported profit or loss is 10 percent or more of the combined,
- its assets are 10 percent or more of the combined assets.

Each of them stressed out the Management responsibility at the disclosure of business result. Therefore it emphasizes its management approach.

### 3. Uniform System of Accounts for the Lodging Industry

Uniform System of Accounts for the Lodging Industry was published by the Hotel Association of New York City with the aim to establish a uniform accounting system for member hotels, in 1926. The document reflects its cost accounting view, because the appearance of the document was the answer to the management needs [6]. The USALI's framework build on responsible accounting. Responsibility accounting stresses the control or influence that managers can exert within the segment of the organization for which they are responsible. USALI's principle is that each manager should be responsible for revenues and costs that are able to control.

Segment reporting is fundamental for management accounting, while its organisation and content should be organized in such way to help the financial statements users to understand better the efficacy of previous periods, to make a better assessment of risk and possibilities of the enterprise and a more realistic assessment of the firm as a whole. A hotel being an investment center, the operated departments like rooms, food, beverage and other services as a profit centers that present an unavoidable information basis in the organisation, informative, accounting and information aspect. On these standpoints it is possible to define the flow of goods, money and information, and optimise the input, content and output of data and information in the management accounting [7]. Figure 2 shows the model of the hotel enterprise as an investment centre.

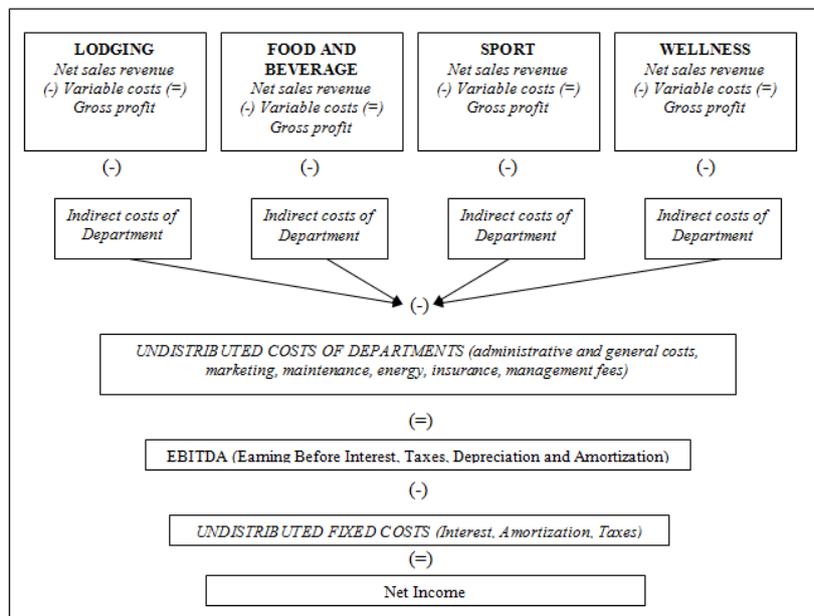


**Figure 2** Model of the hotel enterprise as an investment centre

Departmental income statements should be prepared in the hospitality industry with supporting schedules of revenues and expenses for each of the departments or activities in the property. They provide some of the most important internal sources of information for hotel managers. Each manager that is responsible for a department or an activity within a property should participate in the process.

A responsible manager has an insight into the expenses/revenues that are within his competence. The first level of the internal result is the difference between revenues of those segments cost, that operated their activities directly on the external market and expenses of the same operated

departments presented as the profit from operated departments or contribution margin. The variable costs at this level are controllable operation expenses that are deducted from the revenue to establish the gross operating income. If we deduce from the first level profit the part of fixed cost that can be immediately calculated into the particular business operation, we can establish gross operation profit. The manager can not significantly influence the third level of results, the net operating profit. The uncontrollable overheads (rent, property taxes, insurance, interest expense, depreciation and amortization) are compensated on this level. The head manager controls this category of cost, because it is the result of his decision.



**Figure 3** Calculation of business result according to segment reporting

Despite the fact, that USALI exist more than eight decades and it is in constant improving and adapting process to satisfy new requirements, it is necessary to note that today USALI does not meet the requirements of modern systems of measurement.

Under USALI, only product costs are assigned to the units produced. Fixed overhead costs are not traceable to units of output and therefore not assigned to the units produced. There is not a discernible relationship between units of output and fixed overhead.

USALI is conceived as a partial calculation of costs and it is oriented to the short term decisions. During the growth of general operating expenses USALI does not provide a basis for their measurement and management. The main problem is the fact that overhead costs not allocated to the profit department, but remain "in the block" in the income statement. This refers to the cost of administration, human resources, marketing, energy, current and investment maintenance, depreciation, interest, etc., which arise up to 35-40 per cent of total costs in a hotel enterprise.

## 4. Conclusions

The aim of this paper was to bring attention to the Financial Reporting in the Lodging Industry and to find the place of accounting standards for the Hotel Companies in the process of International Accounting Harmonization.

Responsibility accounting provides information to management about the performance of a sub-unit of the organization. It is also a view of an accounting system, which emphasizes the human element and its effects on operations and stresses the control or influence that managers can exert within the segment of the organization for which they are responsible. To do so, USALI should expand its view to modern cost accounting methods. One of solution should be the activity-based costing (ABC). Activity-based costing (ABC) method provides insight into how management is presently serving its customers, and how to better serve them in the future. It is defined as a methodology that measures cost and performance of activities, resources and cost objects. Resources are assigned to activities,

then activities are assigned to cost objects based on their use. ABC recognizes the causal relationship of cost drivers to activities.

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