

# PROCEEDINGS OF THE 5<sup>TH</sup> INTERNATIONAL CONFERENCE FOR ENTREPRENEURSHIP INNOVATION AND REGIONAL DEVELOPMENT



## REGIONAL DEVELOPMENT FOR UNLEASHING GROWTH THROUGHOUT SOUTHEASTERN EUROPE



**Sofia University  
Sofia, Bulgaria**

June 1-2, 2012

[iceird2012@fmi.uni-sofia.bg](mailto:iceird2012@fmi.uni-sofia.bg)





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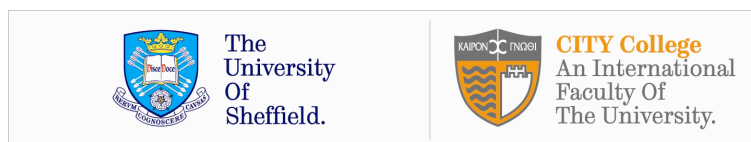
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**Dear ICEIRD 2012 Participants,**

On behalf of the organizing committee, I am privileged to welcome you to the 5th International Conference for Entrepreneurship, Innovation and Regional Development ICEIRD 2012, and the first ICEIRD to be held in Bulgaria. Over the past five years ICEIRD has grown to be the major international conference in entrepreneurship and innovations. It is an honor to preside the 5<sup>th</sup> anniversary issue of the conference themed Regional Development for Unleashing Growth Throughout Southeastern Europe, which continues the tradition of high-quality, broad international participation in all areas of entrepreneurship and innovation for regional development.

The ICEIRD 2012 conference brings together academicians, researchers, business executives, industry organizational leader, government and non-government representatives, management consultants, service providers, technological and business experts and entrepreneurs and innovators to address the challenges unleashed in order to enhance the competitiveness of the Southeastern Europe region industry. The program consists of thoughtful leadership, industry research, best-of-breed practices and technology solutions that can be deployed to ensure the profitable growth of enterprises.

The spirit of the Conference lies in the belief that the global and regional economy favors organizations that can reach across boundaries effectively. It rewards those that can collaborate smoothly with their partners and customers. As a result, business excellence is no longer about individual players -- it's about effortless coordination and communication.

We are honored to have Dr. Rodney Schwartz CEO of ClearlySo London, UK and Professor Robert Huggins of Centre for Advanced Studies Cardiff School of City and Regional Planning Cardiff University, Cardiff, UK as our keynote speakers.

I hope that you will find the conference both enjoyable and valuable, and also enjoy the architectural, cultural and natural beauty of Sofia and Bulgaria. Sofia is a city with a glorious history of thousands of years, settled in the last century BC, and a cosmopolitan modern city full of life.

Kofi Annan, the former UN General Secretary mentioned once in his speech " if you see something wrong in your community or society do not wait till someone will change, do yourself and it does not matter have to be big" so I encourage you that our conference is not only gathering event it is also opportunity exchange ideas, to learn, to share through seminars, workshops, events, and group discussions which is you will learn more and in the great commitment of contributing towards positive change as a collective force of active citizens in ICEIRD.

As agents of change, let us experience value of ICEIRD 2012 and bring that energy to your community for positive changes!

Passion into Action!

Dimitar Birov, PhD  
ICEIRD 2012 Conference Chair

# Table of Content

<b>Automation of e-health systems through mobile devices and semantic technology</b> <i>Besim V. Abdullai</i> .....	16
<b>An Innovation on Small-Medium Scale Industry Cluster Framework to Enhancing Industrial Value Chain - Case Study Bekasi Exclusive Economic and Industrial Zone, Indonesia</b> <i>Ridwansyah Yusuf Achmad</i> .....	27
<b>Innovative Approaches to Increase the Regional Competitiveness in Nuts 2 Regions of Turkey in the Perspective of Regional Policy Changes</b> <i>Ayşen Altun Ada, Bahar Çelik</i> .....	36
<b>Business Performance in the Republic of Macedonia and the Role of Government in the SMEs</b> <i>Prof. Dr. Hamit Aliu, Mr.Sc. Nuhi Sela, Mr.Sc. Fluturim Saliu</i> .....	46
<b>Securing Human Capital in Family Businesses: The Buy or Breed Dilemma</b> <i>Bjørn Willy Åmo, G.T.Wasantha Sriyani</i> .....	54
<b>South-East European Regional Financial Market as a Core Condition for Regional Development</b> <i>Goran Andjelic, Vladimir Djakovic</i> .....	60
<b>Dynamic Business Alignment (DBA) - Leading Edge Thinking &amp; Designing end to end Enterprises</b> <i>Evangelos Angeletopoulos</i> .....	68
<b>Analysis of Training Needs and Life-Long Learning Attitudes for SMEs Managers - Outcomes from Empirical Research</b> <i>Albena Antonova</i> .....	81
<b>Developing Entrepreneurship and Innovation Skills within TEL Ecosystem</b> <i>Albena Antonova, Petar Vrgović</i> .....	88
<b>Global Entrepreneurship and Development Index (GEDI) – Complex Measure of Relation between Entrepreneurship and Development in South-eastern European Countries</b> <i>Mirela Arifović<sup>1</sup>, Bahrija Umihanić<sup>2</sup>, Majda Mujanović<sup>3</sup></i> .....	95
<b>ICT and Education Efficiency in Selected EU and OECD Countries: a DEA Approach</b> <i>Aleksander Aristovnik</i> .....	105
<b>The Influence of Collaboration on Effectiveness of Innovation Activity in Polish Regions</b> <i>Anna Matras-Bolibok</i> .....	116
<b>Intellectual Property Practices of New Technology Companies</b> <i>Christian Carstensen, Stoyan Tanev, Søren Jensen</i> .....	124
<b>S. Beer's Viable System Model Application in Furniture Industry-A Case Study</b> <i>Maria Mikela Chatzimichailidou, Stefanos Katsavounis</i> .....	133
<b>Demand-Driven Supply Chain using Lean &amp; Agile Principles: a Culture for Business Excellence</b> <i>Christos Chatzopoulos, Danijela Gračanin, Ivica Veža, Alexander Tsigkas</i> .....	141



<b>Value Engineering in Industrial Equipment Modeling</b> <i>Alexandru Chichernea, Florin Chichernea</i> .....	149
<b>A Comparative Statistical Analysis of the Insurance Sector in the European Union Member States and Turkey</b> <i>Nilüfer Dalkılıç, Ayşen Altun Ada</i> .....	161
<b>Combination of Academic Science Education with Methodology for Development of Communication Skills, Internal Motivation and Creativity</b> <i>Plamen Dankov, Emilia Nesheva, Nikolai Neshev</i> .....	170
<b>Interactive Teaching of Modern Physics for Students of Engineering and Other Fields of Science</b> <i>Plamen Dankov, Emilia Nesheva, Nikolai Neshev</i> .....	176
<b>The structure of GDP-indicator for economic model for development of Macedonian economy</b> <i>Ljupco Davcev, Ana Ljubotenska</i> .....	183
<b>The impact of the information technology on the business sector development</b> <i>Ljupco Davcev, Andrea Kulako<sup>2</sup></i> .....	191
<b>Integration of Social and Business Networks</b> <i>Dimitar Dimitrov, Boyan Bontchev</i> .....	197
<b>Improving Business Quality of Serbian Companies: The Role of Knowledge</b> <i>Dejan Đorđević, Dragan Čočkalo, Živorad Vasić, Zvonko Sajfert</i> .....	206
<b>The Significance of Contractual Relationship with Distributors for Promoting Organic Agriculture Development in Serbia</b> <i>Jovana Đuričić, Vesna Kočić Vugdelija, Nenad Đokić</i> .....	213
<b>Female Entrepreneurship – the Diasporic Experiences of Black African Women Entrepreneurs in Britain</b> <i>Thomas Tserayi Domboka</i> .....	221
<b>The Concept of Using Standard Topic Map in Business Intelligence System</b> <i>Helena Dudycz</i> .....	228
<b>Small and Medium Enterprises and Economic Development – Case of Bosnia and Herzegovina</b> <i>Zijad Džafić</i> .....	236
<b>The Risks Connected with Innovations on Financial Markets</b> <i>Dajana Ercegovac, Mirela Momčilović</i> .....	244
<b>Repositioning through resilience in times of crisis: the case of entrepreneurial academic institutes</b> <i>Evangelos Ergen</i> .....	254
<b>Empirical Evidence on Innovation Output and Economic Performance in Slovenian Manufacturing</b> <i>Peter Fatur, Borut Likar</i> .....	273
<b>Customer Co-Creation and New Economic Sociology</b> <i>Robert Freund, Zoran Anisic, Jelena Demko Rihter, Dolores Jovanović</i> .....	281
<b>Analysis of 3D Software Visualization Metaphors for Architectural Visualization</b> <i>Maria Ganeva, Dimitar Birov, Iliyana Vladeva, Cvetelina Stoyanova</i> .....	287

<b>Development of an Innovation Strategy for the Thessaloniki Metropolitan region</b> <i>Christos Georgiou, Nicos Komninos, Elena Sefertzi, Konstantinos Styliaras, Nikos Zaharis</i>	298
<b>Fast Growing and Innovative SME are more Resistant to the Economic Crisis</b> <i>Miroљub Hadžić, Petar Pavlović</i>	307
<b>Innovation Management in New Product Development Processes</b> <i>Leif Henriksen, Ahmet Gayretli</i>	315
<b>Crowdsourcing: Past, Present and Future</b> <i>Mokter Hossain, Raisa Halonen, Mohammad Hoque, Gautam Raj Mktan, Tuomas Ritola</i>	319
<b>Bottom of the Pyramid is the Next Focus for Open Innovation</b> <i>Mokter Hossain</i>	326
<b>Entrepreneurship and SMEs' Competitiveness</b> <i>Rozita Talevska Hristovska, Suzana Trajkovska Kocankovska</i>	333
<b>A System Dynamics Approach towards the Role of Innovation in Fostering Trade and Regional Development throughout Southeastern Europe</b> <i>Eleftherios Iakovou, Dimitrios Vlachos, Naoum Tsolakis, Christos Keramydas</i>	342
<b>Corporate Social Responsibility and Public Policies in Romania: Competitiveness and Development through Economic and Social Growth</b> <i>Irina-Eugenia IAMANDI</i>	353
<b>Social Networking &amp; Loyalty Program as Mobile Value Added Services Using NFC</b> <i>Dashmir Istrefi, Betim Cico</i>	363
<b>Clarifying 'Fuzziness' in Systemic Welfare Service innovation</b> <i>Harri Jalonen</i>	370
<b>Impacts of the Organizational Change on Employees' Productivity</b> <i>Dusica Janevska, Gligor Stojkov</i>	383
<b>Science Communicators and Their Role Today</b> <i>Radu Jecu, Ioana-Carmen Popescu</i>	391
<b>Market Strategies Supported by Information Technology</b> <i>Vlatko Jovanovski, Verica A. Jovanovska, Todor Cekarovski</i>	398
<b>Serbian SMEs Contemporary non-credit Sources of financing</b> <i>Slobodanka Jovin, Dajana Ercegovac</i>	405
<b>A Model for Stimulating the Entrepreneurship among the Students of Sofia University 'St. Kliment Ohridski'</b> <i>Zlatina Karova</i>	413
<b>An Entrepreneurial Educational Model for Knowledge-Based Regional Development through Innovative Learning Practices</b> <i>Petros Kefalas<sup>1</sup>, Panayiotis H. Ketikidis<sup>2</sup>, Ioannis F. Ververidis<sup>3</sup></i>	417
<b>Innovation capital and firm's market value</b> <i>Tomasz Kijek</i>	430
<b>Bulgarian Innovations – Are they the true way to industrial growth in Bulgaria</b> <i>Diana Kopeva, Nikolay Shterev, Dimitar Blagoev</i>	437

<b>Building an Expanded Small Firm Growth Model in a Transitional Economy - Evidence on of Fast Growing Firms</b> <i>Besnik A. Krasniqi</i> .....	447
<b>Gender Differences in Entrepreneurial Self-Efficacy</b> <i>Irena Miljković Krečar, Gordana Ćorić</i> .....	475
<b>Evaluation of the Performance of Employees</b> <i>Afrim Loku, Lindita Mehmeti</i> .....	485
<b>Microcredit as an Alternative Mechanism for Supporting Micro and Small Entrepreneurs' Sector</b> <i>Olga Lopatina</i> .....	491
<b>Added Values by Green ICT and its Importance for the Environmental-Engineering Criteria for the Enterprises in the Choice of the IT-Suppliers and Products</b> <i>Dusko Lukac</i> .....	501
<b>External Business Intelligence in Small- and Medium Sized Firms – A Case Study of Finnish Marine Industry</b> <i>Teemu Makkonen<sup>1</sup>, Antti Saurama<sup>2</sup></i> .....	509
<b>An “Adventurous” Approach towards Virtual Entrepreneurship</b> <i>Atanas Manafov, Georgi Pavlov, Velimir Manafov, Irena Pavlova</i> .....	517
<b>Regional FutureWatch – a Framework to Renew SMEs' Competitive Advantage for the Future</b> <i>Anneli Manninen, Tarja Merist, Jukka Laitinen</i> .....	527
<b>Internal and External Factors of Entrepreneurial Intention and the Influence on Small Business Growth : Evident From Small Firms Producing Locally Proceeded Food (Dangke) in South Sulawesi, Indonesia</b> <i>Palmarudi Mappigau</i> .....	538
<b>Enhancing Company's Every Day logistics Using Cargo Loading Optimization</b> <i>Riste Marevski, Kostadin Solakov</i> .....	554
<b>The Role of the Management Control Systems in the Small and Medium Enterprises</b> <i>Mariluz Maté, Santiago DelaFuente</i> .....	560
<b>The Implications of Foreign Investment on the Growth and Development of Domicile Enterprises as a Factor of Regional Development</b> <i>Nada Milenković, Dragana Ikonić, Snežana Milošević</i> .....	572
<b>Growth and Development of the Small and Medium Enterprises in the Function of the Economic Recovery of Serbia</b> <i>Dalibor Miletić, Silvana Ilić, Marija Stevanović</i> .....	580
<b>Women Entrepreneurship in Montenegro – Some Relation to the Informal Economy</b> <i>Marina Milic, Dragana Radevic</i> .....	587
<b>Information Asymmetry in the Software Market: a Failure of the Intellectual Property System</b> <i>Miglena Molhova</i> .....	595
<b>Significance of Internal Audit for the Success of Small and Medium Enterprises</b> <i>Mirela Momcilovic, Sanja Vlaovic Begovic, Slobodanka Jovin</i> .....	602

<b>Entrepreneurship in the Informal Sector as a Form of Labour Market Adjustment – the Case study of Macedonia</b> <i>Dimitar Nikoloski, Ljupcho Pechijareski, Goran Pechijareski</i> .....	611
<b>Sustainable Entrepreneur and Effective Maintenance: Case for Nigeria</b> <i>Akinleye Afolabi Ogungbemi</i> .....	619
<b>Cost Accounting for Globalization and its Impacts on the Hotel Industry</b> <i>Andor Pajrok</i> .....	624
<b>Product Enabled Services in Technology Start-ups</b> <i>Søren Pedersen, Stoyan Tanev, Zheng Ma &amp; Chih-Cheng Lin</i> .....	634
<b>Evaluation of the National Innovation System of the Republic of Macedonia – Business Sector Perspective</b> <i>Radmil Polenakovik , Bojan R. Jovanovski, Trajce Velkovski</i> .....	646
<b>Workplace Security and Willingness to Start Own Business</b> <i>Mirjana Borota Popovska, Vasil Popovsk, Marija Topuzovska</i> .....	656
<b>Social Entrepreneurship is a Step Forward to High Human Development</b> <i>Marija Zarezankova-Potevska, Angelina Taneva-Veshoska</i> .....	662
<b>Innovation Policy in Croatia, Slovenia and Finland: Towards Multiple ‘Best Practices’?</b> <i>Domagoj Račić</i> .....	670
<b>The Consequences of Changes in Groundwater Levels in Costal Areas of the Sava River</b> <i>Snezana Rajkovic, Mihailo Ratkinic, Miroslava Markovic, Radoslav Rajkovic</i> .....	678
<b>Internet and its Diffusion, the Vlora Region Case Study</b> <i>Miftar Ramosacaj, Lukan Puka</i> .....	686
<b>A Comparative Assessment of the Factors Fostering Innovation in the Small and the Medium Enterprises: the case of Germany, Belgium and Spain</b> <i>Humberto López Rizzo</i> .....	696
<b>Why do Scientists create Academic Spin-offs? The Context influence</b> <i>Ugo Rizzo</i> .....	705
<b>Innovation and SMEs in the new entrepreneurial environment of crisis</b> <i>Elpida Samara, Paraskevi Giourka, Dimitris Skalkos, Ioannis Bakouros</i> .....	718
<b>Doha Round negotiations of the World trade organization and the growth of the global economy</b> <i>Slavejko Sasajkovski, Ljubica Micanovski</i> .....	725
<b>Green Layers: Improving the Innovative Capacity of SMEs in the Dutch Greenhouse Horticulture Industry</b> <i>Henk J. Schout and Pepijn van Willigenburg</i> .....	734
<b>Innovation and Use of Technology in Manufacturing Industry</b> <i>Mr. Nuhi Sela, Mr. Fluturim Saliu, Nafi Pollozhani</i> .....	749
<b>University - Industry Knowledge Transfer in non-core Romanian Regions</b> <i>Cristina Serbanica</i> .....	755
<b>Competitiveness of Western Balkan SMEs’ in Terms of Global Economic Crises</b> <i>Jelena Simic, Mila Mihajlović</i> .....	765

<b>Regional Development Capacity of Hungarian Local Governments</b> <i>József Simon</i> .....	773
<b>Transportation Scheduling and Route Planning Framework for Modern ERP Systems</b> <i>Kostadin Solakov, Riste Marevski</i> .....	781
<b>Science Parks and Technology Transfer</b> <i>André Spithoven</i> .....	788
<b>Simulation of Differential Robotic Platform Movement</b> <i>Zeljko Stanković, Dragan Cvetković, Gordana Radić</i> .....	808
<b>Current Themes, Challenges and Research in Social Entrepreneurship</b> <i>Elena Stojanovska</i> .....	815
<b>Entrepreneurship Changes with Special Emphatizes on ICT in Kosovo</b> <i>Fatmir Stublla</i> .....	824
<b>Preconditions for Implementation of Mass Customization Strategy in SME's</b> <i>Nikola Suzic, Zoran Anisic, Cipriano Forza</i> .....	830
<b>Comparative Analysis of the Innovation Capacities in the WBC with Emphasis on Joint Cooperation Needs in the Field of Innovation</b> <i>Jadranka Švarc</i> .....	838
<b>The Knowledge Economy: Some implications for the Republic of Bulgaria</b> <i>Mahfouz E. Tadros</i> .....	845
<b>SMEs, Patent Data and New Tool for Business Intelligence</b> <i>Zeljko Tekic, Dragan Kukolj, Ljubisa Nikolic, Maja Pokric, Miroslava Drazic, Milana Vitas<sup>6</sup></i> .....	855
<b>The Dynamic Interplay Between Factors Determining Success in Spin-Out Process</b> <i>Zeljko Tekic, Cosic Ilija, Miodrag Hadzistevic</i> .....	864
<b>Social networks – Tools for Enhancement of Knowledge Management</b> <i>Kostadinka Toteva, Elissaveta Gourova</i> .....	872
<b>Social Entrepreneurship: Challenges of Impact Assessment</b> <i>Aysenem Tuyliyeva</i> .....	878
<b>The Youth Entrepreneur Profile - Initial Steps</b> <i>Anastasios Vasiliadis, Ingrida Geciene, Magnus Bjorkstrom, Jose Antonio Gonzalez-Elipe, Tina Orfanidou</i> .....	886
<b>Student entrepreneurial characteristics and attitude toward change in Macedonia</b> <i>Angelina Taneva-Veshoska, Ljubomir Drakulevski</i> .....	896
<b>Economic Resilience and Entrepreneurship: Lessons from the Sheffield City Region</b> <i>Tim Vorley, Nick Williams and Peter Rodgers</i> .....	904
<b>Choosing Sides? The Balance in Regional Innovation Systems between Public Research on the Supply-Side and Business Innovation on the Demand-Side</b> <i>René Wintjes, Djuro Kutlaca</i> .....	924
<b>The impact of the Settlement Disparity on the Involvement of Adult Population into Entrepreneurial Activity and Factors Influencing it in Russia</b> <i>Tatiana Zabelova</i> .....	933



<b>European Monetary Union as a Regional Integration – Whether Enter or Not?</b> <i>Dejan Živkov, Suzana Kolar, Marko Milošević</i> .....	<b>943</b>
<b>Authors Index</b> .....	<b>952</b>

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## CONFERENCE CHAIR



**Dimitar Birov** is Associate Professor at the Faculty of Mathematics and Informatics of Sofia University. He has professional experience as research fellow, lecturer, and project manager at Sofia University, University College of Dublin, Ireland, University of Orleans, France, Microsoft Corporation, Redmond, USA, Carnegie Mellon University, and Pittsburgh, USA. He has industrial experience like software developer, software architect, consultant, and CEO. He is patent inventor-Microsoft US Patent. His primary research interests are in software engineering and software architecture, programming languages and knowledge management.

## CONFERENCE CO-CHAIR

**Prof. Panayiotis H. KETIKIDIS** is the Vice Principal for Research, Innovation & External Relations of the University of Sheffield International Faculty, CITY College, and the Chairman & Academic Director of the Doctoral Programme at the South East European Research Centre (SEERC). He is the Chief Editor of the International Journal of Innovation & Regional Development (IJIRD) and Associate Editor of the International Journal of Logistics Economics and Globalisation (IJLEG). He has over 25 years of experience in management, education, and research.



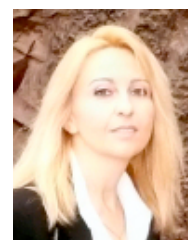
## CONFERENCE CO-CHAIR



**George Chobanov** is Professor in Economics at Sofia University and founding Dean of the Faculty of Economics and Business Administration. He has doctoral degrees both in natural sciences and economics. Professor Chobanov is currently Managing Director of the High-Tech Business Center at Sofia University. He is teaching courses in Statistics, Econometrics, Principles of Economic Analyses and Institutional Economics. His research is mainly focused in Equilibrium Theory, Flow of Fund Analyses, Dynamic Economic Systems, Rules and Behavioral Norms in a Sustainable Society.

## PROGRAMME CO-CHAIR

Yanka Todorova is an expert with exceptional cross-sector experience at top executive positions in innovation strategies' management, performance and risk management, audits, forensic expert litigations, and IPR. Having economics college degree and MSc in Information Sciences, she extended her knowledge through PhD in Innovation Strategy and Technology Entrepreneurship. Well-found with specializations as international economics at Universität Koblenz-Landau, Germany and PhD specialization at the University of London, UK, she shares her knowledge as a guest lecturer at several universities.



## PROGRAMME CO-CHAIR



**Elissaveta Gourova** is Associate Professor at the Faculty of Mathematics and Informatics of Sofia University. She has professional experience as Head of department at the Ministry of Transport and Communications, research fellow at DG JRC – IPTS, member of expert groups of the Council of Europe, EUTELSAT and the of Information Society Forum at the European Commission. Her primary research is cross-disciplinary focused on Knowledge management and open innovation. Her research interests further focus on e-skills, e-Learning, mobility and career of researchers.

# BIOGRAPHIES OF KEYNOTE SPEAKERS AND WORKSHOP CHAIRS

## KEYNOTE SPEAKER AND WORKSHOP CHAIR



**Prof. Robert Huggins** Professor Robert Huggins is Chair of Economic Geography at Cardiff University's School of City and Regional Planning and Director of its Centre for Advanced Studies (2011). Prior to this he was Chair at the University of Wales Institute, Cardiff (2008-2011), and Senior Lecturer at University of Sheffield (2005-2008). Also, he was head of a management and research consultancy (2000-2004) and Senior Research Associate, Cardiff University (1998-2000). He holds degrees in Social Anthropology (BA Hons, University of Kent at Canterbury, 1987), Technical Change and Regional Development (MSc, Cardiff University, 1992), and a Ph.D. in Regional Economic Development, Cardiff University (1998). Prof Huggins has published three books and more than forty articles in peer-reviewed journals, a significant number of which are rated as 'world-leading' journals.

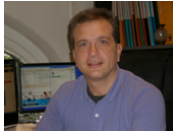
## KEYNOTE SPEAKER AND WORKSHOP CHAIR

**Mr. Rodney Schwartz's** background in investment banking and venture capital makes him an unconventional but authoritative champion for the social enterprise sector. Joining Wall Street in 1980 he rose to become the number one ranked financial services analyst and through the '90s held senior posts in investment banking including Head of Equities for Lehman Brothers in Europe, before leaving the sector in 1997 to found the venture capital firm Catalyst. A pioneer in the emerging social investment marketplace, he transformed Catalyst into a social business consultancy and in 2009 launched ClearlySo, the first global hub to connect social entrepreneurs with investment capital, corporate partners and fellow entrepreneurs. From humble beginnings, ClearlySo has grown into Europe's leading social business angel network, a respected industry content provider and research house with the largest international online database of verified social businesses and enterprises. Rodney teaches social finance at the Said Business School in Oxford and is a regular commentator on the social business and investment sector. He holds an MBA in Finance & Applied Economics and a BA in Political Science from the University of Rochester.



## BIOGRAPHIES OF WORKSHOP CHAIRS

### WORKSHOP CHAIR



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## BIOGRAPHIES OF WORKSHOP CHAIRS (CONTINUED)

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# Automation of e-health systems through mobile devices and semantic technology

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In the time where the digital world is moving to mobile devices, new opportunities are emerging for the e-health systems. We live in the time when data are stored in different databases and different ways. This imposed the use of ontologies to resolve interoperability issues. Ontologies can be used for automation of e-health system data flow, enabling automated responses in real time to patient data entered into the medical record from Physicians and hospitals, and by offering caregivers evidence-based, best-practice information about how to act in emergency or nonemergency situations. Mobile e-health semantic systems help Physicians tracking better the health of their patients, avoid mistakes and act faster in emergency situations. Semantic technology and database technology in combination with mobile devices together make a combined information system which will revolutionize the way how today's health institutions treat their patients.

## Keywords

E-health, mobile computing, semantic technology, ontologies, system modelling

## 1. Introduction

We live in the new era of communication where each of us is equipped with at least one mobile device. This type of digital machines revolutionized our lives and our way of living, making our living easier. In this article we explain an e-health information system where mobile devices, web semantic and database technologies are combined to leverage health care services.

Health informatics, health care informatics or medical informatics is the intersection of information science, computer science, and health care. It deals with the resources, devices, and methods required optimizing the acquisition, storage, retrieval, and use of information in health and biomedicine. Health informatics tools include not only computers but also clinical guidelines, formal medical terminologies, and information and communication systems. It is applied to the areas of nursing, clinical care, dentistry, pharmacy, public health and (bio) medical research.

Among the advantages that e-health systems bring to health institutions one can count on following: better control, quality assurance, satisfaction for team members, clients and relatives<sup>1</sup>, higher efficiency through optimized communication, competition in the public health sector, better service in nursing home care settings, etc.

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<sup>1</sup> Relatives can be family members/care givers

## 2. Introducing a personal e-health system

Health care is information intensive field, rich on data, information and knowledge. These data are captured during clinical work and research processes but used by other processes as well. Clinical care of patients is shared among multiple provider enterprises (e.g. by mobile citizens) requiring information sharing.

Information needs to be aggregated per-patient to allow personalized healthcare and decision support and then across populations for public health analysis and medical research.

Healthcare is information multi type, complex and changing and therefore challenging to manage over time, with very high requirements for validity, privacy, safety and security.

In the basic introduction of electronic healthcare systems the term of e-Health was introduced, and became a standard in the whole world. E-health means the use of ICT to improve or enable health and healthcare. Internet as platform also became part of e-health. Since healthcare services are offered to be used through the internet, citizens have interaction with health professionals who look after their health needs. Nowadays e-health means not only the use of ICT technologies, but reengineering of health care processes, and consideration of the socio technical aspects of design and development of e-health systems.

A new era of e-health emerged with the last technological development trends in the mobile technologies.

More and more Smartphone's with different advanced functionalities are emerging in the market, while their use widely increased. In the same direction also application of mobile phones in every day activities has taken a very important role helping people to live easier and resolve problems more efficiently. Organizing the content of personal data in today's' Smartphone's achieved very high levels, qualitatively and quantitatively. The use of mobile devices had been evolved in a new direction especially after inventing the NFC technology from few mobile manufacturers. This technology allowed these devices to be used in different environments as ubiquitous computing devices. Some of the latest implementation of different systems using NFC and EPC technology in the past, showed as successful by adding intelligence to humans environments, like Roduner 5 from the Auto-ID lab in Switzerland, where scientist used RFID technology to track information about clothes and other similar products, Paik 6 used RFID to track medicaments, and the multinational project Bravo et al.<sup>8</sup>, where NFC enabled mobile phones were used to track the Alzheimer's patient's daily life, etc. The later, also shows how one can use a combined system of NFC enabled devices and EPC technology, providing in such way services which overcome restrictions of both technologies when used separately.

Another perspective that will be implemented through this project is the use of Semantic Web achievements from the previous projects, like MobiSem and DBPedia, from Schandl and Zander <sup>11</sup>, where they built an infrastructure that allows mobile devices to replicate RDF graphs for different objects, and make them available online. These semantic systems allow us to combine the RFID technologies of mobile devices and the mobile semantic systems to add value to the e-health systems. Using web semantics in this projects, allows us to built semantic applications that will allow doctors monitoring the health of their patients, to associate the data achieved from the process, with the data from best practices collected at the data base of best practices. Web semantics can be used to faster predict diseases, behavior changes of their patients, better associations with similar diagnosis in the past, and more effectively monitor patient's health conditions even when they are not in-house; this by replicating data collected from RFID enabled mobile devices in the system.

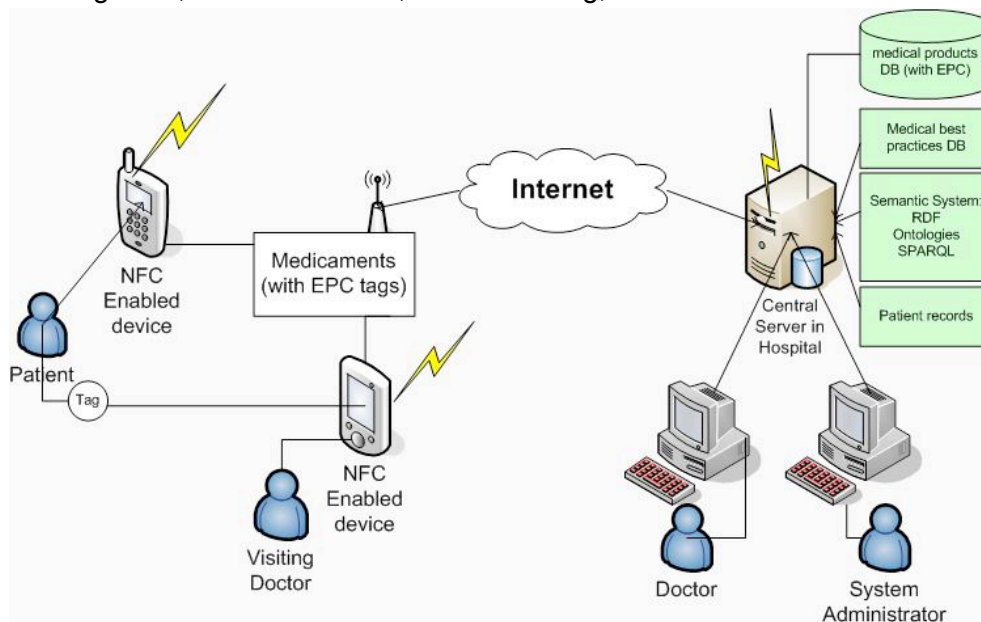
As Auto-ID Lab 1 experts consider, Mobile phones are the most popular personal devices worldwide, with roughly three billion units in operation as of 2006. Market researchers are anticipating that by 2012 20% of all sold phones will be NFC enabled. With 300 million NFC phones sold in 2012, mobile phones would become the largest infrastructure of RFID

reader's world wide. On the other side, EPC tags will steadily become more available on logistical units and consumer products. The fact that more than a billion consumers might be equipped with NFC<sup>2</sup> enabled mobile phones by 2015 raises the question whether the compatibility of EPC item level tags to these devices would not offer significant benefits.

Important are the findings from Spanish researchers Bravo and all.<sup>4</sup> and Swedberg<sup>3</sup>, which identify the differences between NFC and EPC tags, whereas the later uses the RFID and EPC standards to identify patient needs as concerning medicament use and prescription tracking, etc. Encouraging are the achievements of Roduner and Langheinrich<sup>5</sup>, and other similar projects implemented worldwide.<sup>3</sup>

Using above mentioned technologies in the context of e-health we can allow Hospitals and health institutions' to better monitor the health of their patients and also to avoid mistakes in the every day health processes. For, example by using NFC enabled smart phones we can allow patients' data about the medicament used to be tracked, and stored in a database at the Hospital, where his health is monitored. Doctors can track data about their patients, even if they are treated at their Homes.

Thus NFC and EPC technologies used to track medicaments can be used also to monitor patients' health and their behaviour even when they are outside the health institutions. As we mentioned before, these kinds of services belong to telenursing services, which as a part of telehealth have many points of contacts with other medical and non-medical applications, such as telediagnosis, teleconsultation, telemonitoring, etc.<sup>4</sup>



**Figure 1** Simple view of e-Health system architecture

Another technology that can be used to advance the possibilities of the system is the Web semantics. This technology is one of the newest technologies developed nowadays.

The everyday work in hospitals consists of some kind of repeating health processes where we see semantic extended information can easily be captured automatically by a semantic management system. Tracking of information in its semantic context starts with the definition of the process aim and the planning of the realization. Typically this information is stored in file systems, project management systems or databases.

<sup>2</sup> [www.nfc-forum.org](http://www.nfc-forum.org)

<sup>3</sup> More information at: <http://www.rfidjournal.com/pharmaceutical>

<sup>4</sup> <http://en.wikipedia.org/wiki/Telenursing> (accessed 28.05.2010)

During this initial stage of the project the basic ontology is already founded, including all persons that are assigned to tasks based on their skills, experiences and responsibilities.

According to Gruber 10, Ontologies are designed for the purpose of enabling knowledge sharing and reuse. In that context, an ontology is a specification used for making ontological commitments. For pragmatic reasons, we choose to write an ontology as a set of definitions of formal vocabulary. Practically, an ontological commitment is an agreement to use a vocabulary (i.e., ask queries and make assertions) in a way that is consistent (but not complete) with respect to the theory specified by an ontology. We build agents that commit to ontologies. We design ontologies so we can share knowledge with and among these agents. In our case ontologies can be built based on clinical data, medical products prescriptions, medicine best practices, etc.

### **3. Resolving Interoperability issues in e-health systems**

One of the key problems in e-Health (health informatics), is the lack of interoperability among different e-Health systems, and can be investigated in different categories in the e-Health domain, such as the interoperability of the messages exchanged between healthcare applications, interoperability of Electronic Healthcare Records (EHRs), interoperability of patient identifiers, coding systems, clinical best practices, and health care business processes.

All these categories can be investigated in two major layers: Syntactic interoperability layer, which involves the ability of two or more systems to exchange information, and Semantic interoperability layer, that refers to the ability for information shared by systems to be understood at the level of formally defined domain concepts.

Clinical research and practice understands, treats, and prevents human diseases. Data, information, and knowledge must be extracted, collected, developed, processed, and applied in these activities. Representations of these data, information and knowledge are based on observations, examinations, care records and other kinds or recorded empirical data. A shared understanding is needed. In place are unambiguous communications of complex and detailed concepts, leaving the user free to make explicit their own conceptualisation. Conceptualisation on the other hand means querying: across institutional and geographical boundaries, or longitudinally in patient record, simultaneously in many and varying data and information sources for one patient, across cohorts of patients or studies. The meaning, must formally relate to the semantic definition of the information.

#### **3.1. Semantic integration and Ontologies**

##### **3.1.1. User Data and their Semantic integration**

User data is either stored directly in the application systems, where they are needed, or they are stored in centralized user management directories. Also, the data storage itself can be carried out differently, for example: relational databases, or simple text files. To ensure efficient identity management, as a condition that allows effective access control, the existing user data will be synchronised. This can be summarized under the concept of user integration. The integration of these heterogeneous data can be performed at different levels, on a syntactic or semantic level. The syntax or syntactic structure of the data is defined in 13 as *"relationships, deriving directly from the array of characters."* You will put a formal grammar underlying the constructions allowed and exclude forbidden states. In the area of LDAP-based user directories, this is achieved through the LDAP information model, in particular by the strict definition of schemas. The concept builds on the syntax, semantics, and includes further term relationships that result from an interpretation of rule. This means



that a syntactically correct set of characters, words and phrases specific meaning is attached. The commonly used approach to integration in the user data management takes place on a syntactic level. This means that the data structure is analyzed in each data source and a sink, and further based on mapping one defines rules. These are then hard-coded into computer-aided synchronization application.

In order to achieve semantic integration of user data, a common view of the underlying data is required. Although, for different representations of user data in different data storage technologies, for various data structures in different business contexts, a large syntactic heterogeneity pre-exists, one can determine a semantic Homogeneity, by reduction of the data to user's i.e. digital identities, on the substantive (content) level.

Relevant to this work, we will introduce the Identity data for the users, which will give us understanding about the Semantic structure of the given Data. To formalize the Semantic over these data one uses Ontologies.

### **3.1.2. Ontologies for Semantic Modelling**

According to Gruber 25 and Ontology can be defined as following: "An ontology is a formal and explicit specification of a shared conceptualization."

By the term of conceptualization we understand an abstract model of a certain world section, which identifies the relevant elements for this section. Under a formal specification, the description will be understood by means of a notation, whose semantics is defined. Such a notation is called a formal language whereas the aim is the formalized and precise description in a self-consistent and closed model.

Another definition is that of the W3C which states:

"OWL can be used to explicitly represent the meaning of terms in vocabularies and the relationships between those terms. This representation of terms and their interrelationships is called an ontology."

The later is at mostly used from the researchers, while is valued as more complete, since it answers most of the questions discussed, like Guirano and All at 27.

With RDF, any kind of statements can be asserted using arbitrary identifiers (URIs) for resources and predicates. Thus, one requires knowledge about the meaning of these identifiers (often referred to as vocabulary) in order to allow for meaningful interpretation of the data.

Ontologies are designed towards this problem, with Ontology Web Language (OWL) being the most prominent example of an ontology description language.

Ontologies can be edited using mark-up languages based on XML, which facilitates their utilization in different semantic platforms to annotate research resources. These languages define tags to represent the different elements of the ontology (like: <owl:Class>, <owl:ObjectProperty>, <rdfs:subClassOf>, etc.).

### **3.1.3. Challenges in Ontology design**

Ontologies help to separate the importance of data (semantics) of its representation. The semantics is extracted from existing data sources, and can be changed independently of the storage form.

This has several advantages: First, an ontology provides a uniform nomenclature for the domain. This implicitly contributed to the achievement of a semantic clarity, since all Entities of an ontology, have a unique name and a semantically well defined meaning. This makes it possible, that identical syntactical elements (for example, elements of the same name), not semantically equal, be erroneously considered synonymous.

Furthermore, the use of ontologies allows a more flexible integration, since the fixed wiring in terms of mapping rules between two synchronization endpoints, is given in favour of an externalized, semantic mapping. Ontologies also enable the implementation of consistency checking. To implement the ontologies one can use the OWL.

The first obstacle in the integration of e-health user data imposes the heterogeneity of data sources. This issue was already discussed previously in 3.1.1. According to Kashyap and Sheth 14, heterogeneity differs as follows: first, in structural and syntactic heterogeneity, known as schematic heterogeneity, on the other hand, semantic heterogeneity, which is called as Data-heterogeneity.

Structural heterogeneity implies that different schemas (structures) are used for data storage, where in contrast, semantic heterogeneity in information content and thus distinguishes the meaning of a date.

In order to enable semantic integration of data of any kind, the (semantics) meaning of the cross-system exchanged data must be established. Although, already, in service-oriented architectures, a variety of different application systems are used, which can be very heterogeneous in terms of their professional domain, however, the area of this Article viewed by this user data is semantically very homogeneous. The semantics can therefore be well mapped by ontologies.<sup>1516</sup>

According to Wache 17 for the use of ontologies there are few approaches: the introduction of a single ontology approach, the use of multiple ontology approach and hybrid approaches. The use of a common ontology provides a common vocabulary available, which will be used for description. All data sources are set in relation to this common ontology.

This approach is useful when dealing with data sources of the same domain and have a similar perspective on this domain.

When using multiple ontologies, each data source will be described individually and independently. However, this complexity is shifted to a "Connection ontology", which brings the respective ontologies into alignment. Hybrid approaches work with local ontologies; however, try to use a global ontology in the sense of a shared vocabulary or glossary. This global ontology, for the (human) developers in the creation of local ontologies, will present a guideline. In the context of this work we use a Single Ontology Approach.

There is a fundamental, common understanding of digital identities 18, but the representation and storage in the various application systems is handled differently. The problems to be solved here are varied, including name collisions of attributes. The simplest case of a name conflict, the use of different attribute names in different systems for the same attribute, such as givenName = 'Besim' and firstName = 'Besim'. This relationship can be expressed by the explicit definition of synonym relationships in the expressed ontology. Another challenge presents the different data granularity. An example of this are single-attributes firstName and lastName in a data source, while in other data sources a commonName is stored as a combination of two attributes. This fact can be represented using ontologies.

### **3.1.4. Ontology Development**

To implement Ontology we are going to start using the approaches given from 23 which provide a starting point.

Important elements, which we use, for Person identification: commonName, address, credentials, title, email and telephone, the main classes beside this are: MedicalTest, ExerciseTest, Device, Location, Disease, Medication, InformationEntity, Alert, Activity, etc. This list is not completed, but is a start point toward ontology creation. Next we divide the elements in Datatype Properties, and complex elements. The complex elements will be defined as Classes and designed through OWL hierarchy. Examples of complex elements are commonName, address and credentials. Additionally, we define object Properties for these classes, for example: In the Person Ontology from 13 classes commonName, and cn

are characterised as semantically equivalent (`owl:equivalentClass`). Also classes with diversities like `userPassword`, from the LDAP object schema, and `password` from HR-XML are specified with (`owl:disjointWith`). Attributes of all classes are to be defined through the OWL construct `owl:DatatypeProperty`.

The class `Person` will be connected with the class `Address` which is subclass of the class `Location`, through the `hasAddress` (`owl:objectProperty`). The class `address` is ein Super class for further classes like `postalAddress` or `street`. The Class `postalAddress` is connected with the `commonName` through object property `hasCN`. Connection that represent equivalent classes are defined through `owl:equivalentClass`, or `owl:equivalentProperty`, and represent an equality. Also non-equality will be defined, like for example classes: `userPassword` and `password`, which have been defined explicitly as not equal (`owl:disjointWith`), similarly we declare as disjoint the classes `MedicalTest` and the `ExcerciseTest`, while both of the tests are different from the nature so they can not have any relation or similarity in between.

Further we depicted this `Person e-health system Ontology` designed in Protégé:



Figure 2 Example of Personal e-health Ontology, part of it in RDF/OWL format

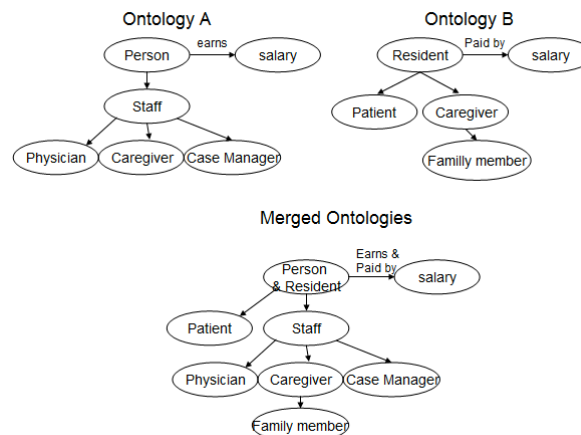
### 3.1.5. Ontologies are flexible to expand

As mentioned from 13, the person ontology presented a framework that is extensible, which logic can be used also within the e-health ontology developed above. Therefore they must be newly integrated through the synchronisation with all participating data resources. For this, the ontologies designed previously should be extended. If the semantics of the added data source has been already described by ontology, it can be used as a starting point for expansion. If not, this must be remedied. On this basis, the semantic connection with the primer ontology is performed. If the amount of the attributes to be added is low, this can be done manually. There are also possibilities, to add attributes in automated or semi-automated way 29. In the event that two semantically different attributes from different data sources carry the same name, is taken into account the concept of namespaces, where the name of each data source can serve as a namespace.

One of the opportunities that Ontologies provide is the resolution of different interoperability issues during the use of different information resources, data banks, etc. One of the

advantages that ontologies provide is their easiness to merge, which is lot easier than the integration of different databases, as we can see from the results of 3231, and others.

The Figure 3 Example shows how two ontologies can be merged:



**Figure 3** Merging of Ontologies

### 3.2. Toward automation of e-health systems

Beside Ontologies, in the Semantic Web is also used the RDF and SPARQL language.

RDF provides the foundation for publishing and linking user data, in other words: "RDF is a language for representing information about resources in the World Wide Web"<sup>5</sup>.

RDF is particularly intended for representing metadata about Web resources, such as the title, author, and modification date of a Web page, copyright and licensing information about a Web document, or the availability schedule for some shared resource like for example: an activity in a location. However, by generalizing the concept of a "Web resource", RDF can also be used to represent information about things that can be identified on the Web, even when they cannot be directly retrieved on the Web. Examples include information about items available from on-line shopping facilities (e.g., information about specifications, prices, and availability), or the description of a Web user's preferences for information delivery.

RDF is intended for situations in which this information needs to be processed by applications, rather than being only displayed to people. RDF provides a common framework for expressing this information so it can be exchanged between applications without loss of meaning. Since it is a common framework, application designers can leverage the availability of common RDF parsers and processing tools. The ability to exchange information between different applications means that the information may be made available to applications other than those for which it was originally created.

RDF is based on the idea of identifying things using Web identifiers (called Uniform Resource Identifiers, or URIs), and describing resources in terms of simple properties and property values. This enables RDF to represent simple statements about resources as a graph of nodes and arcs representing the resources, and their properties and values.

Query languages go hand-in-hand with databases. If the Semantic Web is viewed as a global database, then it is easy to understand why one would need a query language for that data. In this sense SPARQL is the query language for the Semantic Web.

"Query", in the Semantic Web context means technologies and protocols that can programmatically retrieve information from the Web of Data.

<sup>5</sup> According to W3C

The paper of Schandl 9 25 and Zander 11 explains more closely the possibilities of web semantics. Among the projects that mostly contributed in the aspect of automation of mobile information systems we can mention MobiSem<sup>6</sup> and SemDav 9.

The technology developed within these projects can be adapted to e-health systems, which will bring higher level of automation for this kind of systems. Within Mobisem there is also a ranking engine implemented, which based on heuristics selects the most important triples from the triple store i.e. selecting RDF graphs by relevance.

The automation concepts means that the systems based on mobile devices enforced with strong servers at the health institutions that support e-health system processes, can match, compare and store different information collected from context providers and data providers, which further through data mining (similar findings as of 34) can drive to alerts or predictions about the health of patients i.e. for example if the caregiver in a given time has measured a blood pressure of the patient with some value, this value is saved in the e-health system. The central e-health system server will compare these data with the database of medical best practices, and if the value provided from the caregiver about the blood pressure of the patient is higher than the allowed limit, the system will generate an alert which will be send to the Physician which is in charge for this Patient or the Case Manager, and they will take immediate action to give some prescription to this patient. Similar systems are already implemented in practice but remain in the test phase.

### **3.2.1. Ontologies as Software artefacts**

Ontologies as Software artefacts in Ubiquitous Computing Applications can be used at run time for: Ontology-driven applications and Ontology-aware applications (Guraino 1998).

Ontologies as software artefacts at development time: includes the ontologies used as artefacts in software development and maintenance, or in other complementary activities of the development: support activities, project management, knowledge reuse, etc.

Ontology driven applications: when ontologies are part of the system software architecture, as an additional component, cooperating with the rest of the system at run time to attain the software objective.

Ontology aware applications: Are used by the software during run time for a specific purpose, as an information resource, normally remote, upon which the software operates, carrying out, for example, specific queries.

Ontology aware Applications Example (Ontology as database substitute): Mapping relational databases into ontologies, using a mapping processor for generating the ontology and for the execution of queries on the ontology. This refers to facilitate the transformation of the applications that use a relational database to allow semantic access to the content available in the database, 36.

Ontologies at Development Time Example: GAS Ontology: Conceptualises the Gadgetware Architectural Style (GAS), which supports the composition of ubiquitous computing applications from everyday physical objects enhanced with sensing, acting, processing and communication abilities (Christopoulou et al., 2004).

Ontology driven Applications Example: GAIA Pervasive Computing Environment: A smart spaces framework, using an ontology server to get the interoperability among different entities, the semantic discovery and matchmaking in ubiquitous computing systems (Ranganathan, 2003).

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<sup>6</sup> More information about Mobisem at [www.mobisem.org](http://www.mobisem.org)

## 4. Conclusions and further research

Since most of the implemented e-health systems are in their beginning phase, is difficult to predict how these system will further develop, but for sure the phase of implementation and practical use of this kind of systems will lead to new findings, identified bottlenecks, better solutions and more satisfied clients. At the other hand, the complexity of the technology implemented will be higher and higher, which will lead to new research efforts toward more integrated solutions.

We explained that e-health systems, especially personal health systems are in the right way, and achieved a level of automation and acceptance from patients and their caregivers. Health care institutions are realising savings thanks to the reduced overload of their staff, and also reduced costs for health services.

Further efforts should be done in the aspect of web semantic applications which for the moment are highly complex and are hanging from the further development of many other frameworks used within these projects<sup>7</sup>.

Ontologies used in the actual systems are very well developed, but, they are in the process of development. Ontologies are very flexible instrument that can change and adapt according to the systems. Further research need to be done in the direction of impact analysis based on use cases, ontology driven information systems, enterprise architecture approach of ontologies, and use of ontologies as database substitute<sup>8</sup>.

The further development of the mobile technologies and mobile semantic solutions should be carried out in the direction of faster response time of mobile applications, increased capacity and further development of web semantic frameworks in use.

Another issue which leaks behind to the e-health systems is the issue of security of exchanged and stored user data, which remains at the very beginning phase, whereas institutions stated very height security requirements, which leads to very scarce implementation of different pilot projects in practice.

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<sup>7</sup> Like: spark, apache, Jboss, jenna, jetty, arq, junit, pellet, postgresQL, and other W3C frameworks, etc.

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# **An Innovation on Small-Medium Scale Industry Cluster Framework to Enhancing Industrial Value Chain - Case Study Bekasi Exclusive Economic and Industrial Zone, Indonesia**

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This action research aimed to produce an innovative policy needed to accomplish this circumstance through multi-stakeholder participative process. It also tries to promote triple-helix collaboration of academia-industry-government in contributing to regional and national development (Etzkowitz, 2002)[1]. Focus group discussions, in-depth interview, stakeholders meeting, and framework-comparison were conducted in this research. The paper will present how the innovation process was initiated, promoting the collaboration, and the result of the research. The research has provided a comprehensive SMIs cluster framework to enhance the industrial value chain linkage. The cluster framework developed from *nucleus-plasma* concept; one main medium-scale industry with several small-scale industries in one cluster. This concept promotes small-scale industry with less competence to attach with medium-scale industry that has already implemented effective production and learned from them. Trainings are provided for both the company and the entrepreneurs so they can achieve the optimum productivity and link with the large-scale industry. Moreover, coaching clinic for SMIs mentoring is given as part of the trainings system, and an integrated media marketing to promote the SMIs product. In addition, the cluster must be specific to be implemented effectively; an automotive component is chosen as the theme of the cluster.

## **Keywords**

Small and Medium Industry, Cluster, Innovation, and Industrial Value-Chain

## **1. Introduction**

Making sense of how the global economy is evolving is a difficult task. Better theoretical and methodological tools are urgently needed to analyze the complex web of influences, actions, and feedback mechanisms at work. As national and local economy in Indonesia is flourishing through the decades, in industrial development in particular, the government should aware and prepare for a new context of policy in this area.

Encouraging the growth of small and medium industries (SMIs) is widely concern by most of developing countries, include Indonesia. Concerns that motivate state-backed SME support programmes range from the laudable aims of creating jobs, improving welfare, alleviating poverty, raising incomes, enhancing technical and entrepreneurial capacities as well as the often expedient, political, considerations of fostering key constituencies in civil society. The emphasis that comes to place on SMIs is also associate with the failure in meetings the need and demand on standard from the large scale manufacture industries, this, makes the local SMIs could not compete with the foreign SMIs that also allocate in Indonesia.



One of the peculiarities of the industrial sector is they have a complex value chain that involved layered company, expert often called as subcontract, a company that produce things that used as the production input for another company, and it proceed until it meets the final product. The organization of the industrial value chain is quite sophisticated due to the complicated relation among the business people and the lack of competence of the government. The relations make the organization did not take sides to the local SMIs. This issue has rise since the early development of the industrial area in Indonesia.

These forms of industrial organisation suggest growth paths for SMEs that go well beyond the simple survival and employment generation strategies associated with the informal sector and traditional SME development policies. In industrially advanced countries clusters and networks are central to the industrial restructuring framework associated with notions of *flexible specialisation* and the “new competition” (Piore & Sabel 1984 [2], Best 1990 [3].) Schmitz (1995) [4] has argued that such forms of industrial organisation may also be important for SMEs operating in the labour surplus environments of developing countries. This is borne out in a review of small firm clusters and industrial networks in the South by Nadvi & Schmitz (1994) [5]. Although experience is mixed, it appears that such forms of industrial organization offer Southern SMEs the possibility of competitiveness on grounds that go beyond cheap labour.

Nadvi & Schmitz’s review also finds, not surprisingly, that experiences in the South differ from those of SME clusters in the industrially developed North. None of the Southern cases that they cite follow the exact contours found in the classic examples of industrial districts from the so-called Third Italy (see Pyke, Becattini and Sengenberger 1990). They suggest, that positing cluster growth paths around a binary framework of *high* (technically innovative and quality conscious) and *low* cheap labour and technically stagnant) roads, as proposed by Sengenberger & Pyke (1991) [6], needs to be revised. While some SME clusters in the South are firmly entrenched on the low road, others display evidence of aspects of the high road alongside elements of the low road

The theory comes with an intermediate conclusion that cluster policy is part of strategy in order to promote the quality of local SMIs and to make them compete with the global market. Hence, the Indonesian government has experienced many failed in developing the industrial clusters since early 90s. The failure of industrial cluster caused by the incomprehensive concept of the cluster and unserious development that the government runs is the past few years.

However, the need of cluster as part of main strategy in developing SMIs is an urge. An innovation in cluster framework needed in order to meets the requirement of the SMIs itself. They argue that the past cluster is just not more than a “place” to run the company, more than that, the SMIs needs an assistantship and trainings to meet the standard fulfillment from the large scale industry.

## 2. Objection

The objection of this research is to develop a new context of cluster framework for local SMIs in order to develop their capacity in quality (Q), price (P), delivery (D), safety (S) and innovation (I). The output of the research is end up with an innovative model of cluster that could make the local SMIs compete with the foreign SMIs. It also plan to be develop by 2013 if the concept fully accepted by the government.

## 3. Methodology

The approach will be used in this study is a qualitative research approach. Primary data were taken through various ways such as in-depth interviews, participant observation to field observation. As for the secondary data, I use statistical data, documentation from local and

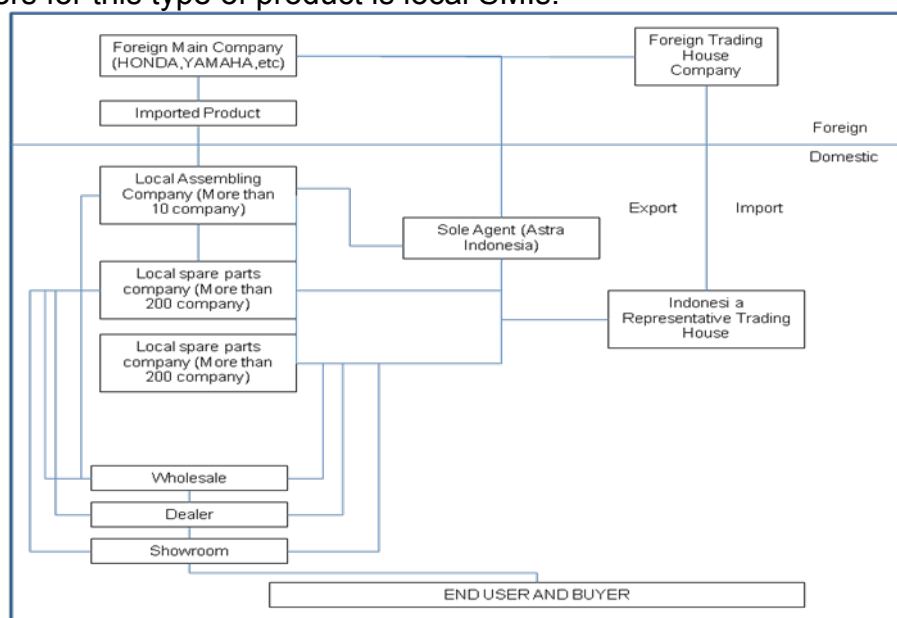
national media, and documents from the stakeholders that were met. The method is often used in power relations as this research includes critical descriptive analysis method. For stakeholder analysis will refer to participation and social assessment book, written by Jennifer Rietbergen-McCracken (1998) [7].

This is an ongoing research that has been running for two years; an ethnography and auto-ethnography are used as qualitative field research methods. Ethnography is based on the assumption that interaction among human groups of people for a period of time will change a culture (Patton, 2002, p.81)[8]. I observed and interact with the business people, government, industries and the academia in order to meet the suitable framework for the research. I also applied auto-ethnography, this observes one's own group by placing oneself as part of the culture (ibid, 2002, p.85). I use my own experience to understand the problems and issues in cluster development before reflected to theoretical and planning concept. In this research, I also part of the initiator in establishing the SMIs association as part of the steps in developing the cluster.

In understanding and develop the innovative cluster framework, we also held series of focus group discussion to acquire aspirations and ideas from different background of stakeholders. A total of 21 group discussion has been conduct in the past two years; include more than 60 in-depth interviews to follow up the group discussion with more distinct question.

#### 4. Industrial Value Chain In Bekasi Industrial Estate

The pattern of the industrial value chain in Bekasi Industrial Estate is quite same with the others industrial area around the world. There is a layered value chain that involves hundreds of company for producing one product. As our focused is on automotive and electronic products, in this paper I will gave brief explanation on one of our main product in Indonesia, which is the motorcycle. The statistics show that 10.000 motorcycles were produce every day in Bekasi Industrial Estate and most of the suppliers for this type of product is local SMIs.



**Figure 1** Motorcycle Industrial Value Chain in Indonesia

The research shows that most of the suppliers companies were from local industries in motorcycle production. The Honda Japan Company also asserts that for one motorcycle they have managed 190 companies to produce 155 parts. And 95% of them are local company. Yet, the local company in this situation is the local companies that has been train and assist

by the Astra Indonesia (the sole agent for the motorcycle industries). Most of them have received series of trainings in technical skills and entrepreneurial skills from Astra Indonesia. However, they still did not located in one area, and it makes the monitoring and evaluation process to ensure the production quality is still on the track more difficult. The excess of straggle is not all of the company can maintain their quality and stand with the Honda or Yamaha requirements, and slowly they were out from the motorcycle value chain.

Essentially, the local SMIs have the capacity to compete in global market, they just need an intense assistantship, training, and opportunity to show and prove their products. So far, this programmes only conduct by the Astra Indonesia by their foundation, the Astra Dharma Bakti Foundation, which has encourage hundreds of new entrepreneur in industrial area every year, but, most of them fell in the first two years.

## 5. The Stakeholders

In developing the innovative cluster framework, there are several stakeholders that involved. It starts from the initiation of Institute of Technology Bandung (ITB) as the leading technology institute in Indonesia. The ITB team consist of 6 sub-teams, named ; (1) value chain team; (2) stakeholders team; (3) infrastructure team; (4) institutional team; (5) information system team; and (6) environmental team.

I am the leader of the stakeholder's team that was the core of the team itself. The main purpose of the team is to manage and engage the stakeholders that have interest in developing the new form of industrial cluster and ended in the concept of the cluster itself.

The team starts the research project by conducting surveys to gain information about the SMIs; the challenges were face by the team knowing that the local government did not have an exact data on SMIs in Bekasi Industrial Estate, it makes us have to mobilize more than 20 surveyors to gain this valuable data. The surveys end with the accomplishment in gaining more than 200 SMIs profile.

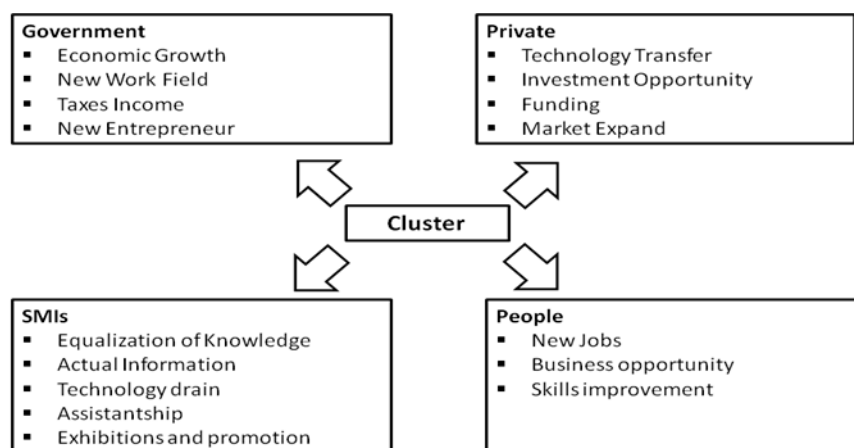
The listed SMIs were being follow up by series of focus group discussion, result to establishment of the Bekasi SMIs Association named AUPI. The AUPI then develop their institution with the complete structure. The AUPI then with ITB start in concept the cluster with another series of focus group discussion and involving new stakeholders. Currently, there are 11 stakeholders that has been part of our working group in developing the cluster. Today, the group named *value chain linkage working group*, the stakeholders involved named in figure 2.

**Table 1** Stakeholders List

Non-Governmental		Private Sector		Government
Institut Teknologi Bandung		Bekasi SMIs Association (AUPI)		Ministry of Industry
Astra Indonesia International		Industrial Estate Association		West Java Province
Revolving Fund Board		Marunda SMIs centre		Bekasi Regency
Chamber of Commerce of Bekasi		Clinic Industry (KLIND)		

## 6. The Need of Cluster

Through the series of discussion, every stakeholder agrees that they will get advantages from the establishment of the cluster. But, the main pre-condition that all stakeholders should fulfill that they should fully committed with this project. We are encouraging all stakeholders to give their support in establishing the cluster. We try to learn from the past, most of the clusters that have been failed were due to lack of commitment of the stakeholders whose should support the cluster. From the figure 2, it shows that every stakeholder will gain advantages by this cluster.



**Figure 2** Stakeholders Advantages through Cluster

The need of cluster background by several reasons, which is;

- **Economic Opportunity**

Along with economic globalization, trade liberalization, regional autonomy and the issue of environmental sustainability, competition leads to an increasingly competitive and integrated market, and then to answer this challenge becomes one of the Industry Cluster the right choice. Industry clusters provide an opportunity for SMIs to make the supply linkages between large companies and small / medium and in addition, Industry Cluster will create an environment conducive to making SMIs competitive nationally and internationally. By Industry Cluster is the potential that exists in the area will be developed in accordance with the core competencies possessed by each region.

- **Market Prospect**

In West Java, there are dozens Industrial Area which consists of over 3700 national and multinational companies. This is a huge market for SMEs, is the largest market share of automotive and supporters, followed by electronics, chemicals, furniture etc. In future major automotive companies such as Daihatsu, Hino, Yamaha and other companies will move production in West Java in addition to the already existing there such as Toyota, Honda, and Suzuki. Opportunities are open to foreign companies considering the impact of the global financial crisis many companies are closing their business and looking for new locations including Indonesia as its production base.

- **Economy Beneficiary**

The role of SMEs in Indonesia's economy is basically a big, however, when the economic crisis hit Indonesia, the role of SMEs increased sharply. Viewing Data from the Central Bureau of Statistics (BPS) shows the percentage of total number of SMEs compared to companies throughout Indonesia is at 99%, the number of workers absorbed by this sector reached over 90% of the total workforce. The data show that the role of SMEs in Indonesia economy is central in providing employment and generating output. Growth of SMEs, especially in the industrial cluster will cause a positive impact on increasing the amount of

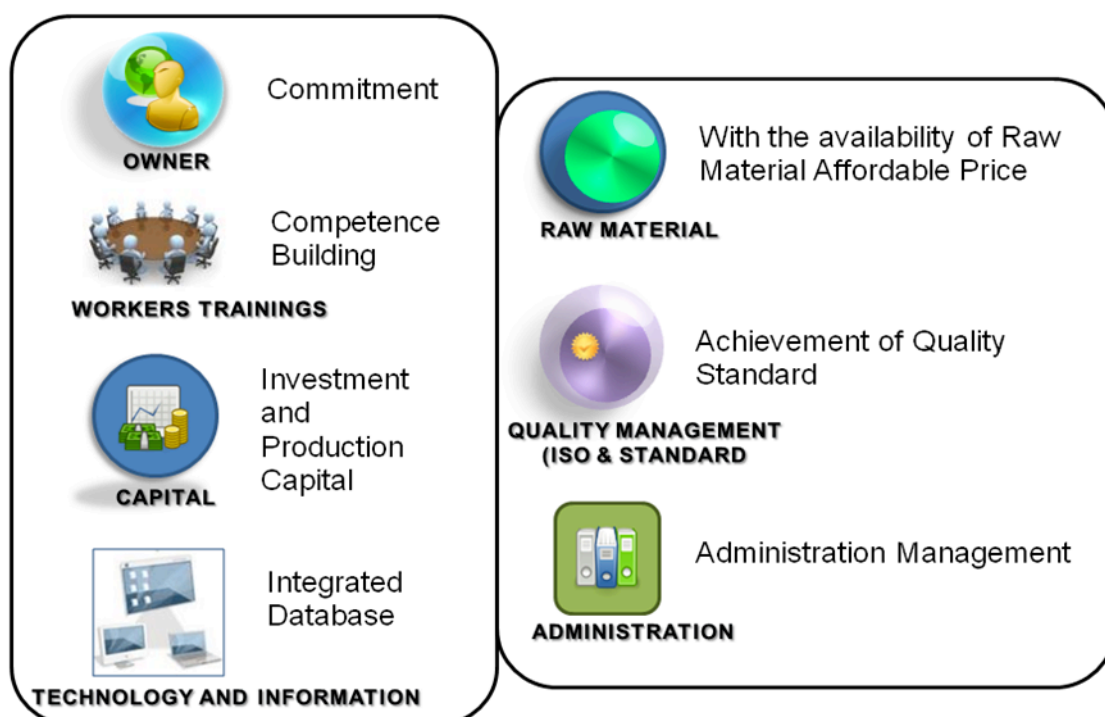
labor, reduction of poverty, equity in income distribution and economic development in the area. The experience of Taiwan as a country comparison shows economy can grow rapidly, because it is supported by a number of so-called community-based SME industries.

- **Social Beneficiary**

The opportunity of global markets and the need for a regional OEM market share is still the opening of business opportunities. Professional experience in their field and have partnered on several multi-national companies. Prioritizing achievement with a guaranteed quality, competitive price, timely delivery system and have the flexibility of the partnership system. Indonesia is estimated to have small industrial centers and more than 12,000 home centers. The number of SME business centers that have been facilitated by the Ministry of Cooperatives and SMEs is still relatively Limited

## 7. Cluster Concept

The proposed concept of the cluster tries to undertake the problems that often face by the SMIs. These problems tend to be repeated and a slow improvement conducts by the business owner. They are use to be convenient in a old style of manufacturing and business management, without knowing that the company changes and revitalization will benefits them more. Through, this innovation cluster, we try to solve SMIs problems, named by the figure below.



**Figure 3** SMIs Challenges and Problems

The research shows that the seven challenges and problems above were often meet by the SMIs in running their company. The commitment of the owner, lack of worker competence, low capital, les access to information, minimum opportunity in affording raw materials, not eager to achieve global standard and inefficient administration and management.

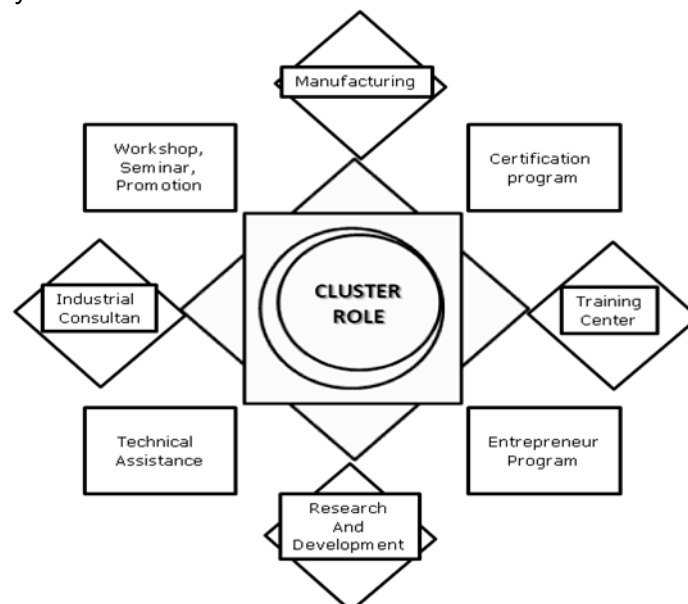
Thus, the cluster should not just being a place for the SMIs in building their company, more than that, the cluster should also increase the level of competency and productivity of the SMIs that inside the cluster. The innovative idea of the cluster is to adapt the nucleus-plasma

concept. Which there are one main company that role as the nucleus, and the other company were being the plasma.

The nucleus company should be a well established company that already undertakes the general SMI's problems. The nucleus also should be in the medium-sized industry that have been suppliers for the local assembling company for more than 5 years and have a routine order from the large-scale company. On the case of our project, there are several option for the nucleus company that match with the requirements.

The nucleus company then subcontracts their production to the SMIs in the cluster. So, the nucleus company role as the marketer, they were searching for production project, and they were branding their company also with the cluster that they supervised. It expected that the large-scale company could trust the nucleus company, and slowly they can also train and improve the quality of the other SMIs in the cluster.

On institutional framework, the cluster were manage to have their own institution lead by the nucleus company, which not only provide project for the SMIs but also run an integrated training programmes. So, the cluster will develop not just as a place to build a factory, but to train and develop the capacity of the SMIs. If one day the SMIs has been develop strongly, they will recommend to move from the cluster and develop another cluster which they being the nucleus company.



**Figure 4** The Role of the Cluster

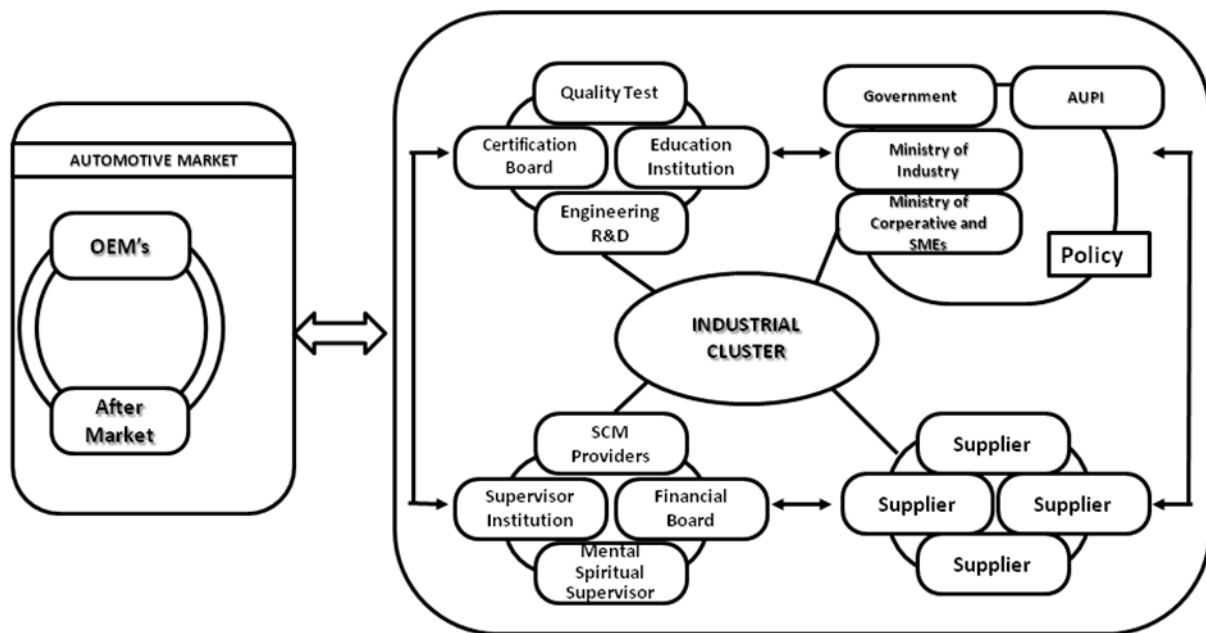
The cluster institution and the nucleus company should provide and collaborate with the plasma company in running various types of research, training, and development programmes for the plasma company and also for the cluster itself. By running the R&D collectively, it will lower the cost, and also several standards such as the waste management or environmental standard could be achieve collectively by several companies in one area.

Another concept that we proposed is that the cluster should be homogenous; a single production type should only conducts in one cluster, in order to ease the process of training, research, and development programme. In the case of our propose cluster is the automotive part cluster which focus in only metal material only, which only need several type of production method, the need of limited machines, and only several skills needed by the workers.

The more specific the cluster will be more efficient in developing the nucleus-plasma concept. In one of our proposal, we are proposed a single machine cluster, it means that the cluster only for one type of machine and type of product. It could make the worker much

more competence, and the foreign country could know where to find suppliers related to the product.

The figure 5 shows how the institutional and partnership framework that runs on the cluster. All of the stakeholders have their own role in order to succeed the cluster project. The cluster itself will be rolling as the nucleus for the other stakeholder in the institutional context. At least there are four stakeholders group needed to support the cluster, which is the (1) government and the SMIs Association for the policy purposes; (2) education, research and development institution for technology research purposes; (3) board of supervisors which provide training and assistantship; and (4) the supplier itself as the resident of the cluster.



**Figure 5** Partnerships and Institutional Framework

Currently, this concept were under review by the local government and several investors, and plan to be build by this year and ready to be run by 2013. This ongoing research project group will transform to the board of innovative cluster if the first cluster meet a success.

## 8. Conclusion

As for the conclusion of the paper, the research meets several founding through this 2 years progress, which is:

- The local SMIs in Indonesia have several common problems that they could not overtake by their own. It should be support by external power that promotes the capacity of the SMIs.
- Lessons learn from the past cluster is due to lack of commitment of the stakeholder, and the cluster itself develop just as an estate, not an incubators and research zone for the SMIs.
- The innovative cluster will enhance the industrial value chain linkage between SMIs and Large Industries in the Bekasi Industrial Estate.

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# **Innovative Approaches to Increase the Regional Competitiveness in Nuts 2 Regions of Turkey in the Perspective of Regional Policy Changes**

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Changes in regional policies and effects that are brought by globalization have weakened the role of the central government not only in implementation of development policies but also in management of regions. Past experiences have shown that providing and maintaining of development with an over-centralized management structure where all kinds of decisions are taken hasn't brought about successful results. As a result, regional policies has changed dimension and regional development agencies have been established. In 2002, regional policies and their instrument have passed to classification system of NUTS because of adjustments to EU and entered into change process. Local governments and development agencies at regional level participates as first actor in implementation of policies. Main key of competition and development in regional policies is innovation. The advantage of competition coming from innovation results from regional innovation systems which lay on the basis of clusters. The purposes of this study are to examine the changes in regional policies by approaching from a critical aspect, examine the activities of development agencies founded in NUTS II regions, Turkey, in the framework of growing and stimulating themselves with their own sources and offer innovative suggestions based on data.

## **Keywords**

Regional Competition, Regional Development Agencies, Regional Innovation, Regional Policies, the Nomenclature of Territorial Units for Statistics (NUTS)

## **1. Introduction**

Economic results of the globalization are too much and the first one is on regional problems. Globalization has not influenced all regions of a country equally. It has caused wealth and productivity not only to collect against the regions which have the characteristics of rural areas and which are not ready for the opening of domestic market to foreign competition but also to the shift of production to developed regions. As a result of the shift of the factors of production in the country to developed countries, regional inequalities have increased. Unequal development of a model of society which is at universal levels emerged as a major problem for most countries. However, solutions for such global problems have been in global scale. Globalization has influenced not only regional problems but also regional policies. This influence has produced a result, which is not only against the intervention of the government but also reduces the role of the government in economy. The main issue concerning this

regional development is the situation of the regions which don't have industrial base to cope with outside world competition. As a result, local government's institutions and organizations of the region has become an instrument which is used effectively in changing the role of the state. In the world, increasing information about the forms of government among people, the development of collect consciousness about globalization, decrease in the capacity of central government's management of local economies, failures of development policies, though changes brought by being information society as a result of globalization have supported the idea of local planning and implementation of regional policies.

In this study, first the historical changes in regional policies have been examined, information about the past experiences and the changes in regional policies of Turkey and EU have been given. Then Turkey were examined in terms of the activities of development agencies, financial support provided priorities, regions competitive in their sector and sectors with potential for development in the frame work of growing and stimulating themselves with their own sources and as a result region based innovative suggestions were offered.

## **2. Regional Changes in the World**

It will be right to examine change in regional policies in 3 periods as the changes of 1960s, 1980s and 1990s. In 1960s, Keynesian regional policies ruled. In this policies stimulating investment in backward regions, decisions of central government were stand in the forefront. Inadequate budget source of central government and bureaucrat inadequateness were the negative sides of this policy.

Keynesian regional policies contributed to an increase in employment and income of developed regions but it didn't increase the productivity. It couldn't stimulate local resources and it failed to prepare a ground for sustainable development. Keynesian regional policies left its' location to neo-liberal practices, which is in favor of market, with the beginning of 1980s. In this policies, there are aims such as removing government interventions on market prices and developing entrepreneurship with incentives in backward regions. There was an movement of production factors from less developed regions to developed regions. NEO-liberal regional policies brought about recession by disturbing weak economic structure of less developed regions with competition [1]. It can't be said that, Keynesian, until 1980s, and neo-liberal, after 1980s, qualified regional policies are different from each other in terms of government. However, with 1990s, new and modern policy form occurred. The instruments of this policy not only were used effectively in changing the role of government but also changed the relations between governments. Policies about local are determined by central government and on the way of providing local governments to decide in local levels, progress is being made. With such an approach, adoption of a regional policy which is not only from the base but also participatory and development according to sectoral priorities become current issues. Economic activities in the region started to be based on economic conditions and superiorities. The aims of the new regional policy are to increase the power of international competition, decrease unemployment, provide economic activity, increase development potentials of backward regions and decrease differences of development among regions. Innovations in this formation result both from regional differentiation in policy instruments and receipt of decisions in local level.

New regional policies bring enabling of internal growth by activating the dynamics of the region to the fore. They are stimulated to grow by using available sources. This policy leaves the concept of public investment and ensuring regional development behind. Contrary to the former regional policies, the most important feature of new regional policy is its' bottom-up approach [2].

### 3. Regional Policies of European Union

Nation-states are not only transferring their authority to the local government, as a result of the changing regional and economic policies, but also they are maintaining the globalization and regionalization. Countries believe that development and competition in capitalist world economy can be through the way of dominate cities or regions consisting of cities but not by powerful nation-state structures. EU sets this phenomenon as a condition to the countries wishing to enter the Union.

EU adapts to the changing regional policy by revision of available policies. In AB, this process started in 1980s and accelerated in the end of 1990s. EU member states are have to adapt themselves according to the common regional policies. However, EU leaves the government's status, authorities and organization to the initiative of member countries. Member countries are improving by taking their regional policies according to their national and regional benefits into account. Member countries, imposed important responsibilities, in the process of adapting to EU policies, implementation of national and regional policies, to local governments [1].

EU member countries determine policies about local bycentral governments and they are proceeding on the way of providing local governments to make decisions at the regional level. With this aim, they completed process of setting up development agencies. Thus, formulation and implementation period of each region which is at local level is started. Regional policies which are reduced to local level are influenced by decisions at all level. The possibility to influence upper regional policies and the control power of central government are limited to development level of the country and management system of the state.

### 4. Regional Policies of Turkey

In 1960s, regions were supported in the frameworks of plans by taking the factors they have into consideration. In Turkey, with the planned period, applied regional policies were not applied in local levels, but they were found application in central bureaucracy and hierarchy within national plan. Regional development couldn't be taken as a whole, consistency in terms of scope and scale in plans couldn't be achieved. Plans before 1980s couldn't be implemented completely because of not adopting or staying in power enough to implement the ready plan. After the period of 1980, economic stability programs prevented the implementation of plans[3].

Regional policies of Turkey began to change especially at the end of 1990s. Helsinki Summit in 1999, this process has gained momentum after adoption of Turkey as an EU candidate and in parallel to this, regional policies began to change, too. With these changes, determining role of local economic units came to the forefront and bottom-up development approach was adopted. Turkey, in the process of adaptation to EU, entered into NUTS classification system in 2002. In Turkey, NUTS classification is done in three stage. NUTS III classification is in province level and there are 81 pieces. NUTS II is described as a result of classification of neighbour provinces and there are 26 pieces. NUTS I, on the other hand, is described as a result of classification of NUTS II and there are 12 pieces. Regions in NUTS I are at the quality of basic socio-economic region. Therefore, they are used in resolution of problems such as Customs Union. NUTS II includes main regions where regional policies can be implemented and where development agencies are established. NUTS III, on the other hand, is used in the determination of regional precautions which are complex although small in terms of economic analysis by taking when needed. These classifications were done by taking geographical regions, amount of population, cultural structure, width of the provinces and provincial administrative areas into account[4].

26 development agencies at NUTS II level were established to form and implement regional development plan. The establishment of development agencies started in 2006 and at the

beginning of 2010, all of the agencies started to their activity. Thus, regional policies and their instruments in Turkey changed totally. With this change, national policies oriented towards the policies that stimulate the local potentials and local governments have begun to play a role as the primary actor in the implementation policies at region level.

## 5. Sector Analysis of the Studies Conducted by Development Agencies

Even though Turkey is countries that have all kinds of opportunities such as humane, geographically and socially, it is unable to show equal development. Shares of industrial and service branches of a region whose agricultural activity is high may be extremely low. This situation leads to low quality life as well as added-value. As can be seen when Table 1 and Table 2 are examined together, development agencies focus on financial support programs for leading sectors of the region.

**Table 1** Distribution of NUTS II Regions in Turkey According to Fields of Economic Activity (% at current prices)

NUTS REGIONS	AGRICULTURE	NUTS REGIONS	INDUSTRY	NUTS REGIONS	SERVICES
TRA2	24,60	TR41	42,10	TR10	73,1
TR82	21,80	TR42	38,30	TR51	72,5
TRC2	21,50	TR81	38,20	TR61	70,9
TRB2	21,30	TR21	35,60	TR31	68,4
TR22	20,10	TR33	32,30	TRB1	66,8
TR52	20,00	TRC3	31,20	TRA1	66,4
TR33	19,80	TTRC1	30,50	TR90	64,7
TR71	19,60	TR72	30,00	TR32	63,8
TR83	18,60	TR63	27,30	TRB2	62,9
TRA1	16,80	TR10	26,70	TRA2	62,8
TR63	15,50	TR31	26,70	TR21	62,4
TR62	15,40	TR71	25,10	TRC2	61,9
TR32	14,40	TR51	24,90	TR62	61
TR61	14,40	TR62	23,60	TR83	59,8
TR90	14,40	TR22	22,60	TTRC1	59,1
TRB1	13,70	TR52	22,30	TR82	58,9
TRC3	13,00	TR32	21,80	TR52	57,7
TR72	12,50	TR83	21,60	TR72	57,5
TR21	11,50	TR90	20,90	TR22	57,4
TTRC1	10,40	TRB1	19,50	TR63	57,2
TR42	6,10	TR82	19,30	TR81	56,3
TR41	5,50	TRA1	16,90	TRC3	55,8
TR81	5,50	TRC2	16,60	TR42	55,6
TR31	4,80	TRB2	15,80	TR71	55,4
TR51	2,60	TR61	14,70	TR41	52,4
TR10	0,20	TRA2	12,60	TR33	47,9

\* Prepared by taking advantage of "Reports of Regional Indicative" from [www.tuik.gov.tr](http://www.tuik.gov.tr) [5]

**Table 2** Financial Support Priorities of Development Agencies in Turkey\*

<b>Regions</b>	<b>Priorities that Financial Support is Provided</b>
TR10: Istanbul	Development of services sector and increasing the weight of the economy Supporting a structure that produces high added-value and uses advanced technologies in industry Improving quality of labor in line with the needs of economic activities that produce high added-value Improving the integration of the region into global economy The region's being an international financial center
TR21: Edirne, Kırklareli, Tekirdağ	Improving R&D infrastructure, branding and innovation and increasing the competitiveness of the economy in line with conversion of economy in favor of sectors that are eco-friendly, competitive and have high capacity of technology The provision of benefiting from basic services such as education, health, social services and increasing the level of prosperity and development of social solidarity by improving the income distribution
TR22: Balıkesir, Çanakkale	Increasing competitiveness Improvement of human capital and social life Provision of environmental sustainability
TR31: İzmir	Provision of competitiveness by increasing efficiency and capacity Increasing the quality of life Conservation and efficient use of natural and cultural assets
TR32: Aydın, Denizli, Muğla	Upgrading transportation capacity
TR33: Afyonkarahisar, Kütahya, Manisa, Uşak	Increasing the power of competitiveness Provision of rural development Improving the infrastructure
TR41: Bilecik, Bursa, Eskişehir	Efficiency and competitiveness in industry and agriculture Variety in tourism Sustainable environment and energy Transportation and logistic
TR42: Bolu, Düzce, Kocaeli, Sakarya, Yalova	Increasing the power of competitiveness Improvement of humane richness Provision of environmental sustainability and empowering technical infrastructure Provision of agricultural development
TR51: Ankara	Improving the capacity of human source in the region and increasing the production value for development by supporting human capital Empowering social capital and making the region an international cultural center
TR52: Karaman, Konya	Directing all the sources of the region to a common goal Efficient and effective use of resources and directing them to the areas that can create the highest added-value
TR61: Antalya, Burdur, Isparta	Improving tourism and evaluation of unused potentials Empowering the infrastructure of transportation Improving the infrastructure of environment
TR62: Adana, Mersin	Putting forward the economic and social potential to increase the attractiveness of the region and promoting the region in national and international area Supporting activities that increase production and employment opportunities

TR63: Hatay, Kahramanmaraş, Osmaniye	Improvement of humane capital in line with competitive sectors Improving the environment of investment Development of industry and trade Increasing the power of agricultural competitiveness Increasing the potential of tourism and culture
TR71: Aksaray, Kirikkale, Kirsehir, Nigde, Nevsehir	Ensuring that the region become an international brand and important destination point by communicating tourism to an industry pioneer in regional development Increasing the competitiveness of the region by producing high added-value products in agriculture, industry and services sectors
TR72: Kayseri, Sivas, Yozgat	Increasing incompetitiveness Development of human sources Improvement of investment infrastructure Improvement of urban infrastructure
TR81: Bartın, Karabük, Zonguldak	Changing the structure of dependent employment by developing potential sectors Development of environment standards and improvement of transportation infrastructure opportunities. Coming to a competitive position in logistics Development of tourism by diversifying Provision of rural development Provision of a fair social development by increasing the awereness of urban and life quality
TR82: Cankiri, Kastamonu, Sinop	Information-based learning economies Nature which reproduces itself again
TR83: Amasya, Corum, Samsun, Tokat	Providing environmental sustainability and empowering technical infrastructure Providing accumulation of capital and direct investment Determined as increasing the level of region's information and technology.
TR90: Artvin, Giresun, Gumushane, Ordu, Rize, Trabzon	Increasing the power of economy competitiveness of the region Activating the region's tourism potential Increasing agricultural diversity in the region and empowering agriculture based industries
TRA1: Bayburt, Erzincan, Erzurum	Providing environmental sustainability and empowering technical infrastructure Determined as increasing the level of region's information and technology.
TRA2: Agri, Ardahan, Igdir, Kars	Increasing the quality and added-value of the production in agriculture and animal husbandary Branding the region by activating its' tourism potential Increasing the competitiveness capacity of the enterprises
TRB1: Bingöl, Elazığ, Malatya, Tunceli	Empowering the social structure and humane capital Development of agriculture and food sectors Development of industry and service sectors
TRB2: Bitlis, Hakkari, Muş, Van	Provision of gender equality Encouraging the use of renewable energy Prioritization of disadvantaged groups
TRC1: Adıyaman, Gaziantep, Kilis	Becoming a logistic center in Middle East Enhancement of agricultural enterprises to a competitive and efficient structure
TRC2: Diyarbakır, Sanliurfa	Developing service providing capacity of the region by benefiting from urban economies Increasing added-value in production and employment

TRC3: Batman, Mardin, Siirt	Eliminating absolute poverty and hunger Providing everyone the opportunity to take primary education Stimulating the gender equality and provision of empowering women Developing a global partnership for development
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\*Prepared by benefiting from region plans of development agencies in Turkey [6,.....,28].

## 6. Innovative Suggestions which Increase the Competitiveness for NUTS II Regions in Turkey

The most important constituents for regional innovation are regional and sectoral ownership, applicability and sustainability. In the development of the regions, the competitive sector shouldn't be taken only by itself. Business sectors should be extended by supporting the sectors which are potential and may be possibly potential to develop. For the development of the regions by their own dynamic, we examined the competitive and potential to develop sectors by benefiting from DTM [29], region plans of development agencies [6, 28] and we offered suggestions below. **TR10:** Priority issues and competitive sectors are compatible. Creative industries in the region and giving priority to high added-value products indicate that innovative approach studies with have been done. **TR21:** The region has a competitive structure in industry. However, it is a region that has the potential of service sector. As a result of this, supports for service sector should be given and region should be supported so that it could become both tourism and industry center. **TR22:** Even though the region is eligible for both tourism and service sectors, it has a very low share in 26 regions. And although it is in a strategic location, its' share in industry sector is also very low. Studies should be done to revitalize and increase added-value of industrial sector. Innovative ideas about components and parts, which have the potential to develop, such as radiator should be developed. **TR31:** Even though region TR31 has convenient areas for agricultural lands, activity is extremely low. Organized industry regions that will prevent the decrease in the efficiency of agricultural lands and which will also provide the establishment of industry in remote areas should be accelerated and priority support should be given to research activities about the issue about detecting unproductive land which can be organized industry regions. **TR32:** Although region TR32 is very convenient in terms of tourism sector especially in the service sector, the activities is not adequate. Priorities in the development of the region and competitive and sectors which have the potential to develop are not compatible. Priorities of the region should be determined again. **TR33:** Even though this region has a very strategic location, according to the other provinces in the region, the social and economic developments of provinces such as Kütahya and Afyon are highly inadequate and also there is not enough database that is adequate for the analysis of the region. The region should be analyzed and the reasons for not developing should be determined. **TR41:** Even though it is developed in industry, it is inadequate in agriculture and service activities. **TR42:** The region has agriculture industry potential which is high added-value, and ideas that will stimulate this potential should be developed. Social and humane development activities should be increased, too. **TR51:** Even though the region has industry potential, its' share in industry is very low. Versatile development ideas that will increase the social, humane and industry competition of the region should be developed. **TR52:** Obtaining high added-value products by combining agricultural lands with industry should be aimed. Thus, contribution to the training of qualified personnel is provided and the regions' quality of life will increase. **TR61:** Activities to develop agriculture in which the region is competitive and industry in which it has the potential to develop should be done. **TR62:** Added-value of the region should be increased by developing innovative activities in competitive areas. Activities to prevent migration and increase quality of life should be done. **TR63:** Activities to combine humane capital with agriculture and industry should be done. **TR71:** Priority issues with sectors which are competitive or may be potential to develop are compatible. **TR72:** The agricultural activities of the region is extremely low and industry is inadequate. Awareness of

entrepreneurship should be increased by extending the increasing activities of both fields and prevention of migration should be ensured. **TR81:** Activities for the development of industrial and agriculture should be done, and attention should be paid on social development. Even though the industrial activities are adequate, agricultural and service activities are not adequate. **TR82:** Products whose added-value is high should be obtained. **TR83:** Weight should be given to the issue of agriculture and region's quality of life should be increased. **TR90:** Activities should focus on activating the region's potential. **TRA1:** In the region entrepreneurship potential should be activated and support should be given to the production of high added-value products. **TRA2:** Even though the agricultural activity of the region is high, the added-value is low. Its' location in industrial activities is very inadequate and so enhancing and entrepreneurial activities which improve social aspects should be supported. Weight should be given to the issue of logistics. **TRB1:** The agricultural and industrial activities in the region are inadequate and so enhancing and entrepreneurial activities which improve social aspects should be supported. Weight should be given to the issue of logistics. **TRB2:** Weight should be given on increasing regional activities' added-value **TRC1:** Inadequate industrial activities should be increased. **TRC2:** Weight should be given on increasing regional activities' added-value, and inadequate industrial activities should be increased. Awareness of entrepreneurship should be increased by extending the increasing activities of both fields. **TRC3:** Awareness of entrepreneurship should be increased and prevention of migration should be ensured.

## 7. Conclusions

Understanding of local economic development, which changes the relationships between governments and highlights the "local", emerged as a reaction not only to the negative effects of globalization on economies but also to the relative failures of all implemented development policies after 1960s. In Countries which implemented Keynesian policies, it was seen that regional policies were helpful to increase employment in less developed countries but, on the other hand, it failed to upgrade the efficiency when compared to developed countries. After understanding this situation and oil crisis in 1970s, regional policies, which was a product of Keynesian approach, began to decrease. As a result of the process that began with the emergence of crisis in 1970s, the role of the state, especially in the economic field, opened to discussion in 1980s and the approach of organized state and management came up, within the framework of economy market. Particularly since 1980s when there were the domination of globalization in world economic system and localization dynamics, regional policies has given more importance to improve the place's quality of the alternative investments such as labor, quality of life, investment climate...etc and internal development rather than government aid. Regions during neo-liberal policies which emerged in 1980s faltered in the competitive environment brought by globalization. In this period, the power of the public weakened and situations such as withdrawal of the state from many production field, the privatization of state banks, determination of interest rates in market conditions has led central government to allocate less transfer for economic local development. Since 1960s, policies, carried out under the roof of the central government, have increased the differences between the regions of countries in worldwide. With 1990s, new regional policies, on the other hand, have taken the structure consisting of social relations, norms and institutions into account. In this framework, important basic changes in the implementation of regional policies in all aspects. This change has led to re-interpretation of the theoretical basis of regional development and it has continued with the changes in aims, goals and activity areas. In this scope, New Regionalism Current has created an new agenda which is to identify the new dynamics in regional development and the implementation of regional policies by statistical classification of territorial units has become spread through development agencies.



Turkey didn't stay out of these changes in the world and, in the process of adjustment to EU; it experienced serious changes in regional policies. Development agencies were the main actors in determination and implementation of regional policies. Turkey is a country which has very favorable geographical and human structure about the issues such as agriculture, industrial and service sector. However, past industrial and regional policies caused productive agriculture lands to become industrial region and it has become essential to import raw materials for development. In this regard, regional development agencies shouldn't ignore the issue of providing the growth of efficient products by preserving agricultural lands. The obtaining high added-value products by manipulating this product in the industry with innovative activities should be provided. In the development of regions, not only the competitive issues should be handled but also sectors which have the potential or may have the potential to develop should be improved. The activities should be complementary and development should be in both social and economic area. The analysis needed in the examination of the provinces within the region is inadequate and so the social, humane and economical structures of the regions can't be examined. In Turkey, there are deficiencies in the data especially between the years 2000-2012. Detailed data base of all the regions should be created and published for the reach of scientific institutions which will conduct analysis. In agriculture, instead of only growing crops, cultivation and manipulation of this product in convenient quality standards should be provided. About this issue, support should be given to the establishment and development of R&D centers which can analyze them. A large part of agricultural products grown in Turkey can not being able to compete in international market because of not having been grown convenient for quality standards.

In Turkey, because agricultural and industrial activities are collected mainly in certain regions, there is an accumulation in these regions and so not only living in these areas is becoming difficult but also social infrastructures are becoming inadequate because of the accumulation. In other regions, with extremely low quality of life and social opportunities, migration is gaining momentum with each passing year. The activities which will be carried out and supported by development agencies, established with the aim of preventing all of them, should provide not only the increase of each region's competitiveness but also the prevention of accumulations. So, every region will develop equally, in terms of economic, social and humane, and spirit of entrepreneurship on regional basis will increase. Thus, individuals living in the region will become qualified individuals and their quality of life will be high.

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# **Business Performance in the Republic of Macedonia and the Role of Government in the SMEs**

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The development of technology, the challenge to the future for the competitive development, cannot be understood outside the context of global economic developments without the participation of small business volume in the productive and service sector. The small business is a challenge for the national and international strategic management in the market economy, enabling a life quality for our community and society, since it offers a great employment opportunity or reduction of unemployment in a higher level than the big business. The challenge for Macedonian companies is the production of the more competitive products using new technologies and product reorganization, in order to maximize the products by responding in this way the opportunities of the market and transition economy. Taking into account that today there are more than 98% of small and middle companies in the UE, many national organizations for the export promotion increasingly find it significant to support the small business sector as a means for stimulating the creation of new values, based on the development programs. In this workshop we will explain the performance of new businesses in the Republic of Macedonia based on sectors and sizes, through statistical analysis, gross domestic product as a measurement instrument based on economic activities, development opportunities of the small business and the role of the government in the SMEs.

## **Keywords**

SMEs, sectors, strategies, economic development, innovations, competition

## **1. Introduction**

Taking into account the fact that the small and middle enterprises are dynamic forces of every economy and that their development leads to the reinforcement of the overall economy, the efforts of the government for the development and support of the SMEs are understandable. When we hear about the word business, it cannot be imagined only the world renowned corporations as IBM, Toyota, Coca Cola, Ford, but also for other challenged businesses which are more compelling and more rewarding. In the recent years, there has been a small business growth towards the developed world, even, at the South - East Europe, places known with their closed and centralized system market. The strategic importance of the small business is an essential strategic element known all over the world for some reasons: Contributes on the employment growth at a higher level than the big business, It is the key of the economic recovery in Europe and also the key of the transition economy in a long-lasting period, It is for the internal market, using the national resources, It uses and develops internal technologies and skills, It is more flexible for the economy and society, it facilitates the technological innovation and it provides opportunities for new ideas and abilities for them to be applied. The role of the government based on the economic program for the enterprises, especially small and middle enterprises, stimulates the creation

of conditions for business development through the provision of the capital and higher technologies. The data show that the number of SMEs from year to year is increasing, and in this way they are becoming important creators of the production and also the most important factors of the local and regional economy.

The development of the SMEs in the Macedonian economy not only as a means of entrepreneurs prosperity, but also for stimulating the consciousness in terms of need and economic reforms scene, is the Ministry of economy, under the competences of which is the sector of SMEs- the agency for support of entrepreneurs.

The challenge for domestic companies is the production of competitive products, using new technologies, because with the increased innovation and services, the export is increased and the Macedonian economic position in the global market is improved.

The way how the performance of local businesses by sector and sizes should be explained, the development opportunities will be given chronologically in the following paragraph.

## **2. The development models of the small and middle enterprises**

The growth and development of the SMEs enterprises calls for the need of a model search which assures a sustainable competition in the market. The countries in transition are faced with different challenges especially SMEs, as a result of globalization processes, respectively the global competition and the necessity for the new markets conquest, and also the application of newest management technologies. SMEs need to have a more open, flexible and adaptable structure for each time, depending on the conditions of the environment, they can be successfully interlinked with the value chain of spreading the knowledge, as a warranty for their future business.

The factors which affect the competitive ability, like having lower costs, enhancing the values and also new abilities that the market offers may encourage the innovations to increase the quality and ability of the entrepreneurs. The process of innovations creates connections with the environment, linking the activities for planning, market researches, scientific researches, and technological development of the organizational restructuring. The model for the development of the strategic support of the SMEs is a clusters' form, especially within a certain region, for the purpose of corporation with the international market, a model which advances the creativity and innovation, information and motivation, the quality of management, the organization of the enterprises and the lower costs based on the total costs of the transaction.

## **3. Enterprises in the Republic of Macedonia, Size and Structure**

Number of small and medium enterprises, in the R. of Macedonia, in order continuously grows. There are incentives to innovation, increase productivity factor, factor in the realization of the highest rates of economic development since the country are facing strong competition, and are bound in search of new opportunities. In all countries worldwide, the number of SMEs represents between 95.0% and 99% of the total number of enterprises. This confirms the fact that they are the main driver of the national economy. The enterprises sector in the Republic of Macedonia does not substantially differ from the sector in other countries in terms of its importance for the economy. Most of the active enterprises are small in size. For example, in 2007, this size category of active enterprises represented over 98.0% (exactly 98.98%) of the total number of active enterprises,<sup>9</sup> reflecting the importance of these enterprises for the economy of the country. Private enterprises contribute considerably to the economy of every country. They play an important role in terms of their

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<sup>9</sup> Annual Report, 2007, for the SME Sector, R. of Macedonia, [www.economy.gov.mk](http://www.economy.gov.mk)

contribution to GDB, creation of employment, contribution to exports, creation of innovation products and services and payment of taxes, etc.

### 3.1 Classification of Enterprises

According to the Law on Trading Companies, enacted in 2004, enterprises in the Republic of Macedonia must take one of the following legal forms: General Partnership Companies, Limited Partnership Companies, Limited Liability Companies, Joint-stock Companies, Limited Partnerships by shares. Most of the enterprises in the Republic of Macedonia are registered as limited liability companies, which means that they are founded by one or more natural or legal persons. The law on Trade Companies defines the value of minimum capital requirements of an enterprise. This value may not be less than EUR 50.000 in convertible MKD. Structural part of the annual turnover is based SMEs, the number of employees, balance sheet, the way of management, etc. Classification of SMEs according to the law on commercial companies (Companies Trade) is prepared in accordance with the definitions used by the recommendations of the EU; these are practically shown in table number 1.

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**Table 1** Classification of Enterprises

	<b>EU definition for Enterprises<sup>10</sup></b>	<b>Law on Trade Companies ( 2004)</b>
<b>Micro</b>	Up to 10 employees	Up to 10 employees
	Annual turnover ≤ 2 mill EUR	Annual turnover ≤ 50.000 EUR
	Balance sheet total ≤ 2 million EUR	Not more than 80% of the gross income should come from one client
<b>Small</b>	Up to 50 employees	Up to 50 employees
	Annual turnover ≤ 10 million EUR	Annual turnover ≤ 2 mill EUR
	Balance sheet total ≤ 10 million EUR	Balance sheet total ≤ 2 million EUR
<b>Medium</b>	Up to 250 employees	Up to 250 employees
	Annual turnover ≤ 50.000 EUR	Annual turnover ≤ 10 million EUR
	Balance sheet total ≤ 43million EUR	Balance sheet total ≤ 10 million EUR
<b>Large</b>	All others which do not fall under the above mentioned classification	All others which do not fall under the above mentioned classification

Source: European Commission, The New SME Definition: User guide and model declaration, *Enterprise and Industry Publications*, Brussels, 2005, p.14

## 4. Active Enterprises in the Republic of Macedonia and by Sectors, Period 2005 - 2010 and 2011

Number of SMEs in the decade to 2011, according to statistical analysis are increasing,<sup>11</sup> see table 2. From table 2 we see that the average small enterprises for the period 2005 to

<sup>10</sup> [http://europa.eu.int/comm/enterprise/enterprise\\_policy/sme\\_definition/index\\_en.htm](http://europa.eu.int/comm/enterprise/enterprise_policy/sme_definition/index_en.htm)

<sup>11</sup> Report of Statistical Office of R. of Macedonia, no.6.1.9.32 date 29.06.2009

2009, is 53.772 or 98.7% percent. The highest percentage, of small notice in 2007 with 98.98%.<sup>12</sup>

**Table 2** Number – demography of active enterprises in the period 2005-2011

Year	Small enterprises	Medium enterprises	Large enterprises	Total	% small
2005	43,877	463	84	44,424	98.7
2006	43,269	438	78	43,785	98.8
2007	50,541	424	95	51,060	98.98
2008	61,827	1,177	189	63,193	97.8
2009	69,347	1,159	204	70,710	98.07
2010	74,083	1,211	203	75,497	98,13
2011	71,746	1,187	185	73,118	98,12

Source: State Statistical Office of Republic of Macedonia, 2010, dated 12/03/2010 nr.6.1.10.15, p.2

According to the data of the State Statistical Office the number of active business entities in the Republic of Macedonia in 2010 was 75497.13 The sectors with the highest share in the structure of business entities were: Wholesale and retail trade; repair of motor vehicles and motorcycles with 28326 entities or 37.5% and Manufacturing with 8263 entities or 11.0%, whereas the least represented were the sectors Electricity, gas, steam and air conditioning supply with 107 entities or 0.1% and Mining and quarrying with 164 entities or 0.2%. The data on the structure of active business entities according to the number of persons employed show that the highest share of 78.5% belongs to business entities with 1-9 persons employed, followed by business entities with no persons employed (or the entities did not provide information about persons employed) with 14.2%, and entities with 10-19 persons employed with 3.3%. The share of entities with 20-49 persons employed was 2.1%, those with 50-249 persons employed participated with 1.6%, while entities with 250 or more persons employed had a share of only 0.3%. According to the Statistics the number of active business entities in the Republic of Macedonia in 2011 was 73 118.14 The data on the structure of active business entities according to the number of persons employed show that the highest share of 82.9% belongs to business entities with 1-9 persons employed, followed by business entities with no persons employed (or the entities did not provide information about persons employed) with 9.1%, and entities with 10-19 persons employed with 3.8%. The share of entities with 20-49 persons employed was 2.3%, those with 50-249 persons employed participated with 1.6%, while entities with 250 or more persons employed had a share of only 0.3%.

## 5. The role of the government in SMEs

The absence of a meaningful and inclusive concept regarding the development of entrepreneurship, which especially includes small and medium sized companies, remains a fundamental political strategic challenge of economy, in contrast to European experience that for several years has established an advanced system of entrepreneurship, built according to the needs. Macedonia still faces the problems of economic transition, which is difficult for the financial access. Regarding the importance of entrepreneurship, Republic of Macedonia, year after year, has an increscent of small and medium companies with over 98 %, which is

<sup>12</sup> Source: State Statistical Office Of Republic of Macedonia, 12.03. 2010, no. 6.1.10.15

<sup>13</sup> Report of Statistical Office of R. of Macedonia, no. 6.1.11.12 date 25.02.2011

<sup>14</sup> Report of Statistical Office of R. of Macedonia, no. 6.1.12.134 date 24.02.2012

of a great importance for the gross domestic production and country's economy, where there are employed over 80 % of the workforce that fights population's unemployment .

A high priority of Government and the Ministry of Economy's program is the development of SMEs. Government program's role ( the role of the government's program ) is the improvement of business premises the planning of many activities in support of entrepreneurship , tax and custom education for new companies, export promotion , support motivation up to 5.000 EU for analyzing foreign markets, vouchers for innovations in help of universities and firms, while as a help for the business climate will follow the treatment of regulatory institutions in order to simplify the work of small and medium enterprises, as well as direct foreign investment. As a strategy for a New Europe 2020, are the economic reforms in Eastern European countries under the OECD organization, a vision that derives from the strategic framework Lisbon 2000, as processes recommended by an increscent of macroeconomic sustainability, with more job places (jobs) and greater social cohesion, where innovations are emphasized more as the main movement of decades to come. That's why the Republic of Macedonia on its way towards integration to EU and other places (countries) aspiring to NATO membership, have to put their focus more on the increscent of innovation as a mobility component of competition.

For this reason, from all offered project in the framework of regional projects of OECD – “ Regional Competitiveness Initiative “ of Western Balkan - OECD has selected as primary the preparation of innovative strategic document for the republic of Macedonia, which represents significant progress, improvement of regional image as a place for investment and the efficient implementation of investment politics. Nowadays, all stakeholders of economic policy should emphasize that there do exist risks regarding the economic growth. This is the European economy, and it deepens on whether the developed countries will find appropriate solutions for debit crisis. Our expectations are that the economy of Macedonia, with the support of the budget through capital investment and direct support of 150 million Euro's, with preferential interest rate of 5,5 % on annual level from the European Investment Bank in support of small and medium enterprises, (may) predict solid economic growth of 4,5 % for the next 2012 year – highest in the region, in contrast to that of Central Bank of the R. of Macedonia by 3 % and International Monetary Fund by 2 % that is much less than government's predictions that should also consider the state reserve instruments.<sup>15</sup> The message of World Bang for Macedonia - Eastern Europe, is the improvement of business climate that leads to stable macroeconomic policy and extensive structural reforms, economic competitiveness through implementation of

strategies and creation of competitive products, since the economic development of a small country like Macedonia, depends on them. According to quarterly III.2010, IV.2010, I.2011, II.2011, III.2011 ( see table 3), Domestic Economic activity has continuously increased and registered faster growth for five consecutive quarters, and in the second quarter, gross domestic product growth rate of 5.3% was registered, which was higher than previously.

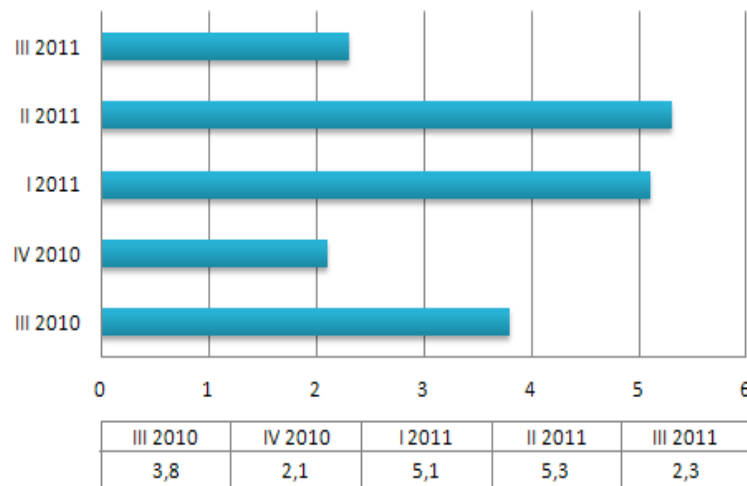
Expected growth of 4.3%, annually, despite to global economic growth in the second quarter of 2011 amounted to 3.7% on annual basis (see figure 1), which is a significant slowdown compared to previous periods (4.3% in the first quarter), but also in terms of expectations. The slowdown is mostly due to movements in developed countries, reflecting the two groups of factors. First, although they were largely anticipated, the effects of supply disruptions due to natural disasters in Japan and oil supply shocks due to the events in the Middle East were stronger than expected. The second group of factors adversely affecting growth, are those of fundamental nature related to poor recovery of private demand in developed countries

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<sup>15</sup> Sources: Central Bank of R. Macedonia

**Table 3** GDP are Quarterly Level

**Gross Domestic Product ar Quarterly Level, compared to the corresponding period of the previous year (growth rates) %**



Source: State Statistical Office of Republic of Macedonia, 22.12.2011, No:3.1.11.08.

and volatility of financial markets due to the debt crisis and possible problems in banking sector in developed countries, especially in the Euro area<sup>16</sup>. Generator of the growth in the second quarter was the domestic demand. The growth of private consumption strengthened further, but it cannot be fully supported by the trends in high-frequency indicators of private consumption, because the directions are divergent. Gross investments, which in the previous three quarters were a major driver of domestic demand growth, dropped in the second quarter. However, the movements in the high-frequency data suggest growth of investments in fixed assets, and not this end is the considerable support through the government investment and increased lending to the corporate sector. Hence, the negative contribution of gross investment probably stems from the reduction of inventories. Exports also contributed to the growth, which recorded slower increment amid weaker foreign demand and lower growth in the prices of major export products in world markets. At the same time, imports recorded a significant deceleration of growth so that in the second quarter, the net-exports had a positive contribution to GDP. The latest projections for the forthcoming period point to weaker growth prospects for the domestic economy by the end of the year, but because of the better results from the beginning of the year, GDP growth in 2011 would be maintained at around 3.5%, as was expected in the July projection, too. The slowdown in growth is expected to continue in 2012, and real GDP will be higher by about 3%, driven mainly by the announced government and foreign investment. The risks around the projections for growth are mostly downward and still connected to the projected path of foreign demand and world prices, the expected investment from abroad and the realization of the planned government investments.

<sup>16</sup> Source: National Bank of the Republic of Macedonia and IFM's, 2011<sup>16</sup>



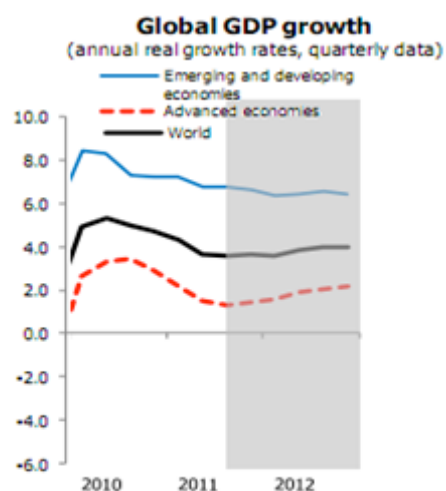


Fig.1. Global economic growth

## 6. The summary

All the enterprises, no matter if they are small or big, private or public, profitable or non-profitable, despite the areas where they operate, in their activities they have one thing in common-the necessity to manage. Each of these, to achieve a goal involves a lot of sources: human, material and financial. In this context, the manager is he, that in the work process, merges and coordinates these resources to achieve organizational objectives. The primary task of managers in the modern world of business is to accept risk and to take decisions in a dynamic environment where are combined and influenced a wide spectrum of economic, social and technical factors, which operate as naratore in the the presentation and in the putting new products or services, the modern technology, etc. The manager uses the appropriate forms in more effective way to conforte with competition and to be more successful in the market. The strategic-creative state programs, motivation, and resource abilities, through the ministry of economy and science which are very well studied, have the meaning of continuity export growth, through economic promoters -the appearance of local companies with concrete plans of action in foreign markets, taking into consideration the number of free economic zones that we build but also the number of new investments for the infrastructure from European investment banksthings which are distributed by the Macedonian bank to support the development. The possibilities for incorporation new measures in the local system to support new businesses, and small and medium companies through commercial banks in favorable conditions, that's currently 0.3% from the local GDP are spent on scientific research activities, despite that in the EU countries for 3%.

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# Securing Human Capital in Family Businesses: The Buy or Breed Dilemma

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**The purpose of this paper is to reveal the strategies family firms undertake in order to secure necessary levels of human capital in their management positions. Family firms go to length in order to breed their own stock of human capital, but are very reluctant to buy such by hiring non-family members as managers. This study applies a case method and derives data from a family businesses located in southern part of Sri Lanka. The findings indicate that family firms need to recognize the dynamic need for human capital by hiring outsiders in management positions.**

## **Keywords**

Family Business, human capital, business survival, family generations, successor, hired managers, non-family managers

## **1. Introduction**

Family business plays a significant role in the new global economy. Regardless of the role for economic development relatively little attention has been given to the family firm's unique and complex challenges. All over the world, high failure rates or poor performance has been recorded after the transference of business leadership from one generation to the next [1]. Lack of human capital of the leaders in the succeeding generations is one of the causes for this high failure rate [2]. In spite of the increased attention devoted to the study of family firm performance in intergenerational transitions of business leadership, academic research that attempts to examine the importance of human capital upon success in family firms is still scarce.

The world is changing more and more rapidly, implying an increasing demand for human capital. A family firm could solve this by developing its own human capital (breed) or it could buy human capital (hire an outsider as a manager). The usual way in family firms is to appoint or select a successor from the family members. There are several advantages as well as disadvantages of selecting the successor among the family members. Comparatively with non-family members, a family member often has training, skills, flexibility, and motivation specific to the business. Even so, it is argued that families may lack necessary skills and abilities due to small labor pool, lack of talent, or inadequate trainings [3].

The present study endeavors to reveal the effort done for creating human capital by preparing the children in the family for future business leadership. We selected a family business which is a prominent business in Sri Lanka and reveal how the transition of leadership affects the performance of the business. Further this study explores the process of human capital creation among the family members who have been appointed as the leaders of the business. The paper also reveals processes leading to hiring outsiders as

managers in a family firm. Based on the discussion, some guidelines are offered for family businesses and suggestions are made for future research.

## 2. Theoretical framework

Family business is defined as a business actively owned and/or managed by one or more member of the same family [4: p. 42]. In other words, a business can be defined as a family business when its ownership and management are concentrated within a family unit [5: p. 47]. In Sri Lanka, the total contribution of family businesses to GDP was between 40 to 60 percent [6]. Recent research has shown large declines in firm performance around family-CEO appointments [7] which led to significant underperformance of firms controlled by family CEO relative to firms managed by non-family CEOs [8; 7]. Furthermore, the impact of the inferior managerial talent can potentially extend beyond family firms, hurting aggregate total factor productivity and economic growth [8]. The family firm has to compensate for the lack of knowledge among its family members while balancing the need for knowledge caused by increased competition with the wish for family members control over the business.

Becker [9] remarks that the presence of high levels of human capital impacts the quality of business behavior. Higher levels of human capital are associated with stronger performance [10]. Consequently, human capital provided by the entrepreneur(s) constitutes a key determinant to ensure business success [11; 12]. There are different types of human capitals. Lafuente and Rabiteno [13] suggested that human capital comprises individual's attributes among others as formal education and previous labour experience. In addition to this, in-house training is also considered a key to superior business achievements [14]. This investigation then differs between three main categories of human capitals; formal education, in-house training and industry experience.

Researchers [12; 13] points out that it is widely recognized that formal education positively impacts the entrepreneur's decision making process increasing the firm's growth opportunities. More educated entrepreneurs have the necessary skills, discipline, motivation, information and self-confidence to attain higher growth rates in their businesses, hence, they are more likely to perceive and exploit business opportunities [12]. Other researchers stress the importance of in-house training in addition to formal education. Living within the family and working within the business from an early age allows family members to develop deep levels of firm-specific tacit knowledge [14]. Training family members for leadership within the family business is then very important. As such, knowledge gained by training can be seen as an "enabler of longevity," i.e., as contributing to the survival of the family business. In successful multigenerational family firms, hence, the previous and following generation exchange ideas and encourage mutual learning [15; 16]. Practical training within the family firm allows people to acquire, share and transfer knowledge across generations.

It is also necessary to complement formal education and in-house training by general industry exposure. Cooper et al. [12] specify that industry-specific know-how may play an important role in the understanding of "how business is done" in a specific context of suppliers, competitors and customers. Family firms can perform well over time when the new generation is integrated into the family business and the transfer of knowledge from the previous generation to the next takes place [15]. Other studies show that intergenerational succession is problematic [17]. Dyer [3] argues that the family may lack necessary skills and abilities due to the small labor pool, lack of talent, or inadequate training a family may represent. Researchers argue that recurring causes of business failure fall under the general category of "business incompetence" caused by lack of knowledge and management incompetence [18].

Breeding human capital for use in a family firm, by educating or training family members is a long term strategy. Another option for a family business to get access to human capital than breeding it among its family members is to hire a manager. The benefits are that the

knowledge the hired manager represent is easier to replace when the knowledge is outdated or show it self insufficient. Likewise, when the outside world changes fast, it might be difficult to retrain or educate family members to respond to these dynamic changes. The drawbacks on hiring a manager, as seen from the family point of view, are the increase in controlling costs [19]. A hired manager and an owner might have different preference for firm growth or for the risks the firms undertakes [20]. Another drawback with non-family managers is that hired managers often require higher monetary compensations than do family managers [21]. The larger the family firm is, the more likely it will rely on nonfamily managers because there will not be enough family members willing and able to help manage all aspects of the business [22].

### **3. Methodology**

One approach to gain a better understanding of the strategies the family firm undertakes to secure necessary levels of human capital is through examining the process of succession from one generation to the next [23]. As the issue of the strategies the family firm undertakes to secure necessary levels of human capital through examining the process of succession from one generation to the next is complex, a case study approach was chosen for this investigation [24].

At first, documentary reports about the firm were examined. Secondly, 7 in-depth interviews were arranged with the active family members who represent the third generation. Two selected employees at manager and managing director levels, who have been working under the various generations, were also interviewed. The interviews had an average length of one hour. Investigation of each generational period was carried out to develop the case history, and identify the human capital creation process and its pros and cons. Since the data were collected in a qualitative form, a descriptive analytical tool was applied to elaborate the perceptions, emotions, and comments of the respondents relating to the human capital aspect of the business over the generations. This analysis was conducted by actively searching for alternative explanations than those outlined in the theoretical part of the paper [25]. Previous research on family firms suggests investigating how family members personally experienced and judged the transfer process and its outcomes when investigating success or failure in generational changes in family firms [16]. In light of the problems of missing data for revenues dating back to 1885, we chose to rely on the judgment of the involved individuals when reporting the storey of this family business.

MCA & Sons Company (a nickname) is generally considered as one of the most prominent family business located at one of the major cities in the Southern Province of Sri Lanka. The firm was founded as a sole proprietorship in 1885 and produced coconut oil. As reported by an employed manager of the company (non-family member) with more than 45 years of experience in the company and still is in the same position, the profit of the business start to decline gradually during the leadership period of a grandson between 1945 – 1955. Moreover, the good relationship the business had with suppliers and customers also gradually declined in that period. However, the firm later experienced a remarkable increase in business results during the leadership period run by Son 3. At present the firm is led by yet another grandson and operates at sales volumes below break-even.

### **4. Findings**

The family firm undertakes several strategies to secure access to necessary human capitals. The main strategy for MCA & Sons is to breed human capital among its family members. This is in line with the succession process described in the family business literature. The founder-owner of the family firm prepared his offspring for duties in the family firm. The employed manager comments: “The founder had given the priority for the family members

specially sons-in-blood and grand sons-in-blood when appointing key managers of the company as well as appointing members to the BOD (hired manager)." The sons received both in-house training and formal education. "He provided a good education and business training for the sons in the second generation before they joined as executives and/ or the directors of the company. For example, he trained his eldest son (Son 1) well by appointing him as the manager of one of the business units of the company in 1920. He had given a good education to all of his sons and he included them in his business activities" (hired manager). The founder even provided the sons with relevant industry exposure. "Son 1 was involved in drying coconut produced from lands owned and hired by the company and buying and selling of citronella oil collected from surrounding estates. He had received foreign exposure by following a one year Business Diploma in a foreign country" (Hired manager). This training was then provided to all sons of the founder-owner, and consisted of both informal training by in-house work, industry exposure and as formal training at business or management schools. The main strategy for the family firm was then to breed its own human capital.

By criticizing the human capital level represented by several business leaders in the firm, the Managing Director (grand son 5d) pointed out that, even though, working outside the family firm and using consultants provides a more detached perspective over how to run and how to introduce changes and innovation in the business, no emphasis in this regard has been given by any of the family business successors. The leaders in successive generations failed to introduce modern technologies and the Managing Director believes this failure is due to the lack of concern on improving knowledge by getting outside experiences. The inward focus was the cause for the failure in diversification efforts done by the leaders in the second generation, causing poorer performances.

The present Managing Director (grand son 5d) reports that a strategy not pursued to a large extent in this family firm is to buy in human capital by hiring outsiders as managers. The first time this happened was in 1955. The hired manager was the son of a very close friend of the founder father. At present the age of the first hired manager of the company is 75 years, he now have more than 50 years work experience with this company. He was hired as the assistant for the managing director in the 2nd era of the company. He looked after the overall business, an in particular the sales division. The present chairman expressed that "developing the human capital of the two hired members also was prioritized by this company. The first hired manager became a manager as he had proven his capacity at the time of absence the chairman of the company. Before this he received the opportunity for looking after the overall business since he was working as the assistant, and he then became responsible for the long life customers of the company and by this had received the understanding of how to run the business." The hired manager was internalized into the management group of the family through in-house training. This was also how the second hired manager got his position. "And also, the present managing director is non blood family relation and he was also trained by letting him work in several positions of the other business units operating under the MCA & Son's company but at separate premises for example, cinema hall, stationary shop etc. At present he has sufficient talents and skills to manage the business" (Present Chairman).

## **6. Analysis**

The MCA & Sons' Company is a family firm which operates in its third generation and was growing well during the founder's period. As revealed through the interview with key managers of the company, the founder did a great job of building and maintaining human capital among the potential successors. Two of the sons in the 2nd generation acquired high levels of education, knowledge, and experience, and the business was profitable also during their regency. They managed to establish a link between the family and the business utilizing other family member human capital for the good of the business. They did not invest enough

in younger family members' human capital to ensure business success by their successors. Hence, all other successors have failed to run the business properly. As a result of this they failed in continuing the growth level achieved by the managers in 1st and 2nd generations.

The founder provided his sons with a formal education suitable for continuing the business. The grand-sons were also provided formal education, but they themselves report that they did not see a strong link between their education and their actual or potential role in the family business. Industry training was a vital part of the human capital the founder wanted to build among his potential successors. There is less evidence of such a focus in the later years. The risk of relying only on experiences gained within the family firm is that it might not enable new insights. This family has not paid enough attention to training courses and working outside the family firm. As a result, the relative degree of knowledge has decreased especially in the later generations. In particular, due to lack of knowledge about what is happening at the outside business world, and then in particular, the technological developments in the industry, competitors' strategies, and new business routines may be causes for the decline of the business. This case reveals that business experiences gained outside the family firm is needed for firm survival.

The founder hired a non-family member as a manager. This person was initially hired as an assistant, and through in-house training and familiarization put in the position as general manager. One of the sons of the founder hired another general manager in order to assist the senior general manager. This person is also provided enduring in-house training. This is not a clear cut buy strategy. The family firm does not hire and fire managers as their need for human capital changes, nor do they shop around for good heads and seek new ideas by hiring consultants to solve specific problems. The family firm train outsiders until they are as family members and then they include them in the management family. The findings show that the founder had a strong breed strategy with some elements of a buy strategy. Their sons mainly pursue a breed strategy, with a focus on in-house training. The grand-sons do not have a clear strategy for acquiring and keeping human capital. This contradicts previous research that indicates that later generations do more succession planning than do the first generation [26].

## **7. Conclusions and implications**

A family firm needs access to necessary human capital. When the family firm is unable to or unwilling to breed this from family members, it has to hire outsiders representing the needed knowledge. In the case when the family firm needs to buy in knowledge by hiring non-family member in powerful positions, the family needs to establish routines such that the family still keeps the wanted degree of control over the values the family business represents. Our findings indicate that when there is a need for knowledge caused by increased competition coupled with a disability to provide this knowledge from the family members, it may lead the family firm to hire outsiders as managers. A wish for control by the family members over the family firm may make the family firm reluctant to hire outsiders as manager. Our analysis of the MCA & Sons Company supports these assumptions. The case results indicate that the more knowledge that is needed in a family business; the more a successful business need to buy in knowledge by hiring a manager. The more competitive the environment is; the more knowledge is needed. The less knowledgeable the family members are able to become, the more the business need to buy in knowledge. The tighter control the family wants over the family business, the less likely is it that the family business relies on hired managers.

Further research is needed in order to suggest means for strengthening older family firm's access to necessary human capitals. This paper shows that some family firms lose their grip on securing necessary levels of human capitals. This paper shows one strategy pursued in order to secure external human capital while still holding a firm grip on the control of the business. The strategy is to internalize the externals and make them as a member of the family through in-house training. In our case the results is far from optimal, as the long breed

period in this internalization weakens the influence from knowledge on affairs outside the family firm. If the family members in charge of a family firm are not able to respond properly to an increased demand for human capital, the family firm will eventually expire. This paper shows the need within family firms to acknowledge the need for additional human capital, represented by non-family members. The paper also reveals a need for more research on how to administer knowledge represented by others than family members. Families need to acknowledge outsiders for their contribution to the firm.

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# South-East European Regional Financial Market as a Core Condition for Regional Development

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The article explores and tests the conditions for the creation of a unified South-East European regional financial market in function of more intense regional cooperation and development. The goal is to research the conditions of creating a unified South-East European regional financial market, and to name the benefits of such a market, in terms of better regional cooperation and development. The main hypothesis of the research is that creating a unified South-East European regional financial market would significantly improve the conditions on all the national financial markets of the region, and would contribute to faster regional cooperation and development. Bearing in mind the effects of the global economic crisis, i.e. the European debt crisis, this subject matter is especially interesting. The crises have stressed the need for further regional integration, especially regarding the EU integration processes. Namely, due to the underdevelopment of the region's national financial markets, which are characterized by high liquidity risk and extreme volatility, these observed financial markets are more sensitive than the developed financial markets. The methodology used is based on comparative methods of analysis. The research results are significant both for the professional and the academic community since the main goal of the research is to determine the preconditions for creating a unified South-East European regional financial market, and also to propose concrete steps towards the creation of such a market. The research results indicate the necessity for a cross-border and territorial cooperation, that will outcome in the creation of a unified South-East European regional financial market, which will establish a solid basis for further regional development.

## **Keywords**

Cross-border Cooperation, Financial Market, Regional Development, Territorial Cooperation

## **1. Introduction**

Globalization processes contribute to the intensification of changes on financial markets on the one hand, and to the surpassing of national features of the financial markets on the other; and as such are leading to a tendency of creating globalized financial markets. It is still premature to talk about a global financial market, but we can openly talk about regional – supranational financial markets. This organization form of financial markets is particularly typical of developed economies and market circumstances, due to the fact that developed financial markets can more efficiently absorb the specific features of individual national economies. The organization and functioning of the European Union, North American and other financial markets support this thesis. Many authors have studied and are still dealing

with the courses of events and trends of globalization through the prism of the creation of supranational financial markets. It is evident that globalization tendencies determine the organization of the financial markets; in particular, during the integration processes, i.e. the harmonization processes. These processes are especially important for transition economies, in terms of creating an adequate basis for further regional development and cross-border cooperation. Also, it is especially necessary to observe the place, role and importance of the financial globalization processes and general conditions of financial integration in order to create supranational financial markets, as key factors for regional development. Namely, for developing countries, financial globalization can take on a catalytic role in generating numerous collateral benefits which enhance long-term growth and prosperity. [1] In the context of regional development and the creation of supranational financial markets, financial globalization makes coordination on capital flight possible. [2] Kose, Prasad and Taylor (2009) find that financial development, as a consequence of financial globalization, multiplies the benefits while reduces the sensitivity to crises and extreme events. Domestic and international collateral constraints play a particularly important role in financially underdeveloped low-income economies where access to arm's length financing is limited. Further analysis of financial globalization processes emphasizes the presence of a constraint between the indirect benefits of financial integration and the potential risks if an individual country removes the barriers to free capital flows, but has not created the appropriate conditions beforehand. [3] International financial integration was often viewed, in the policy-making circles of the early 1990's, as a new engine of growth which, together with international trade, would help to lift the standard of living in "emerging market" countries. Even though the financial openness has affected the competitiveness of the given markets; the benefits from the international financial integration have been relatively small even for countries which had large capital inflows. On the one hand, the benefits of financial integration mean an increase in transparency on the observed markets and consequently, foreign investors are attracted, while on the other hand volatile capital flows have negative effects on domestic institutions, policies and growth. [4] During the past two decades, the degree of international financial integration has increased significantly, and caused a number of advantages such as: more efficient capital allocation, i.e. savings; territorial cooperation, i.e. possibility of investments across countries; the possibility to increase the level of portfolio diversification by domestic investors; the development of the industrial sector due to the possibility of raising capital on an integrated financial market; a positive impact on the output of the countries; and so on. In all, higher levels of international financial integration can lead to a more efficient economy and ultimately to a higher level of economic well-being. [5] Beside all the positive elements, the processes of financial globalization and financial integration have certain risks, which are particularly expressed in terms of the global economic crises, i.e. the European debt crisis. Financial market globalization affects the structure of stable steady states of the world economy, as it changes the balance between these two competing forces - the rich are richer and the poor are poorer. [6] Namely, financial globalization makes the transfer of risks possible, i.e. financial contagion, since any instability can almost immediately be transferred from one financial market to another, taking into account the level and the grade of integration of the markets observed. Thus, international financial markets are subject to unpredictable swings, costly financial crises, and contagion. The issues of desirable characteristics and of financial system stability arises, especially so in transition economies, due to the large capital inflow which is a result of the financial integration. The basic elements of a sound financial system are a supportive legal and regulatory environment, strong internal governance, external discipline provided by market forces, and external governance provided by regulation and supervision at both the domestic and the international level. [7]

Modern business conditions on the financial markets – which are characterized by immanent risks, – require prompt actions to reduce the risks, all aiming to the direction of further regional development and cross-border cooperation, and creating a unified South-East European regional financial market, as a response to the growing uncertainty due to the

consequences of the global economic crises, i.e. the European debt crisis. For the region's countries, the EU integration processes represent an opportunity, i.e. a mechanism by which a faster integration of the financial markets can be achieved, and therefore consequently – further growth and development. This way a comparative and sustainable growth and development pace of the markets listed would be achieved with the developed financial markets, with a particular emphasis on reducing the asymmetry in the given dynamic environment conditions. Integration clearly has been, and for the most part still is, much less complete within the periphery than within the core but, nevertheless, is increasing. Markets today are more complete than earlier; integration is more geographically ubiquitous. [8]

Taking into account the above mentioned comparative research, the creation of a unified regional financial market, a sort of an assembly of regions or a globalized form of the financial market, is a process which does have its own laws and consequences. To talk about a unified financial market (as a unity of several national markets) is not possible without first having achieved a certain similar level of socio-economic development, and establishing equalities in the forms of organization of market conditions. Attempts to overcome these issues artificially, only by administrative measures, have not given the expected results so far, and such projects are considered unsuccessful. Before entering a discussion on the process of creation and establishment of a unified financial market, which would include several national economies/regions, it is first necessary to face certain preconditions. These preconditions represent the unity of the state of affairs on the national markets and economies, in terms of the achieved/required level of harmonization and the degree of development of these national markets. Accordingly, a particularly important issue is the analysis of the crisis that since the recent years have been taking shape, and which has a major impact on national markets as a consequence of a certain discontinuity in the development, especially in developing countries. The impact of the crisis - on both national and global levels, - is much discussed. The fundamental dilemma, when talking about the issue, is: is the crisis a reality and/or imagination? (In the sense of whether the crisis is an engine for growth and change, or the crisis is an inhibitor of development and change?) The issue of crisis impact on the creation of supranational financial markets is of huge relevance.

Developing countries, or the so-called transition economies, are very interesting to analyse, because of state of affairs that prevail on these markets. On the one hand, these are markets where there is a considerable level of readiness to overcome the problems of the previous period; but on the other hand, there is also a considerable resistance to any changes, and usually from those who are not advocates of market transparency. This conflict of interests constantly raises the questions of new beginnings and new continuities, which emerge as consequences of a previous discontinuity. That is why repeatedly on these markets, the need for a mutual coordination and an eventual integration is written and spoken about, with the aim of the region's further development. However, little has been actually done or achieved in this field. It is reasonable enough to question the issues that have led to the disharmony in the process of integration at the regional level, and also to raise the questions of how to overcome all the challenges that are on the way. The subject matter of the research is to study the factors and origins which have caused the reduced speed of the integration processes in the South-East Europe region, as well as defining the conditions that need to be satisfied in order to complete the processes of successful integration of the financial markets of South-East Europe into the global flows, and which certainly eventually result in the region's further development.

In that sense, the basic hypothesis of the study H0 is: "Creating a unified South-East European regional financial market will significantly improve conditions on all national financial markets in the South-East Europe region, and will contribute to faster regional cooperation and development."

Naturally, in order to create a unified South-East European regional financial market, it is necessary to examine, analyse and fulfil a number of preconditions, which will contribute to the unification of the entire region of South-East Europe.

The goal of this research is to gain specific knowledge about the methods and the pace of the integration processes of the South-East European financial markets, in the function of giving concrete proposals on optimal ways how to create a unified South-East European regional financial market.

The research results will be useful both to the academic and the professional/business community, as it will provide concrete suggestions for creating a unified regional financial market of South-East European countries.

Following the introduction, the place, the role and the importance of the crisis as a driving force of change will be analysed in the second chapter. The third chapter explores the starting points, i.e. the possibilities of creating a unified South-East European regional financial market, by taking into account all the specific characteristics of the national financial markets in particular. Then the concluding remarks follow, as well as directions for further research in the area.

## **2. Crisis – driving force of change**

Crisis and emergency situations can be discussed in different ways. Some authors recognize crisis as an opportunity for development, while others believe that crisis is a destabilizing factor. Crisis is an error in the assumed continuity. If we start from this assumption, the causes of crises and the emergence of critical situations, in general could be discussed in a broad sense, because this assumption means that if all the circumstances are predicted and anticipated on time and have also been appropriately responded to, then these situations cannot be considered as crisis states or situations. In this sense, it is logical to ask what actually a crisis is. How to recognize it, describe it, and ultimately how to react to it? There are numerous questions, and therefore challenges, and even more answers. The understanding of crisis and critical situations is largely determined by the personal characteristics of individuals who deal with these issues, and also by their dedication to answer some questions more and others less in their efforts to analyse crisis and emergency situations. It is impossible to talk about crises in general. It is inevitable to strive for a definition and a description of the crisis in its manifestation, through the prism of perceiving the cause-effect relationships that result from the effects of regulations of a particular system. Also, there are different manifestations of crisis or crisis states - social crisis, political crisis, moral crisis, economic crisis, and the like. Although they are seemingly different, - hypothetically said 'different' – all these forms of crises have the same origin and outcome, which ultimately affect the various flows of financial funds in a single system, and therefore it can be concluded that any crisis situation leads to the devastation of the society both as a unity, and on the level of the individual, which then again results in the instability of the socio-economic circumstances. Crisis is the inevitability of each system and it is its integral part. The only question at stake is its perception, i.e. the analysis and evaluation of the effects of the crises to the system itself. Many are inclined to argue that the crisis is most evidently seen through the prism of the state of affairs in the financial system. After all, in the recent years, crises are best described and assessed through the prism of the conditions and circumstances in the realm of the financial system. It is a controversial issue, given the fact that none of the crises have been proven to be induced, nor could be overcome by solving the state of affairs in the financial sector. It is only the effects of the crises that are mainly manifested in the financial sector, given the fact that the changes which are induced by the crises are best and first seen on the level of financial flows and trends; however, the crisis itself cannot be addressed to as an exclusive product of the financial sector. This thesis is supported by the fact that crises, either directly or indirectly, are a permanent presence in the socio-economic trends, and that since only the advent of globalization and globalized exchange of information can we primarily talk about financial crisis. Looking back in time, it becomes obvious that crises have always been a matter of everyday life and that people throughout history have dealt with crises in many different ways; i.e. in resolving its

consequences. In ancient times, crises primarily manifested as disagreements or struggles between members of different groups of people, and through the mirror of these differences other forms of crisis appeared. In the recent history, crises and emergency situations are first manifested through the prism of the impact of the crises on flows of financial resources, which result in significant discrepancies in the financial sphere, and finally affecting the entire socio-economic state and trends.

As logical, doubts arise about the reality of the crisis which has been manifesting the last few years. Could this just be an attempt of hypertrophy of everyday life, with the ambition to affect the redistribution of social wealth and to impose new relationships in the possession of goods on a global scale, all through the prism of crisis and crises situations? The fact is that despite the disturbances produced by the crisis, both at macro- and micro-levels, the rich become even richer and the poor are impoverished even more. The similarities to the early phases of capitalism and to the primary distribution of national wealth are evident. History teaches us that things, circumstances, events reoccur, either under different, or often even under the same names. In this sense, is the crisis about which people have been extensively writing and speaking in the recent years really a new factor in the socio-economic trends, or is it an intentional hypertrophy of the real state of affairs and sequence of events in order to influence capital flows? Is this a real or an imaginative crisis, or a certain fiction of reality in an attempt to exaggerate reality so that events would be considered as different than normal? All these issues, dilemmas, ambushes and doubts set in front of individuals are significant challenges, and the answers lie in an intimate, personal understanding of the essence of the notion of crisis and crisis states.

In recent years, significant turbulences occur primarily in the sphere of financial relations and in spheres of financial system regulations. Many are inclined to seek for the causes of these conditions in the financial sector and in the deregulations of the financial sector, but the fact is that the crisis is only manifested in the state of affairs in the financial system; however, the causes are hidden much deeper and concern the systematic definition of socio-economic relations. A major problem is also the transition of the socio-economic system from monetarism to neo-Keynesian approach, with ever larger and more active state involvement in market flows. In this sense, the neo-liberal concept is on trial and it is unknown what awaits us in the future. There are numerous challenges present, and even more questions, but – currently – only few answers. However, some facts are agreed on by almost all; namely, that the crisis is inevitable, its perception primarily depends on individual bases and on individual understanding of the causes, as well as the assessment of the effects, and that the future is uncertain and probably very turbulent. Nevertheless, precisely in those challenges lie the opportunities for growth and development, and it is crisis and crises situations that the basis for future development should be sought.

Crises are the engine of change, and changes are a factor of development. In defining the place, role and importance which crisis and crises situations have on the socio-economic development, the personal understanding and the individual angle of perception is of great importance. What one sees as crisis, it is an opportunity for somebody else. In this sense, one can speak of a dialectical understanding of the crisis: reality and/or imagination?

The reflections on these thoughts are best assessed through the example of transition economies, which are characterized by significant changes in their socio-economic relations, dynamical circumstances and the eternal pursuit of harmonization of their socio-economic systems.

The dialectical understanding of the crisis also has a personal dimension, which is a deep, intimate, personal and honest judgement about the understanding of the crisis and crises situations. Finally, for a deep and sincere understanding of the concept of crisis and crises situations, it is necessary for everyone to ask themselves about the place, role and importance which crises have had in their own lives, and about the impacts which these crisis made on their decision-making processes and also on the assessment of the same crises. Understanding crises from this perspective, some of us will be supporters of the view

that the crisis is a reality, while others will consider that crisis represents an imagination of reality, and is simply a different perception of changes.

Accepting all of the above noted, it is only proper to conclude that the current moment in time is the right time to initiate changes on national financial markets, which will move towards the direction of convergence and unification, all with the aim of creating a unified financial market in South-East Europe. The crisis, and the changes it causes, should be used in the function of development to create a new quality from the existing one. Only this way it is possible to use the comparative advantages offered by the economy of scale and to create real conditions for further integration processes of the South-East European countries into the community of European nations.

### **3. A unified financial market of South-East Europe: fiction or reality?**

The title of this chapter is intentionally defined in an irritating manner, in an attempt to finally demystify all the prejudices related to the integrative processes of the financial sectors of South-East European countries. The study will try to confirm the thesis, that the processes of integration and the need to significantly contribute to the development of the region are inevitable. This is to be done for all those who support conspiracy theories, or who advocate the necessity of existence of national financial markets and believe that their unification and integration can only be achieved through the processes of integration within the European Union. Logically, the question arises: why has so little been done in this field, even though all actors are aware of the necessity of these processes? Usually, the answers to such questions are the simplest and the most banal. To put it simply, the level of indifference, self-glorification and personal vanity did not allow faster integration processes of the financial sector.

When the state of affairs are analysed on the national financial markets of South-East Europe, certain similarities can be noticed. These are relatively "shallow", low liquidity, low-capitalized markets, with significant levels of instability and inconsistency, and with constant presence of moral and ethical questions. The institutional regulations governing the organization and functioning of these financial markets are quite similar, but the major challenges are in the sphere of supervision, i.e. the control of activities and participants on these markets. In this sense, the integration processes should enable greater fluidity of capital resources, while strengthening the supervision of these markets. To make the process of integration of national financial markets effective and efficient, it is necessary to take into account the existing similarities, as well as the specific characteristics. Namely, it is a well-known fact that the South-East European countries are at different stages of transition and EU integration processes. The rapid development and dynamism of events in the region, accompanied by the EU integration processes condition the degree of synchronization and co-movement between the observed national financial markets. The adaptability to the environment conditions represents the core of competitive advantage of South-East European national financial markets, especially bearing in mind the growing uncertainty induced by the global economic crisis, i.e. the European debt crisis. It is exactly the integrative processes that eliminate the negative characteristics of the given national financial markets, which include: extreme volatility, low trading volume, high liquidity risk, the extreme sensitivity to external shocks, lack of transparency in operations, a high level of insider trading, market inefficiency, changes in credit rating and the like. Most of these issues are of idiosyncratic nature. Creating a unified South-East European regional financial market would largely have a positive impact on the economic and social development in general; it would also increase investment attractiveness, both from the standpoint of the potential investors (due to the creation of a predictable business environment); as well as from the perspective of the observed markets themselves, which this way would be granted easier access to capital necessary to conduct business activities. The success of the reforms,

synchronizations and complementarity of national financial markets of South-East Europe, i.e. the creation of a regional-supranational financial market, will determine future regional development, as well as the possibility of intensifying cross-border and territorial cooperation. Being aware of the necessity of the integration processes in South-East Europe on the one hand, while there is a significant level of resistance on the other (by those market participants to whom these trends do not match), it can be concluded that the process of integration is on a blind track. As a possible solution, it may be considered to exploit the crises for the integration processes, and under the cover of an anti-crises package to create a unified South-East European regional financial market. One could probably not talk about any enthusiasm that these processes would induce on the national economies of South-East Europe, but certainly all would feel the benefits of such measures on the medium to long terms.

A logical first step would be to create first a joint advisory body for the entire region of South-East Europe, which would deal with the state of affairs in the region and would propose concrete measures to overcome the challenges. This body should later develop into a supranational supervisory authority of the financial market of South-East Europe. In parallel with these activities, it would be necessary to merge the stock-exchanges of the South-East European countries, and also the Euro as the official currency should be introduced. Initially this could be the dual currency payment system (such as in Hungary), with a tendency to move entirely to the Euro, in spite of all controversies. These processes would lead to unification of the regulative functions on the financial markets in South-East Europe, and what would effect in a unified South-East European regional financial market.

## **4. Conclusions**

Creating a unified South-East European regional financial market is repeatedly an interesting and intriguing topic. It is interesting because it creates room for broader thinking on the subject of integration, but also irritating because it "opens doors" to all unbelievers when criticizing globalization and the consequences entailed in terms of national identity loss.

The facts underline the idea that integration and integrative business processes are a necessity of everyday business life, and the sooner they are started the better and more optimal the effects and consequences will be. In this sense, the study confirmed the basic hypothesis of the research that claims that creating a unified South-East European regional financial market contributes to faster development of the region, both at the level of national economies, and the level of the whole region. The path that needs to be passed is not easy or simple, but it should begin as soon as possible. It is necessary to use the crisis as an initiator of change and development, and thus start the changes at the national level, which will lead to changes on the regional level.

However, there are many challenges. This study attempted through a systematic approach to decompose the dilemmas and the ambushes on the road of integration and to propose concrete steps that should be done. Naturally, a complete solution cannot be offered, but the moves have to be adapted along the way. Also, the issues of socio-political situations in South-East Europe cannot be avoided, but the common goal of all these countries is the ambition to become full EU members.

Bearing in mind the results of the research, directions for further research include the continued monitoring of the state of affairs on the national financial markets of South-East Europe through the prism of creating an adequate basis for strengthening a cross-border and territorial cooperation, as integrative processes, aiming towards the creation of a unified South-East European regional financial market, and further regional development.

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# Dynamic Business Alignment (DBA) - Leading Edge Thinking & Designing end to end Enterprises<sup>17</sup>

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Current approaches of organization design and operation are static at best, and flawed at worst. We continue to use hierarchical, silo-driven types of design – and that’s a vertical design – when actually the customers are buying horizontally. Every time they buy a product or services from us, they are buying some of our procurement, some of our logistics, some of our operations, some of our sales and some of our marketing. Additionally, the world of business and commerce is moving ever faster. Customers are becoming increasingly demanding for quality and price, especially in a business recession period and they want their specific demands to be met. To meet these challenges we need to adopt a fundamentally new business model. BDA model is founded on “alignment” principles, aligning the enterprise (Leadership Style, Business Culture and Business Strategy) with its customers, supplier’s principals and third party providers (outsourcing). The model starts with the customers, and introduces a new way of interpreting their needs and expectations, and consequently a new way of segmenting customers. This new solid but dynamic point of reference makes the organization capable to start developing a new business strategy (External Alignment / Customers) via reverse engineering. Equally, on the inside of the organization, we need to unravel the complexities of Corporate Business Culture - where all the forces of darkness lurk - in order to achieve better Internal & External Alignment. The premise of the alignment ideas coming from more than 20 years of field work, and the realization that people drive business. The vital ingredient and the critical determinant of corporate performance, is the leadership style of the top team. The behavior of this team will be put under the microscope in a way not previously seen in text books or seminars. Shaping up the Corporate Business Culture to improve the execution of Business Strategy involves several factors, including organization design, matching people and roles, process re-engineering, a more intelligent use of IT, careful selection of KPIs and corresponding incentives, appropriate training and development initiatives, role modeling and enlightened recruitment. We will explore all these vectors of performance, and seek to show how they impact corporate performance.

## **Keywords**

Dynamic Alignment, External Environment, Business Strategy, Business Culture, Leadership, Strategy Mix, Culture Change Levers, Customer Service, Cost Reduction

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<sup>17</sup> This paper is based on the Dynamic Alignment concept developed from the “Supply Chain Thought Leader” Dr. John Gattorna based on more than 25 years field work experience. The business consultants firm Business Logistics Services Ltd (BLS) is a member of the Gattorna Alignment Worldwide Group responsible to introduce and implement the Dynamic Alignment Methodology in the area of Balkan Peninsula under the auspices and his guidelines.

# 1. Introduction

## 1.1. *Why strategic plans fail?*

Forty to sixty percent of written strategic business plans in different types of business fail or never delivered on the ground, even though have been developed from expensive business consultants or well known professionals.

The root cause of non performance is much closer to home, it is inside the enterprise, and not due to the competitors activities as many would believe.

The existing worldwide experience taught us that the main reasons for this lack of success are:

- Lack of understanding customers.
- Conditions change makes the plans obsolete.
- Wrong strategy mix.
- Not having the right people involved.
- Wrong structure, processes, IT systems, and HR systems.
- Wrong people in leadership positions.

## 1.2. *A more enlightened view of contemporary enterprises*

The main players in the game of success or failure are customers, managers, employees, principals, suppliers, 3rd parties etc, etc.

People, and people alone, are the centre, of every enterprise that exists in the world today. On the outside we call these people “customers” or “clients” and on the inside we have boards, managers and employees running the business.

Every type of enterprise, whatever a commercial one or a not – for – profit; is a “pathway” through which products and services, even though ideas, are moving as they gather value and cost en route to the end user / customer.

In this effort, the people of the enterprise (Board, C level managers, employees, blue collar workers etc.) in their way of doing business they develop strategies and use a lot of processes, activities and relations, technology and infrastructure to supply efficiently and effectively the customer, in other words to respond and meet the needs and the expectations of the people outside the enterprise.

The truth is that most organizations have not reached an acceptable level of understanding their customers’ dominant buying behaviours, and only very few genuinely understand and have an in depth knowledge of their customers.

# 2. Aligning the enterprise around customers

There is only one fail – safe frame of reference when designing and operating organizations: the customer and the customer situation. This is the starting point for all subsequent actions. If we don’t think this way, we are either guessing or kidding ourselves.

Once we fully understand the behavioural structure of our marketplace, it is possible to “reverse engineer” the configuration of our supply chain<sup>18</sup> back through the organization to actual operations on the ground. And because there is always more than one type of

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<sup>18</sup> The “pathway” through which, products and services, even though ideas are moving as they gather value and cost en route to the end user / customer.

dominant buying behavior evident in any product / service – market situation, it follows that there is likely to be more than one type of supply chain.

In all organizations worldwide, experience taught that three to four generic supply chains, and the variations of these, exist in different mixes, depending of the product, service or country. Briefly, these are as follows:

- Continuous replenishment supply chains to service customers focus on collaboration.
- Lean supply chains to service customers focus on low cost and price.
- Agile supply chains to service customers focus on responsiveness and quick reaction.
- Fully flexible supply chains to service customers focus on hedge and deploy resources.

Additionally in some large organizations, it is possible to discern more than one buying behaviours present. So, any response must have a dynamic capability; this is not duck shooting where the enterprise have a single response and endeavour to infinitely adapt enterprise response as customers move across the sights of the enterprise. That approach is cost – prohibitive because of the myriad exceptions involved, and it is very wearing on the people inside business.

As conditions change, customers possibly move from their natural or preferred way buying behaviours, either temporarily or permanently, to one of the other three buying states listed above.

Once the enterprise pin down the structure or its marketplace, it is possible to develop a corresponding range of responses that align with different customer buying behaviours which have been identified. This become a package exercise, where the enterprise mixes and matches recipes of attributes such as price, brand, speed, and /or consistency of delivery, relationships, degree of innovation and more. The same basic product or service can be delivered in many different ways to suit the same or different customers. The devil is in the detail of implementing the supply chain configurations to deliver these intended strategies, rather than their formulation, and that is where people play more roles, front and centre. They can either make things happen or resist simply because they want to. This is an insidious form of resistance because it is difficult to identify and measure the real time, and often the effects only become apparent after significant time has elapsed. And by then it is usually too late to recover.

### **3. The key to successful execution is people**

The dynamic alignment concept requires that four levels of human endeavour be aligned:

- Marketplace
- Response(s) to customer demands (Strategy)
- Internal culture capability and
- Leadership style

All the above hold together primarily with leadership, organization structures, processes, and technology. The biggest problems occur at the interface between intended responses (strategies) and the internal culture capability of the enterprise.

This is one of the big challenges for human resource managers (HRMs). HRM professionals must have a strategic role in their organization, as custodians of the corporate culture, when they know in depth the existing corporate culture and they are capable to advise top management in the quest to reduce obvious “misalignments” particularly at this crucial interface.

The experience shows that, in this critical field very little progress has been done by HRMs. There is a little or no respite in sight and the organizations continue to operate much as they have done for decades, and educational institutions are teaching the same old stuff their students, the next generation managers. It's a vicious circle that we must break out of sooner

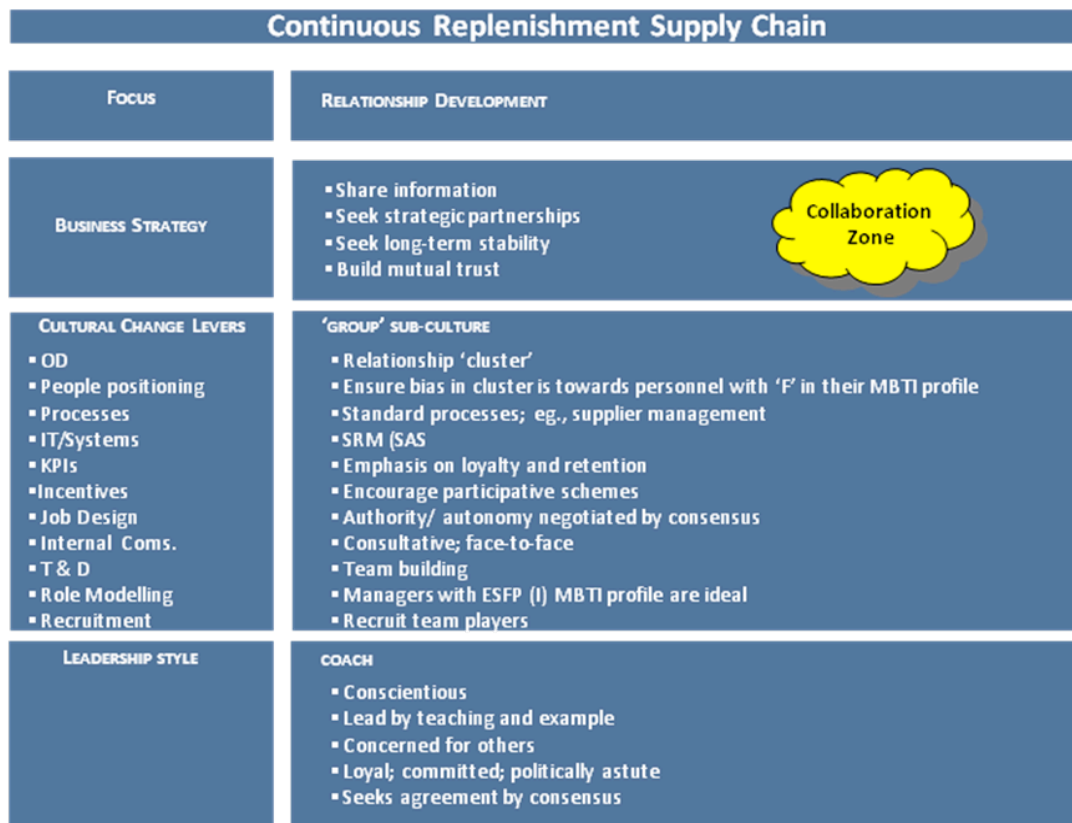
rather than later. That time is getting close for many organizations, otherwise they won't survive

#### 4. The four generic business alignment configurations

Each of the four (4) supply chain types listed above look different at each level of alignment framework. They have to be in order to focus on a particular dominant buying behaviour. Each of these unique configurations is depicted in figures 1 to 4.

For the purpose of this paper the focus will be on the forces at work at the cultural capability level, because it is here that the human action inside the enterprise plays out, mostly hidden from view. This is also where the "forces of darkness" lurk, leading to gross organizational ineffectiveness. It is also right here that we need HRM professionals to be focusing their attention and providing technical advice and support to senior management. The following attributes that shape and create subcultures are the ones we want them to focus their attention and energies on.

- *Organization design (OD)*. Other than "leadership style" itself, this is the most powerful force for shaping subcultures because it constraints the way in which people work, just like a straitjacket. Unfortunately it is also the area that has seen the least progress in theory over the last several decades. Organizational designers have been unable or unwilling to come up with anything better than the traditional functional silos, and variations of this, such as matrix structures. Functional silos served us well in the relatively slow moving world of 50s, 60s and 70s, but have become progressively more misaligned with the way customers want to buy over the last two decades. It seems we will never rid ourselves of this format, and maybe we won't have to.



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**Figure 1** Continuous Replenishment Supply Chain

Matrix organization structures were introduced to overcome the weakness highlighted above in functional silos, but have generally not been effective, and will not get any more effective from here on. The problem is the internal conflicts generated at each intersection between a customer-focused account manager and the all – powerful vertical functions that hold the budgets.

The way forward that allows the enterprise to engage and align with customers more effectively in a fast moving operating environment is the “cluster” approach. The idea is to build groups or clusters of multidisciplinary personnel that faithfully replicate both the competences required to service a particular customer segment, as well as embedding the required mindset bias. For example, where we have to a continuous replenishment supply chain aligned with a collaborative segment of customers, it is important to embed a “relationship” mindset or subculture and support this with the appropriate processes and technology.

In this way, we can keep the conventional functional silos in place, but with a different *raison d'être*. They become the repository of specialist skills and competences, and a “force generator” from which the new clusters draw personnel of all disciplines for short – or long term assignment to particular clusters.

Likewise, clusters for each of the other three types of supply chain can be configured with the appropriate mix of disciplines and mindsets. Surely this is the area where HRM professionals can play a major role working with functional and cluster heads to engineer the required configurations.

Lean Supply Chain	
<b>FOCUS</b>	<b>HIGH VOLUME; LOW VARIETY; LOW COST; MTF</b>
<b>BUSINESS STRATEGY</b>	<ul style="list-style-type: none"> <li>▪ Seek economies of scale</li> <li>▪ Low cost production</li> <li>▪ Forecast demand; mature products; predictable lead times</li> <li>▪ High reliability</li> </ul>
<b>CULTURAL LEVERS</b> <ul style="list-style-type: none"> <li>▪ OD</li> <li>▪ People positioning</li> <li>▪ Processes</li> <li>▪ IT/Systems</li> <li>▪ KPIs</li> <li>▪ Incentives</li> <li>▪ Job Design</li> <li>▪ Internal Coms.</li> <li>▪ T &amp; D</li> <li>▪ Role Modelling</li> <li>▪ Recruitment</li> </ul>	<b>'HIERARCHICAL' SUB-CULTURE</b> <ul style="list-style-type: none"> <li>▪ Organize 'clusters' around core processes</li> <li>▪ Ensure 'clusters' have bias towards personnel with 'S' in their MBTI profile</li> <li>▪ Re-engineer all processes and standardize</li> <li>▪ Replace legacy systems with ERP system</li> <li>▪ DIFOTEF; forecast accuracy; 'unit cost'</li> <li>▪ Conformance to buying policies</li> <li>▪ Centralized control – rules and regulations apply</li> <li>▪ Regular; structured; 'need-to-know' basis only</li> <li>▪ Emphasis on analysis and measurement</li> <li>▪ Managers with ISTJ (A) MBTI profile are ideal</li> <li>▪ Recruit players with deep analytical skills</li> </ul>
<b>LEADERSHIP STYLE</b>	<b>TRADITIONAL</b> <ul style="list-style-type: none"> <li>▪ Leads by procedure; precedent essential</li> <li>▪ Implements only proven business practices</li> <li>▪ Cost controller; efficiency focus</li> <li>▪ Uses information to control</li> <li>▪ Seeks stability</li> <li>▪ Risk averse</li> </ul>

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**Figure 2** Lean Supply Chain

- Positioning people in the appropriate role. That is, square “pegs” in square hole. This is where the fine – tuning begins. Personnel are closely reviewed in terms of their technical skills and mindsets, using such techniques as the Mayers Briggs Type Indicator (MBTI) for the latter to ensure that they “fit” any roles they are appointed to. We are talking about nuances here, but they count tremendously towards organizational effectiveness at the aggregate level. The days of wiping out whole layers of management are gone. Looking back, that was born of ignorance and heavy – handedness.
- Process re-engineering. There are no mysteries here, but the key is to ensure that the primary processes which align with each supply chain type or pathway are in place. They become standard and are invoked by the cluster as required.
- Information technology & systems. These simply mimic and institutionalize the processes already established through enlightened re-engineering. The problem to date has been that organizations have been throwing the full gambit of systems technology at every type of customer situation, without discrimination, looking in vain for the silver “bullet”. However, there is no such thing in supply chain management. What we need is an underpinning ERP system to provide one version of the truth, and then interface this with different combinations of IT applications. So, for example the main application servicing the collaborative customer segment might be a Customer Relation Management (CRM) system. It will help us manage the loyal high – value customers in the way they expect where relationships and trust are paramount.

Agile Supply Chain	
FOCUS	MANAGE ENTERPRISE FOR RESPONSIVENESS; QUICK RESPONSE; MTO
BUSINESS STRATEGY	<ul style="list-style-type: none"> <li>▪ Fast decision making</li> <li>▪ Fast delivery; flexible schedule</li> <li>▪ Rapid response in unpredictable conditions</li> <li>▪ Available capacity</li> <li>▪ Postponement techniques</li> </ul>
CULTURAL LEVERS <ul style="list-style-type: none"> <li>▪ OD</li> <li>▪ People positioning</li> <li>▪ Processes</li> <li>▪ IT/Systems</li> <li>▪ KPIs</li> <li>▪ Incentives</li> <li>▪ Job Design</li> <li>▪ Internal Coms.</li> <li>▪ T &amp; D</li> <li>▪ Role Modelling</li> <li>▪ Recruitment</li> </ul>	“RATIONAL” SUB-CULTURE <ul style="list-style-type: none"> <li>▪ Build on ‘speed’ cluster</li> <li>▪ Ensure bias in team is towards personnel with ‘N’ in the MBTI profile</li> <li>▪ Minimise number of processes; re-engineer</li> <li>▪ Install software applications such as SCP; APS; NoM</li> <li>▪ Absolute speed of response</li> <li>▪ Achieve targets; cash and in-kind bonuses</li> <li>▪ Authority/autonomy established by clear and published limits</li> <li>▪ Formal; regular; action-oriented</li> <li>▪ Problem-solving; resource allocation and management</li> <li>▪ Managers with ENTJ (P) MBTI profile are ideal</li> <li>▪ Recruit personnel who are results-driven</li> </ul>
LEADERSHIP STYLE	COMPANY BARON <ul style="list-style-type: none"> <li>▪ Leads by objectives (MBO)</li> <li>▪ Embraces change</li> <li>▪ Goes for growth</li> <li>▪ Focuses on what’s important</li> <li>▪ Analytical; fact-based negotiations</li> </ul>

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**Figure 3** Agile Supply Chain

- Key Performance Indicators (KPIs). This is an area of management that seriously impacts on performance, yet is so badly understood. People will do what's inspected, not what's expected. So we have to use this principal in framing the KPIs unique to each type of supply chain. Out with the so called "balanced scorecards" and in with a few very carefully selected KPIs, purposefully designed to faithfully signal what management wants people in the firm to do.
- Incentives. These are the mirror image of the KPIs, selected especially to particular situations. It's a matter of "horses for courses". What are the most appropriate incentives for personnel who are themselves steeped in relationship-building and maintenance? Is it cash? or is it something in kind that will further motivate them? Again, over to HRM professionals to figure this out.

Fully Flexible Supply Chain	
FOCUS	HEDGE AND DISPLAY RECOURCES
VALUE PROPOSITION	<ul style="list-style-type: none"> <li>▪ Meet unplanned/unplannable demand</li> <li>▪ Innovate solutions, delivered extra fast</li> <li>▪ Extensive human intervention</li> <li>▪ Have certain suppliers ear-marked for emergency situations</li> <li>▪ Encourage capacity build among selected suppliers</li> </ul>
CULTURAL LEVERS <ul style="list-style-type: none"> <li>▪ OD</li> <li>▪ People positioning</li> <li>▪ Processes</li> <li>▪ IT/Systems</li> <li>▪ KPIs</li> <li>▪ Incentives</li> <li>▪ Job Design</li> <li>▪ Internal Coms.</li> <li>▪ T &amp; D</li> <li>▪ Role Modelling</li> <li>▪ Recruitment</li> </ul>	ENTREPRENEURIAL SUB-CULTURE <ul style="list-style-type: none"> <li>▪ A single problem solving 'cluster'</li> <li>▪ Ensure bias in the 'cluster' toward personnel with 'P' in their MBTI profile</li> <li>▪ Very few if any. Decisions made locally to suit situation</li> <li>▪ Use whatever systems applications necessary</li> <li>▪ Emphasis on finding creative solutions to problems, very fast</li> <li>▪ Reward individual effort and risk-taking</li> <li>▪ Autonomy through empowerment</li> <li>▪ Spontaneous and informal</li> <li>▪ Lateral thinking</li> <li>▪ Managers with ENFP (D) MBTI profile are ideal</li> <li>▪ Recruit enterprising, resourceful personnel</li> </ul>
LEADERSHIP STYLE	VISIONARY <ul style="list-style-type: none"> <li>▪ Leads by inspiration, is authentic</li> <li>▪ Informal</li> <li>▪ Decisive</li> <li>▪ Values innovation</li> <li>▪ Values knowledge</li> <li>▪ Expects sub-ordinates to take accountability</li> </ul>

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**Figure 4** Fully Flexible Supply Chains

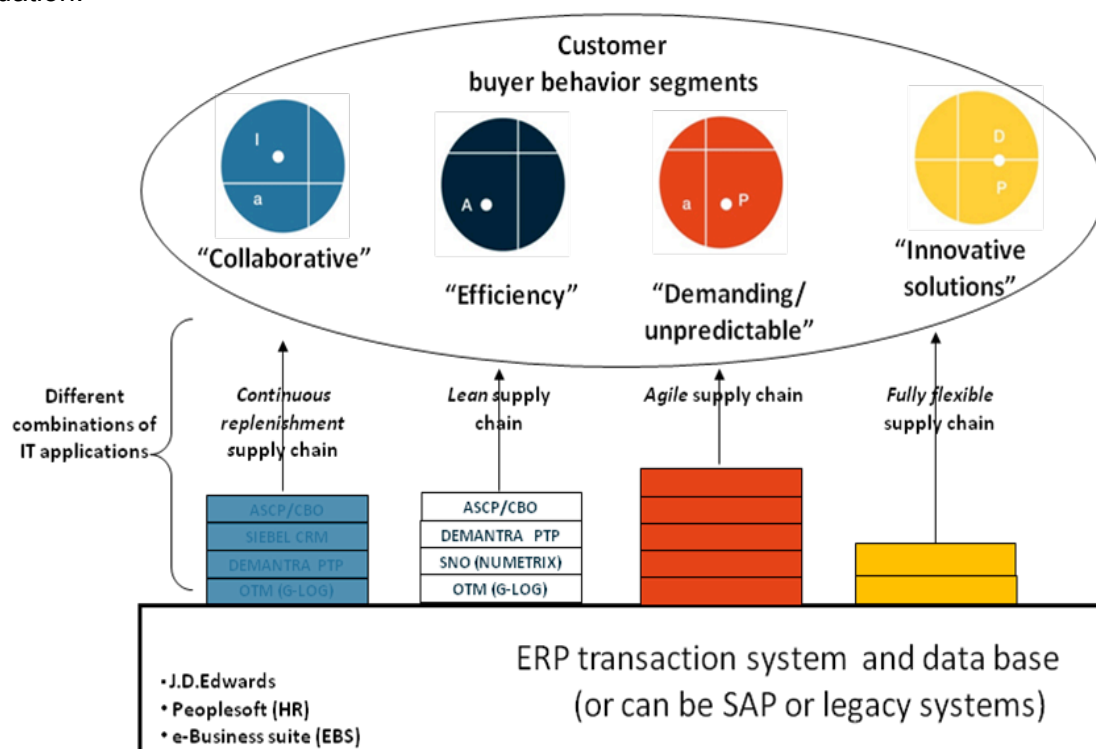
- Internal communications. Different subcultures have different communication styles. The trick is to embed the style that best aligns with the subculture the enterprise is trying to shape. In the case of the organizational cluster driving the continues replenishment supply chain, this is likely very inclusive, with actions only being taken after a consensus is reached. To be fair, this can sometimes be a slow down out process but, then again, when you are servicing this of relation focus customer, time is on the side of the enterprise. Nothing changes fast. Everything is a result of a lot of thoughtful consideration. So the cluster is just reflecting that trait.



- Training & development. Here we expect that HRM professionals will design and conduct a Personal Development Program (PDP) for each and every individual executive. Gone are the days of spending big on mass training initiatives. This was wasteful at best and a dereliction of duty at worst.
- Recruitment. This parameter represents a very powerful force for “genetically engineering” selected subcultures in an organization to reflect the external market structure. Recently a number of recruitment firms, thankfully, “get it” and actively engaged delivering individuals to enterprises that meet technical, experiential and mindset parameter.
- Leadership style. Finally, there is overarching influence of leadership style that is perhaps as important as shaping subcultures in enterprise organization design. Here again there are plenty of sophisticated tools available to HRM professionals to measure and monitor management and leadership styles. HRM professionals can assist management by helping and advising in the formation of the various clusters and in particular, which individual executive is appropriate for the particular leadership role being considered.

## 5. Technology is a wonderful thing

There is still too much emphasis on technology as the likely “silver bullet” which is going to solve all the problems of underperforming enterprises; this will never be the case. Nevertheless, too many enterprises are throwing every type of system at their supply chains, with little thought as to what designs do and don’t work. Too often, large system implementations are justified on the basis of false premises - for example inventory reduction and increased stock – turns – when they should be seen as strategic investment and foundation.



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**Figure 5** Requisite technology for supply chains



The false is obvious. The top management of every enterprise must have clear in their mind that the specific configuration of technology, depends largely on the structure of the market being served and the corresponding behaviour segmentation. This in turn informs what processes are most appropriate for each major segment, and technology that underpins these processes simply follows. It is simply clear; each type of supply chain will require a different technology recipe to achieve close alignment with the corresponding segment (Figure 5).

Each supply chain type has a different technology emphasis. So back to our original theme which requires us to mix and match the applications that sit on top of the ERP, like “pimples on a pumpkin”

Continuous replenishment supply chains. This is the genuine “collaborative” zone, and here the primary, indeed only emphasis, is keeping the relationship going with our most loyal customers. Most of the time these are 20% of customers of any enterprise, but they could easily present 60%-80% of its revenues and 80% of its profitability. In this segment the customer account management process is the key in this situation and should be underpinned by a suite of applications such as:

- Customer Relation Management (CRM)
- Vendor Management Inventory (VMI)
- Collaborative, Planning, Forecasting & Replenishment (CPFR)
- Supplier Relationship Management (SRM). This system is required for the supply site of the enterprise where relationships with strategic suppliers are critical.

Lean supply chains. In this situation the emphasis moves away from the loyalty and retention of loyal customers to simple focus on efficiency and lowest cost to serve. The primary technology is the ERP system, supplemented by a network optimization modelling tools which is interfaced directly to ERP. Other execution systems such as Labour Management System (LMS) for scheduling the workforce and keeping the cost down, and an Automated Data Capture (ADC) system will be invaluable in keeping track of stock and triggering replenishment protocols.

Agile Supply Chains. Here the emphasis changes to absolute speed of response, even if that costs more! The name of the game when serving high demanding customers in an unpredictable environment is to have the capacity already available – it’s too late to scramble for capacity when demanding customers come calling, and of course they never give a forecast in advance.

The trick is to reduce the number of processes to a minimum and to use technology to quickly run viable scenarios to fulfil the demands. Likewise with suppliers where the enterprise is pushing them for an emergency order that was not in the original forecast.

Here the recipe is to develop and use a range of tools and techniques like production postponement, modular production, network optimisation etc, which make the enterprise capable to respond quickly at low cost. In this orientation tools like Supply Chain Planning (SCP), Customer Account Profitability (CAP), Advanced Planning & Scheduling (APS) etc could support the effectiveness of the enterprises processes.

Fully flexible supply chains. This is a “catch all” supply chain configuration that uses a high degree of human intervention, and potentially any and all systems as required, to produce an innovative solution in quick time for the customer, who at this stage doesn’t care about the price. The situation is hurting them so much that they just want a solution, and very often it is only one supply chain that has a chance of finding a solution in such a short timeframe. This type of supply chain uses whatever it takes to get a satisfactory result for the customer, and the technology can be sophisticated or basic.

## 6. The KPIs

All we know from bitter experience that “people do what’s inspected, not what’s expected”! The essential point is that we should select and use a few KPIs with each type of supply chain, and the emphasis will, by definition, be different in each case (Figure 6).

Continuous replenishment supply chains – Where relationships matter most. Here, we are measuring such factors as: length of customer relationship; the degree of information being shared both ways and the percentage that we, as supplier, represent of a particular customer’s spend in a particular product category. The focus is on service reliability and retention of relationship over the long term.

To engage customers of the collaborative type in this way we need to create a “relationship” subculture inside the business, which goes well beyond most commentators’ process approach towards the subject of performance measurement and management.

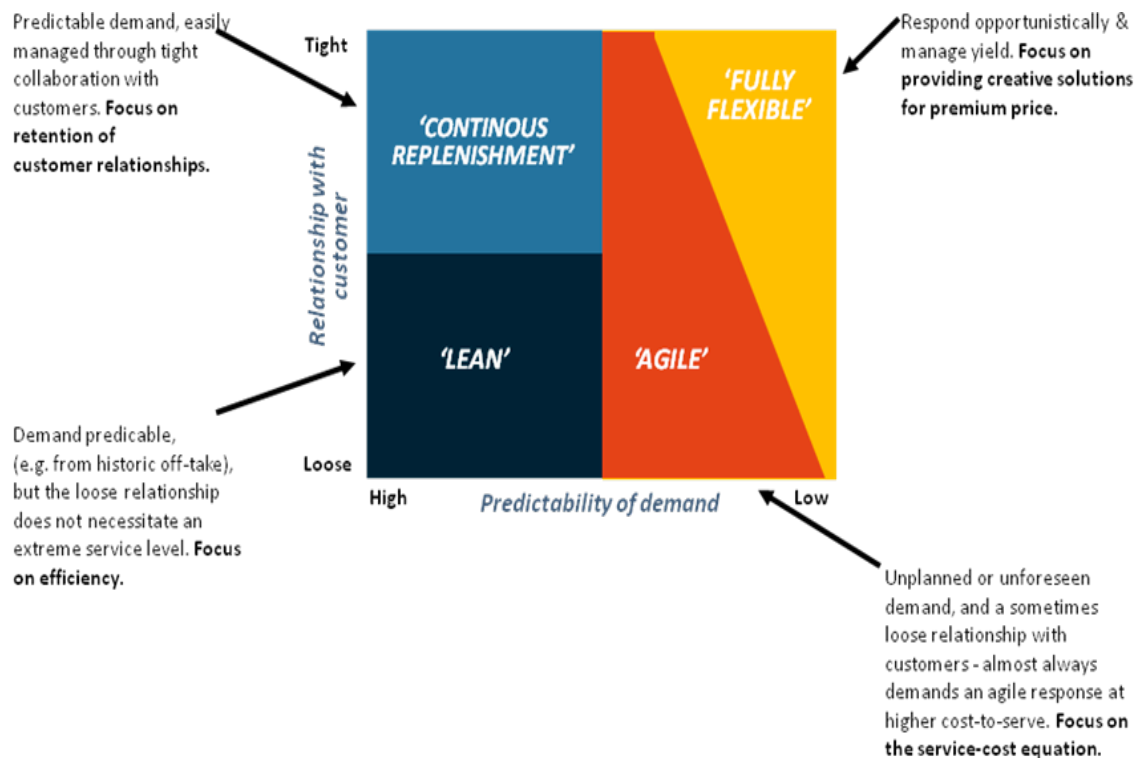
Lean supply chains – Where the focus is on efficiency and lowest cost to serve. In this type of supply chains we are bent on delivering a low cost predictable service to customers who otherwise don’t care for extras. In terms of measures, those that come to fore are forecast accuracy, Delivery – In – Full – On – Time (DIFOT); cost per unit and selected productivity ratios. Nothing else matters much. So inside our organization we need to encourage a “cost – controlling” subculture that puts conformance to policy right up there in lights. This is not a place for mavericks.

Agile supply chains – Where quick response is paramount. The emphasis in this type of supply chain moves from reliability to time sensitivity. How long does it take us to respond to the customer’s request, even though we did not know it was coming? This is the world of unpredictability, and serving and thriving requires wholly different capabilities. We measure time to respond and we measure the capacity of the supply chain at vital points along the pathway to customers. It is a case of optimizing our resources than maximizing utilization, because by definition, serving customers in this mode means that we need to design in redundancy, and that costs money, which customers must be prepared to pay for at some point.

The corresponded subculture is “aggressively customer – focused” and bent on speed. This is not a place for long – drawn – out of processes of consensus – seeking. This is a place for action.

Fully flexible supply chains – Where nothing is impossible. This type of supply chain is designed to respond to the unplannable event and is therefore hard on resource usage. We are not bothered about cost, or utilization, or even relationships in this type of supply chain – only getting an acceptable result for customer, very fast. We see elements of this type in emergency or humanitarian operations, in breakdown situations and in military operations.

The subculture inside the organization is very “can – do”, and everything and anyone who can assist in getting the desired results is drawn into the effort. There are little or no concerns about cost because “no-fix” means even greater cost. Creativity and innovation are the key characteristics in this type of supply chain.



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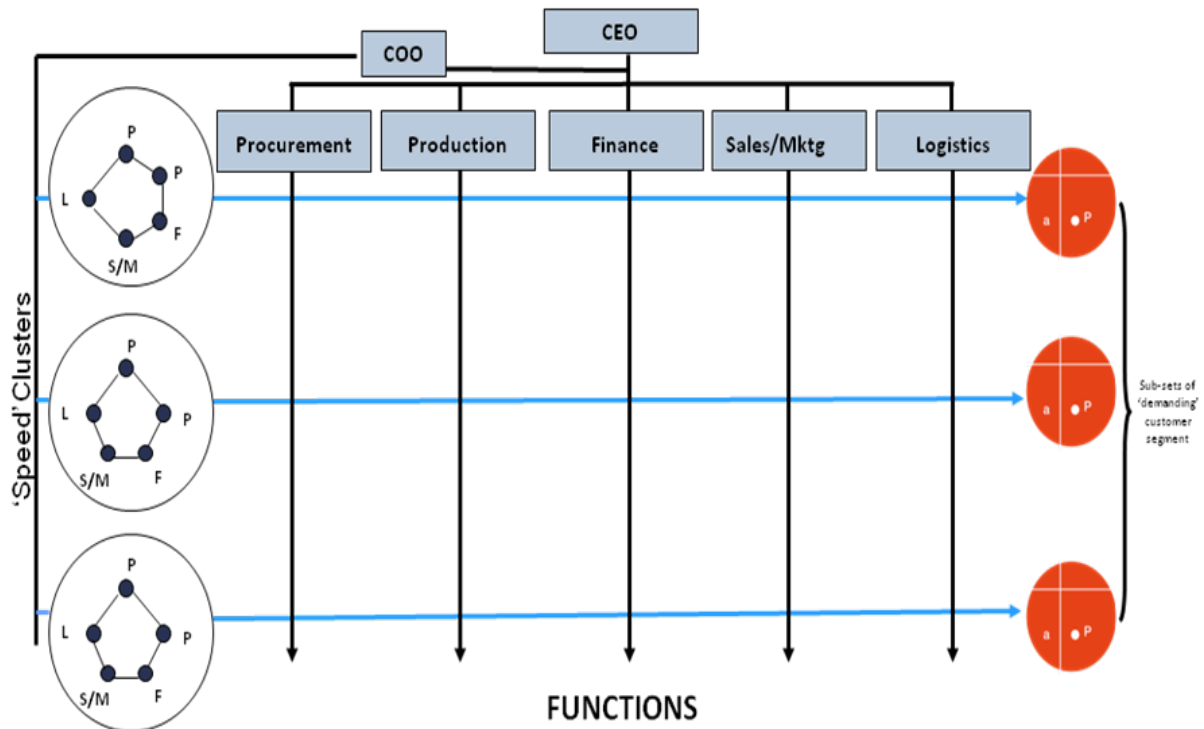
**Figure 6** KPI's focus in the four generic supply chains

## 7. Designing a peak performance enterprise

As discussed earlier, the key is organization design which has in place organizational “clusters” that power the different types of supply chain configuration, based on customer demand patterns, and have mechanisms in place to link the various clusters in situations (Figure 7).

The approach is to have strong functional specialisms where specific capabilities are developed and reside a customer centric teams composed of representatives of all appropriate functions necessary to fully “align” with customer expectations.

The customer centric clusters are multidisciplinary by nature – personnel are seconded into them from time to time to suit the particular customer type being served.



**Figure 7** Indicative agile supply chain clusters

So, for those relatively few customers whom we have identified as genuinely “collaborative” we will engage continuous replenishment supply chain driven by clusters of personnel seconded from the vertical functions.

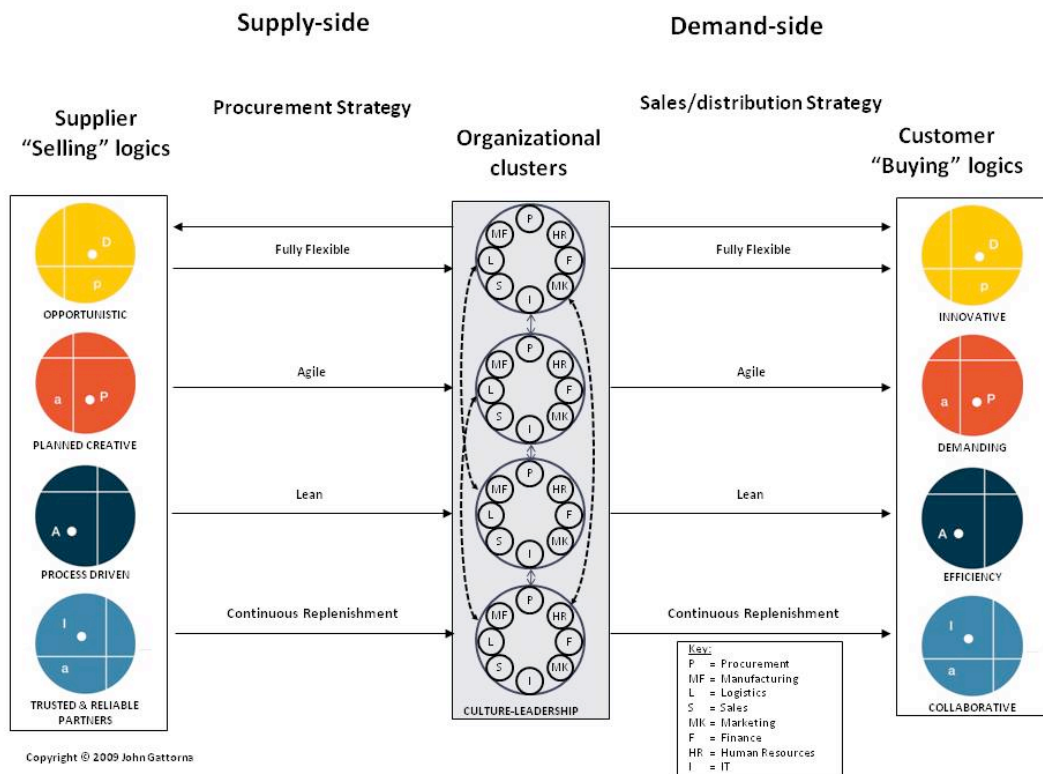
These customers – centric “relationships” clusters will be accountable for meeting customers’ expectations, and the functions are there to support as required. The customer – centric clusters, however many these are, all report to a line executive, probably to the COO.

To serve those customers in the price – sensitive / efficiency segment we need something very different. Here, the emphasis is in refining the various processes involved to deliver the lowest possible cost to serve via the lean supply chain configuration.

However, this time, each cluster focuses on a major process rather than a customer, and the various processes come together to deliver the lowest cost and most consistent service possible for the particular segment.

In order to satisfy those customers who demand a quick response in an otherwise unpredictable market place, we need something different again. In this situation, the multidisciplinary clusters are designed for speed, and the bias embedded in the agile supply chains serving these demanding customers is just that – speed.

Finally, in cases of unexpected events or crises, the fully flexible supply chain configuration is required to deliver innovation solutions, super fast.



**Figure 8** A new & dynamic business model for supply chains of the future

## 8. Conclusion

We are really saying if we want to develop a sustainable, profitable business going forward, there are four things we have to line up. First of all, we have to understand our marketplace much better than most companies do at the moment. We then have to develop some sort of response to that marketplace; develop business strategies which are appropriate. And then underneath that, inside our company we have to look very hard at the internal cultural capability of the firm, and beyond that, of course the leadership style. Of all the factors that shape human behaviour on the ground, the two most powerful are leadership and organization design.

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# Analysis of Training Needs and Life-Long Learning Attitudes for SMEs Managers - Outcomes from Empirical Research

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Life-long learning is a must in the new realms of dynamic and complex global environment. New professions constantly emerge requiring new skills and competences. Companies need to fastly adapt to the current situation and therefore have to progressively improve skillset and competences of their employees. The present research aims to identify how managers and owners of SMEs understand the role of life-long learning and what are their basic considerations concerning vocational training and human resource development. Analysis of empirical data, summarizing the outputs of 7 LLP projects in the last years will be presented. There will be outlined SMEs principle vision for life-long learning, preferences for specific forms and instruments for VET learning, analysis of preferred training characteristics and training providers. The research paper will analyze specific training gaps and will propose suitable strategies to be adopted by training providers. Finally the paper will present the NETCOACH project (funded by Leonardo da Vinci program, LLP 2010-2012), and its SME learning strategy, based on learning-by-searching approach and on-line coaching instruments.

## **Keywords**

New competences, Life-long learning, Training needs, SMEs

## **1. Introduction**

Within the knowledge-based society, knowledge and competences are identified as key factors for economic development and company progress. Small and medium sized companies (SME) are recognized as more competitive, innovative, flexible, entrepreneurial and market-oriented. SMEs are key drivers for economic growth, innovation, employment and social integration [1]. Moreover, the specific role of SMEs as leading factor for regional development has been recognized and admitted on EU level, and therefore specific instruments and policies for SMEs development has been adopted [1]. The European Commission has issued number of policy documents, aiming to promote successful entrepreneurship and improve the business environment for SMEs, to allow them to realize their full potential in today's global economy [1].

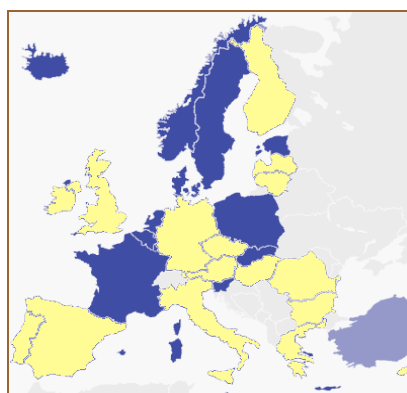
On the other hand, the OECD report [2] highlights that SMEs are less likely to obtain management training than larger firms due to financial constraints, information gaps and other factors. Moreover, the situation of SMEs training can be characterised by a paradox [3], because on one hand continuous training and lifelong learning (both for workers and managerial staff) are regarded as crucial elements of competitiveness against the backdrop of globalisation. But on the other hand however, statistics show that continuous training and qualification are less likely to be available to employees working in SMEs than to those in large companies. A recent report of OECD [4] identifies some of the barriers for SMEs trainings including high costs, difficulty of interrupting production ("no time") and of accessing

training at a suitable time or location. A particular problem for policy makers and training providers is that smaller firms are relatively and absolutely less likely to provide external training than larger enterprises to all grades of workers [5]. It should be highlighted that SMEs largely vary by nature, by scope and activity, and therefore their training needs cannot be generalized. However, statistics reveal that SMEs managers are hesitating to train key employees, and further conflict is identified for training certification (making employees more appreciated on labour market). Moreover, the authors highlight that not the SME size but their growth perspectives are leading SMEs to conduct more trainings [5].

The present research aims to investigate how SMEs managers perceive knowledge acquisition and what are their preferences for life-long learning methods, techniques and approaches. The objectives of the analysis is to present to training providers and policy makers more specific information and recommendation about SMEs expectations. This will allow interested partners to tailor better SME-oriented training offerings and support mechanisms. SMEs learning patterns are increasingly important not only because of the fast economic and technological changes in the global environment, but reflect as well the ability of SMEs to survive the recent economic downturn. Therefore there will be discussed some of the key conclusions and assumptions about SMEs managers attitudes for life-long-learning and training, made within several reports during LLP projects [6]. The first part of the research will outline the conclusions of 6 LLP projects (Table1). They are based on empirical data collected in the period 2003-2011. The methodologies for collecting empirical data include questionnaire-based surveys within several EU countries. Respondents usually vary in number from country to country, but they are relevant to European context. The second part will analyze the outputs of TNA report for NETCOACH, conducted in 2011 [7]. The conclusions will aim to serve training providers and training institutions providing vocational training services for SMEs. They will be useful as well for policy-makers and NGOs, who need to identify how to better support SME development.

## 2. Methodology

The first part of the paper will summarize the outcomes of training needs analysis (TNA) reports, part of 6 life-long-learn projects funded under program Leonardo da Vinci (table 1). The investigated 6 TNA reports provide a general overview of training preferences for more than 900 respondents from 16 EU countries – A, Bg, Cz, Cy, De, Fi, Gr, Hu, Ir, It, Lv, Li, Pt, Ro, Sp, Uk (figure 1). It has to be highlighted that the obtained results cannot be compared directly due to variations in the survey methodology, form of the survey and questions used, group sample and thematic scope. However, the conclusions can be coherently integrated and compared to contribute for better understanding of SME managers training needs and preferences.



**Figure 1** EU countries that took part in the TNA surveys (yellow)

The first part of the report provides conclusions of the 6 TNA reports, conducted between 2003 and 2009 (Table1). Then, there are presented the outcomes of the NETCOACH training needs analysis report and its further recommendations.

**Table 1** LLP Projects and TNA analysis reports

<b>Project name</b>	<b>Respo ndents</b>	<b>Countries</b>	<b>Project topic</b>
InnoSupport 2003 [8]	53	DE, UK, GR, LV, RO	Innovation management
TRACTORS 2007[9]	167	Sp, Gr, Ir, A, It, Li	Innovation management
Trainmor- Knowmore 2006[10]	177	Gr, Ir, A, BG, Ro, Cy, De	Knowledge management
SLET 2007 [11]	n.a.	BG, FI, GE, GR, HU, IR, LV	e-tendering
TrainSME 2005[12]	274	Fi, A, BG, Cz, GR, DE, HU	Training of SMEs
Strategy-train 2009[13]	194	Gr, Ir, A, DE, BG, FI, Pt,	Strategy management

As the TNA analyses reports have been prepared by different partners and following different methodologies, the direct comparisons of the results will not be suitable. Moreover, some of the expressed trends and conclusions can be misleading now, due to the changed expectations and new economic realms after the financial crisis. The main concern of the research is to investigate how specifically TNA identify the preferences of SMEs for training methodology and training delivery methods, including tools and e-learning instruments. Specific questions will highlight the use of e-learning, personal learning preferences, preferred technologies. Moreover, barriers and difficulties for LLL implementation will be highlighted.

## **2.1. Summary of 6 TNA reports**

As general conclusion of TNA reports can be selected that overall SMEs managers prefer training solutions structured to fulfill specific company needs. Moreover, learning programs should be task-specific (process and task-oriented learning), short-term, based on modular principle. SME managers report interest to combine VET training programs with networking events with peers, based on interactive training approaches. Therefore training content should be practical, based on case studies, practical tools, benchmarking, and delivered in combination with on-line platforms. One interesting note is that the majority of SME managers prefer training organized during working hours. An increased interest is shown to on-line short modules and self-learning on-line lessons.

For training providers, SMEs trust most on private training companies, as they are easily recognized as experts not only because of mastering specific knowledge and skills, but because they tend to better understand the market-dynamics and to be focused on business issues. On second place are identified mentors/consultants that combine both one-to-one mentoring and continuous company consultations and interventions over longer periods. Professional training institutions come on third place, delivering standard on-the-shelf learning courses.

The preferred training environment combines training with networking events and interactive peers discussions. Managers highlight the importance of peer group management activities, including networking and benchmarking, using on-line materials and communication platforms. On second place they prefer on-site training (in company offices), followed by on-



line platforms and discussion forums. The SME managers select as the most suitable training tools: workshops and seminars (80% of the responses) and e-learning platform (66% of the responses). The less preferred training tools include CD-ROM (approx. 53%) and handbook (47%).

In general SMEs report different difficulties for finding relevant learning solutions. They declare that in general there lack learning solutions adapted for SMEs needs (65% of respondents). The general nature of current vocational programmes is not suitable for small businesses when assessed against the diverse needs of owner/managers; On the second place are put the cost of the courses (64% of respondents) and time limits (63% of respondents) as substantial constraints for SME businesses. European SMEs don't find appropriate training solutions to be locally available (61% of respondents). Not last, SMEs owner/managers lack understanding for their own deficiencies or lack of knowledge.

In conclusion, it can be stated that SMEs managers need to receive market-oriented evidences to approach training solutions. These arguments may include direct transfer of knowledge (training + consultation), networking (training + networking), or specific solutions to specific problems (case studies, process-oriented training).

### **3. NETCOACH outcomes**

The NETCOACH project aims to integrate and transfer good practices of 5 other successful LLP projects and facilitate SME access to them. It will focus specifically to provide valuable support and training for SMEs managers in four important subjects – Creativity and Innovation Management, Knowledge management, E-Business and Integrated management solutions. Thus specific characteristics and preferences for training and coaching of the SME management target group have to be detailly investigated and examined.

A TNA survey was conducted in February 2011 in 5 partner countries – Ireland, Austria, Bulgaria, Portugal and Germany. The on-line platform <http://www.kwiksurveys.com> was used for conducting the surveys and for analysis of the results. The partners succeeded to fulfill the number of 138 respondents – managers and entrepreneurs, who represent the main target group of the project. The survey was composed of 4 main parts: Needs of Trainings, Interest for training in specific domains (related to the project), Preferred form of training and finally Company & Private data.

The first part of the questionnaire aimed to identify the current practices of managers and entrepreneurs to find relevant information and specialized help. After that they were asked to make some general observations and expectations for the near future (during the next 1-3 years). The second part discovered areas of specific interest for entrepreneurs and managers. The idea behind was to identify how to best structure the information available from other projects, in order to achieve better visibility and fit to the SMEs managers preferences. The third part aimed to review the preferred forms and methodologies for VET learning. The last section collected general information for company and for managers that took part in the survey. Filling the last section was optional but it allowed project partners to identify interested managers and entrepreneurs and to make initial lists of interested companies and individuals.

#### **3.1 Netcoach survey general conclusions**

The NETCOACH survey aimed to identify needs for training, training preferences and training topics identified by SMEs managers and to combine online business coach with training providing. The first question asked how often SME managers use different channels for finding additional information and help for specific business problems. The responses were grouped in 2 categories – asking for help from people and finding relevant information from specific information sources. It was found that in case of problem, the majority of SMEs

entrepreneurs and managers look for help in Internet using search engines. Therefore, locating relevant information and training materials in Internet, well indexed by search engines will have the highest impact for the target group. 35% of respondents use Internet daily to find solution of specific business problem. About 22% of the respondents go daily (and 20% weekly) on specific expert sites in Internet, where they know they can find specific information and advice. However, statistics show that managers largely rely on in-house experts to solve specific problems. Therefore training of employees is considered as important factor for company development. Some other conclusions can be made from the data obtained:

1. Managers prefer to discuss problems with other individuals. As employees and experts from the company are easily available they are often the first choice. More rarely managers consult other business professionals or friends. Occasionally and for bigger problems managers can ask for advice specialized consulting companies. This is very important to highlight that SMEs managers don't want to get deeper in the specific problems, they prefer to look for advice from other individuals (more specifically in-house expert) or professionals and experts in the field before taking decision. Therefore managers attitude is to go for advice and not for training.

2. Managers rarely look for specific theoretical information and training for specific business problem outside Internet. On one side Internet provide fast access to wide sources of information, but on the other side managers don't look to become themselves experts in the specific field. Their main concern is to cope with multiple daily problems. Therefore 81% of respondents assume rarely or never to go deeper on focused training. Professional magazines and reviews are occasionally or never consulted (65%). 52% of managers reports that they use rarely or never specialized business literature, textbooks and business guides.

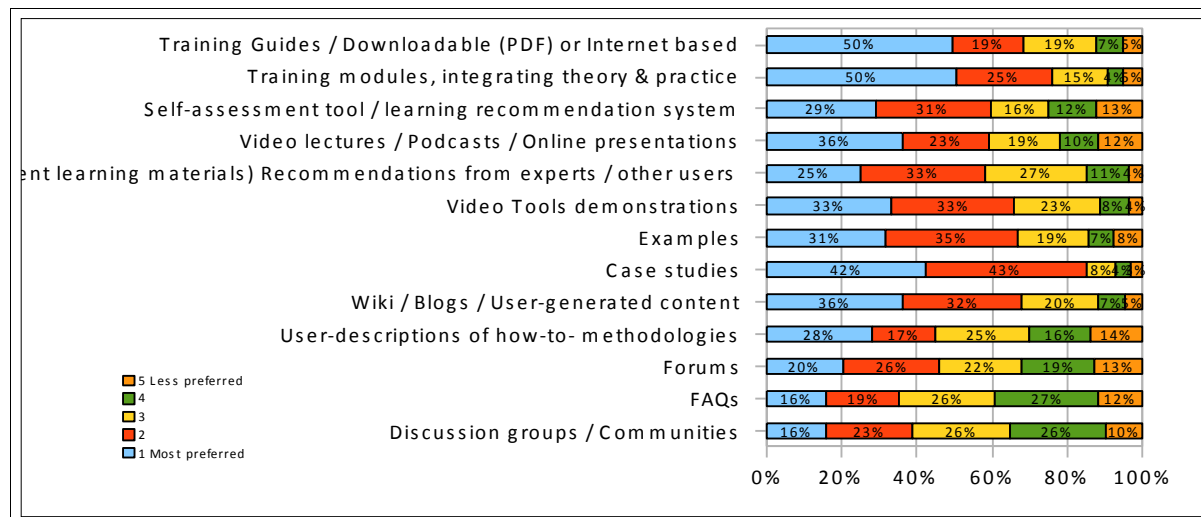
The analysis of these questions assumes that learning materials for SME managers should be available on-line and well indexed by search engines. Apart from this the content should not be presented only as learning or training content, but preferably as problem-based situations, where experts and other users report detailed problem situations and its possible solutions - how to cope with specific problem situation.

The second group of questions tried to identify the SME manager's plans for the near future (1-3 years). In general, it was discovered that managers are quite optimistic for the next future /1-3 years/. About 62% reported that they will launch new product or service, 66% assumed that they will enter in new business alliances and 57% said that they will most probably enter on new markets or change the main market of business operation.

The launch of new products or new services means innovations, intensive marketing research, production and process innovations, certifications (professional quality standards), infrastructure building and hiring new employees. About 46% of respondents expect to hire new expert staff. All these activities suppose intensive knowledge acquisition and potential training needs. Therefore it can be expected that following the severe global competition companies are forced to become more creative, flexible and innovative in order to survive. Another outcome of the survey is that wider group of managers consider as very probable to adopt e-business application in the next 3 years (43%), and more specifically to use social internet (59%), CRM systems (50%), or use e-business applications supporting internal processes (52%), sell or buy on-line (e-commerce). ICT become a norm in the business activity and many new business models are adopted via ICT technologies. However, e-business applications often remain hard-to understand for non-experts (and especially SMEs managers) and therefore ICT content should be specifically addressed and "translated" to business benefits in SME training context. A conclusion can be made that ICT can bring more innovations in business models and therefore SMEs trainings should include adoption of these new technologies for any of the business processes.

### 3.2. Specific Training format

According to fig.2 Managers prefer to receive downloadable or internet-based training guides and training modules integrating both theory and practice. Case studies and examples are highlighted as preferred training content. Video lectures, video tools and on-line presentations and user-generated content are appreciated methods as well.



**Figure 2** Preferred Training formats

SME managers consider following factors in order to select specific training: the practical focus of the training, qualification of the trainer and the training schedule. It is highlighted again that managers look for practical and relevant business-specific information. Another important factor is time, as managers need to leave their daily activities and thus time schedule is an argument. Cost, location and training materials are identified as other factors, influencing final decision. Finally, it is found that certification is not substantial factor for selecting training. Even recognition for prior and informal learning are not such relevant for SMEs managers;

Among the preferred training forms and providers is selected short-term training by training organization, followed by short-term training by business organization. Again, managers are focused on practical focus of the training. Self-learning organized in e-learning courses and options for certification are selected as next choice. The less preferred training for managers is academic training involving certification and degree.

Most of the managers don't need specific certificate for the training. However, among the options they preferred certificate issued by training institution, certificate by business association and recommendation from clients, as definitively more preferred than other choices.

On the question how much time could SMEs spend on training, most of the managers report between 5-10 hours per month. It shows that managers consider training of 1-to 2 hours per week as a possible option for their schedule. It should be considered again what the aspect of the training is (coaching, networking, problem solving or e-learning).

## 4. Conclusions

Most of the managers use Internet as main source for information and therefore SME training content should be available online. Moreover, SME managers only occasionally search for specific training content. That is why, the focus of VET trainings should be put on useful practical information, valuable for daily business operations. On the second place training

content should be oriented to practical issues and specific questions that managers need to resolve during their daily operations; Furthermore, managers do not need training per se, they expect specific situations, where they will need to be better prepared and need to have this specific knowledge how to cope with these situations. These situations are related to growth paradigm [6] and can include: launch of new products/services, entering new business alliances and co operations, entering new markets, implementing e-business applications, extending the use of social Internet, employment of new expert staff. These situations require interdisciplinary competences that are not covered by a specific learning course. Therefore, learning providers should facilitate SMEs managers to structure their own learning path based on specific situations and available learning modules.

SME managers are mostly interested in practical information, implementation issues, case studies and examples. Therefore, learning content should be specific, problem-oriented and practical. SME managers prefer to receive downloadable or internet-based training guides and training modules integrating theory and practice. Case studies and examples are highlighted as preferred training content. Video lectures, video tools, on-line presentations and user-generated content as wiki, blogs and others are selected as well.

Managers select specific training according to the following factors: practical focus of the training, qualification of the trainer and training schedule. And more specifically, SMEs managers look for business arguments to select specific training course. Therefore, learning providers should focus and tailor better training courses, in order to reach wider group.

The present document aimed to present the summary of lessons learned and main outcomes of the previous 7 LLP projects trainings needs analysis– InnoSupport, Trainmor-Knowmore, Tractor, TrainSME, Strategy-Train, Quality-SMEs, SLET and NETCOACH. Based on this we provided practical recommendations for SMEs managers training and learning patterns.

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- 8 *InnoSupport LLP project financed by EC; project web site: <http://www.innosupport.net/>*
- 9 *TRACTOR LLP project financed by EC; project web site: [www.train4creativity.eu/](http://www.train4creativity.eu/)*
- 10 *Trainmor-Knowmore: LLP project financed by EC; project web site: [www.trainmor-knowmore.eu](http://www.trainmor-knowmore.eu)*
- 11 *SLET LLP project financed by EC; project web site: <http://www.etender.info>*
- 12 *TRAIN Sme LLP project financed by EC; project web site: <http://www.merig.org/trainsme>*
- 13 *Strategy-Train LLP project financed by EC; project web site: [www.strategy-train.eu](http://www.strategy-train.eu)*

# Developing Entrepreneurship and Innovation Skills within TEL Ecosystem

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**Entrepreneurship and innovations are important factors for development of stable regions and sustainable economy. However entrepreneurship skills and innovative thinking could not be trained with traditional teaching methodologies. Therefore, active learning is widely applied and different innovative teaching approaches as learning by doing, practical exercises, virtual experiences and simulations should be explored. New technologies propose additional instruments for successful fostering development of entrepreneurship and innovation skills. In the last years, various Technology Enhanced Learning (TEL) instruments have been developed, designed with specific focus on entrepreneurship, SMEs and innovations. Based on different technologies, they cover instruments for optimized knowledge search and knowledge sharing, simulations, mobile and smart applications, community building, personalization techniques, content-related instruments and others. However often end-users- educators and trainees still miss practical information how they can access, combine and use these technologies. Therefore, the present research aims to identify how these TEL instruments can be integrated in unique TEL ecosystem and to propose a practical model for its further implementation.**

## **Keywords**

Entrepreneurship, Innovation, Technology Enhanced learning

## **1. Introduction**

Entrepreneurship and innovation are important factors for development of stable regions and sustainable economy, thus creating sustainable entrepreneurship. Here, sustainable entrepreneurship is observed as the one consisting of social, economic and environmental concerns of relevant internal and external stakeholders [1].

In the last decades, the emphasis on innovation of both small and medium enterprises (SMEs) on one side and big multi-national companies on the other side has contributed to transcending classical policy boundaries between industrial policy, environmental policy, science and technological policy [2]. Due to rapid growth and changes in technologies, and also due to ever-changing global economy and it's demands, entrepreneurship is nowadays rarely mentioned without innovativeness.

Knowing that both entrepreneurship skills and innovative efforts require a wide array and big amount of practical knowledge, it is appropriate to investigate the best ways to implant that needed knowledge to the economy's work force and managerial staffs.

This paper explores active learning activities that are needed for entrepreneurs to acquire relevant skills and innovative thinking. It does so by observing active learning and new learning technologies and based on that proposes an integrated TEL framework. Finally the

paper will outline some of the basic features of a project proposal entitled “Innovative learning technologies for Entrepreneurship and innovation in the SEE region - ILTES”.

## 2. Entrepreneurship Skills and Innovative Thinking

In both Europe and the United States policy makers believe that more entrepreneurship is required to reach higher levels of economic growth and innovation. The starting assumption that propels enhancing of entrepreneurship in these regions states that entrepreneurship is not a constant personal characteristic, rather - entrepreneurship skills can be taught. Following that assumption, policy makers believe that increased levels of entrepreneurship can be reached through education, especially through entrepreneurship education. To achieve this goal, governments of many European countries implement entrepreneurship education into their school curricula [3]. These efforts mostly have limited results, because they target only certain entrepreneurial skills, which are known to be easily improved; ignoring most of the important competencies. It is our belief that entrepreneurship can not be trained in traditional way in classroom settings; It involves new form of active-learning; participative learning; learning on real cases; learning in communities.

Some of the traits and skills observed as correlated with entrepreneurial success are shown in table 1 [4]. It is known that traits are relatively stable and hard to change with traditional teaching methodologies, but anecdotal evidence give us reason to believe these traits can be improved with alternative teaching methodologies suggested with this project.

**Table 1** Basic entrepreneur competencies: traits and skills

<b>Traits</b>	<b>Description</b>	<b>Improving</b>
Need for achievement	Striving for performance and setting high goals	difficult
Need for autonomy	Independent decision making, resolving problems on your own	difficult
Need for power	Having control over others in order to influence their behavior	difficult
Social orientation	Easily making social connections needed for idea realization	difficult
Self efficacy	Belief in one's own ability, can bring activities to successful ends	difficult
Endurance	Ability to continue willfully, in spite of obstacles and setbacks	difficult
Risk taking propensity	Ability to deal with uncertainty; willingness to of risking to take a loss	difficult
<b>Skills</b>		
Market awareness	Ability to sympathize with the needs of potential clients in business contexts	easy
Creativity	Viewing from different perspectives, turning problems into opportunities	easy
Flexibility	Ability to adapt to changes in environment	easy

Stimulating innovative thinking is found not to be an easy task, too. It is found, for example, that autonomy, guidance and support are critical components of innovative thinking [5].

Autonomy involves freedom to think and act independently, having control over one's own working processes. Guidance and support are often misinterpreted as opposite of autonomy, implying that one can not have autonomy while being guided and supported. The truth is that

people can be guided in general direction of their work, also getting support and sharing knowledge, while at the same time they being autonomous at what they do.

It is also shown that systematically listening to what the market asks for can also be observed as important part of innovative thinking [6].

### **3. Active Learning and New Technologies**

Active learning is widely accepted technique for developing competences and skills in entrepreneurship and innovation. The role of personal experiences and emotions are substantial for learning process and require improved pedagogical methods for providing high-level learning as learning-by-doing, situated learning, experiential learning, learning-by-observing, learning-by-role-playing and others. As [7] discover “only experience coupled with practice, thinking, questioning, challenging, guessing and trial and error creates the insight and experiences that lead to real understanding, comprehension and meaning”. Further, best learning with highest impact comes from direct experience [7], and that is why proactive, experience-gaining learning is better than reactive and passive learning [8].

The Kolb’s learning cycle [9] is one of the most enduring learning models, focusing on active learning, learning by doing and evaluation of learning experiences [10]. The Kolb model comprise 4 stages [9]:

1. Having an experience,
2. Reviewing the experience and reflecting on outcomes, seeking feedback from others.
3. Theorizing about what happened and why, then exploring options and alternatives.
4. Exploring ideas, concepts, theories, systems and models, interrelationships between ideas, events and situations, formulating own theories or models.

Thus, according to [10] the main learning sub-processes are: theory input, practical experience, application of theory and idea generation. While traditional learning methods suggest clear roles for knowledge transfer, clear knowledge-base and outcomes of learning, active and problem-oriented learning suppose less structured learning process. Teachers and lecturers do not dominate the learning process and their role changes from knowledge providers to knowledge facilitators and team-learning supporters. Active and problem based learning is usually developed in teams and groups, where learners actively collaborate and exchange ideas. In active and problem-based learning, the knowledge base is not seen as well identified and structured, but it is evolving with the time, enlarging and changing according to context and recent developments and often it is interdisciplinary. The outcomes of active learning are less structured because they involve not only finding appropriate solution for specific problem, but they include as well building soft skills as: team work, communication skills, knowledge sharing and presentation; learning to learn; result-oriented work; research and experimental skills and others. Therefore organization of learning experiences and assessment of learning outcomes from active and problem-based learning represent a challenge for educators and lecturers.

Entrepreneurship and innovations cannot be taught via traditional methods and there should be explored different innovative teaching approaches as learning by doing, practical exercises, virtual experiences and simulations. The aim of our research is to propose an ecosystem or a framework combining technologies and open innovations mechanisms as appropriate instruments for successful fostering development of entrepreneurship and innovation skills.

#### **3.1. Technology-enhanced Learning (TEL) for Active Learning**

Development of technology-enhanced learning is substantial part of the knowledge based society. Learning technologies fast evolve due to number of reasons:

- Fast changing environment and adoption of Life-long learning as a norm;
- Emergence of new smart technologies, allowing Internet access and easiness of interaction and collaboration (smart boards, smart phones etc)
- Adoption of new learning methodologies as complements to traditional learning and stand-alone applications – e-learning, blended learning, m-learning;
- Increase of social networks, learning communities, cooperation communities;
- High interest in new learning instruments as serious games, simulations and virtual worlds;
- Adoption of web 2.0 logic, sharing resources and open access to educational resources;

Every year new technologies find successfully their place within the educational process, extending pure e-learning systems. While not designed for educational purposes, many web 2.0 instruments as wiki, blogs and social network sites, and micro-blog as tweeter are implemented in class settings. Smart technologies change the learning experiences including smart boards, smart phone applications and tablets. Thinking in 3 dimensions is well explored in virtual world's simulations and serious games.

Although many of the new technologies are free for use, there still do not exists proper attitude how to apply new TEL advancements for enhancing education in entrepreneurship and innovation. We believe that especially in the SEE region development and implementation of new learning technologies will result in new market opportunities and perspectives both for the training institutions, trainers and professionals, students and others.

### ***3.2. Technology Enhanced Learning (TEL) Instruments with Focus on Entrepreneurship, SMEs and Innovations***

In the last years, various technology enhanced learning (TEL) instruments have been developed, designed with specific focus on entrepreneurship, SMEs and innovations.

Based on different technologies, TEL cover instruments for optimized knowledge search and knowledge sharing, simulations, mobile and smart applications, community building, personalization techniques, content-related instruments and others. TEL instruments as Serious games, virtual worlds, web 2.0 instruments and mobile learning applications have been widely adopted in learning scenarios. Moreover, different researches [11] prove that these instruments, and especially serious games and virtual worlds influence positively the formation of skills for entrepreneurship and innovation, because they:

- Improve communication and group work– facilitate communication, enable efficient teamwork and knowledge sharing, improve intercultural interactions, and limit prejudices and racism. Serious games and virtual worlds successfully create an immersive environment for language learning and help students to overcome foreign language barrier.
- Improve access to information and decision making. New TEL contribute for better use of ICT and train students to master rich media objects within complex learning environments. Provide access to knowledge bases and improve analytical skills and critical thinking.
- Improve active learning and context – new TEL support creative learning activities and experiences, proposing immersive context of knowledge use and area for experimentation and exploration of opportunities.

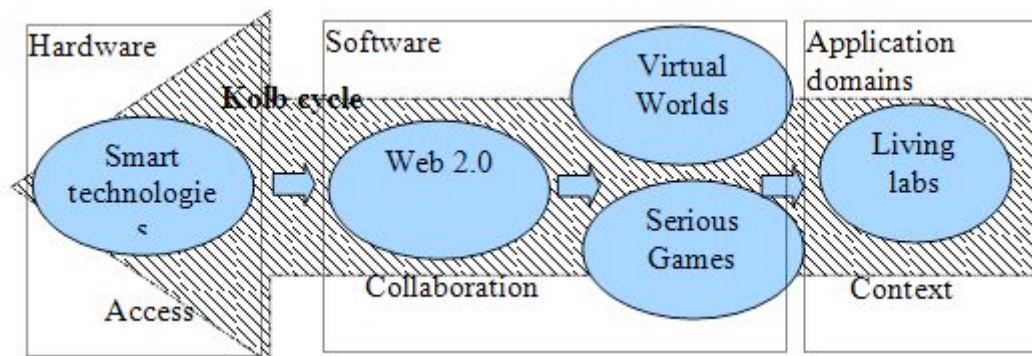
### ***3.3. Integration into TEL Ecosystem***

Often end-users, educators and trainees miss practical information how they can access, combine and use innovative TEL technologies. Therefore, the present research aims to



identify how these TEL instruments can be integrated in unique TEL ecosystem and to propose a practical model for its further implementation.

In order to develop an integrated ecosystem for active learning in the field of entrepreneurship and innovation, we will focus on three basic processes. As identified on Figure 1, the proposed TEL ecosystem is based on the learning cycle of Kolb and combine hardware, software and infrastructure elements.



**Figure 1** Integrated TEL ecosystem

1. Access to information: Adoption of innovative smart technologies in learning process improve information gathering and complex information processing. Smart handheld devices can be applied in emerging augmented reality applications, combining digital and physical objects. Any-time/anywhere paradigm, include improved connectivity, interactivity and access to learning experiences. Moreover, smart devices improve access to theoretical knowledge, to open systems and knowledge bases, especially for multimedia content.
2. Collaboration: Web 2.0 is already well adopted practice, but still academia institutions do not use its full potential concerning student-student interactions and teacher-student interactions. Although many web 2.0 systems are adopted in different courses including wikis, blogs, social network sites, micro-blogs, shared documents and others, good on-line discussions, researches and communication patterns are still not a norm. Web 2.0 area is already populated by end-users, but students still hesitate to recognize their active role in the Web 2.0 learning sites – to share and externalize knowledge and information with others via Web 2.0 instruments.
3. Serious games and virtual worlds represent software technologies for simulations that improve development of innovation and entrepreneurial skills, providing context, feedback, collaboration and involve active learning scenarios.
4. Context: active-based learning should be part of specific context and problem set. Usually educators in business, entrepreneurship and innovation courses use case studies and examples, that are part of textbooks or general data bases. Our approach is to use living lab paradigm and regional innovation ecosystem, in order to involve students to solve real local problems. Living labs (LL) is evolving concept, fast spreading around Europe (EnoLL). This is a form of user-driven open innovation ecosystem, based on a partnership which enables users to take an active part in the research, development and innovation process with product conception. It can be defined as “an environments for innovation and development where users are exposed to new solutions in (semi)realistic contexts, as part of medium- or long-term studies targeting evaluation of new solutions and discovery of innovation opportunities” [12]. This process has two main positive sides – students improve living labs activities, provide innovative solutions and get stimulating experience for organizations that they know. The second positive side is that companies and other members of living labs fast can recognize good ideas, good students and good opportunities for further cooperations with academic institutions. Involvement of living

labs in the ecosystem will increase knowledge transfer, capacity for knowledge absorption within companies, and visibility of research outcomes.

Based on the presented integrative framework, the idea of a project entitled “Innovative learning technologies for Entrepreneurship and innovation in the SEE region – ILTES” is developed. It aims to develop focused ecosystems for innovative training technologies fostering Entrepreneurship and innovation within SEE countries.

ILTES’s main objective is to develop innovative entrepreneurship technology ecosystem including advanced technologies such as: simulations (serious games and virtual worlds), Web 2.0 technologies, smart technologies and mobile platforms, and enriching it with open resources and living labs integration to the entrepreneurship education. Some of the outcomes of the project are: integrated training technology ecosystem, including technology platform with various services - instruments, resources, networks, communities and learning tools and innovative content- appropriate data base and case studies. Further, handbook and teaching methodologies for lecturers and pedagogical aspects will be developed and several seminars and workshops will be organized. This way, ILTES aims to improve not only understanding of educational professionals individually, but to build an overall community and ecosystem, that can better adapt with emergence of new educational technologies.

## 6. Conclusion

Although there is a big number of an advantage for application of TEL in entrepreneurship education, also there are many limitations for their widespread use. One of the constraints that remain is the need to adapt educational methodologies with new enhanced ICT methods. The analysis proves that innovative TEL 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 [13]. One other difficulty is the assessment of learning in innovative TEL environment. 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 TEL often are not part of the curriculum (collaborative work, visualization skills). Therefore, application of innovative TEL 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.

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# **Global Entrepreneurship and Development Index (GEDI) – Complex Measure of Relation between Entrepreneurship and Development in South-eastern European Countries**

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Complex measures like Global Entrepreneurship and Development Index (GEDI) create a basis for better and more detailed understanding of relation between entrepreneurship and economic development. Global Entrepreneurship and Development Index (GEDI) incorporates contextual characteristics of entrepreneurship by focusing on entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations. Global Entrepreneurship and Development Index (GEDI) is consisted of 14 pillars, 3 sub-indexes and one „super index“. Every pillar includes individual level and institutional level variable that corresponds with micro that is macro level of entrepreneurial aspects. Through analysis of Global Entrepreneurship and Development Index (GEDI) indicators for South-eastern European countries, it is possible to gain insight in important implications and create recommendations for improvement of state of entrepreneurship in South-eastern European countries, which will be additionally enabled through comparison of the results of innovation-driven economies, included in the analysis, that have supportive entrepreneurial environment, with results of efficiency-driven South-eastern European economies with insufficiently supportive entrepreneurial environment. The most part of the paper is dedicated to presentation of achieved results for the Global Entrepreneurship and Development Index of South-eastern European countries and their connection with the economic development. The aim of the paper is to emphasize the causality between entrepreneurship and economic development through prism of the Global Entrepreneurship and Development Index - GEDI, and on the basis of the research results to suggest recommendations for improvement of entrepreneurship in South-eastern European countries. Additional aim of the paper is to promote one new way of unique measurement of entrepreneurship within and between the countries.

## **Keywords**

Economic Development, Entrepreneurship, Global Entrepreneurship and Development Index (GEDI), South-eastern European countries

## 1. Introduction

Economists, for a longer period of time support the fact 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. One of the most popular divisions of world economies is the one based on level of economic development introduced by Michael Porter, who defined three stages of economic development: factor-driven stage, efficiency-driven stage and innovation-driven stage. All of the mentioned stages has certain specifics, and contribution that entrepreneurship provides to economic development varies in relation in which phase is economy.

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. In accordance with this, in previous period great level of importance was given to roles that institutions have in economic development of certain country, what confirm three large research projects of The World Bank, Heritage foundation and The World Economic Forum dedicated to quality measurement of institutions between the countries and during the time. At the other hand, research project the Global Entrepreneurship Monitor measures the business formation process in different countries.

However, there was no uniquely accepted measure of entrepreneurship within and between the countries, so taking in consideration the advantages and lacks of previous researches on entrepreneurship, two respectable researchers Zoltán J. Ács and László Szerb 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 and Development Index that incorporates the essence of the contextual characteristics of entrepreneurship and fills the gap in measuring of entrepreneurship and development.

South-eastern European countries, Bosnia and Herzegovina, Croatia, Greece, Macedonia, Romania, Serbia, Slovenia and Turkey participated in the project Global Entrepreneurship Monitor during, for construction of the index relevant period, what, among other preconditions, enabled construction of the Global Entrepreneurship and Development Index for these countries. All these countries are grouped in efficiency- driven economies, except Slovenia which is an innovation-driven economy.

Purpose of this work is to emphasize the relation between the state of entrepreneurship in the country and its stage in economic development, as well as to emphasize the potential of the Global Entrepreneurship and Development Index for understanding the entrepreneurial environment, and level of entrepreneurship development at countries level and the level of region of South-eastern Europe, as well as its potential in providing useful implications for required policy actions directed towards entrepreneurship development.

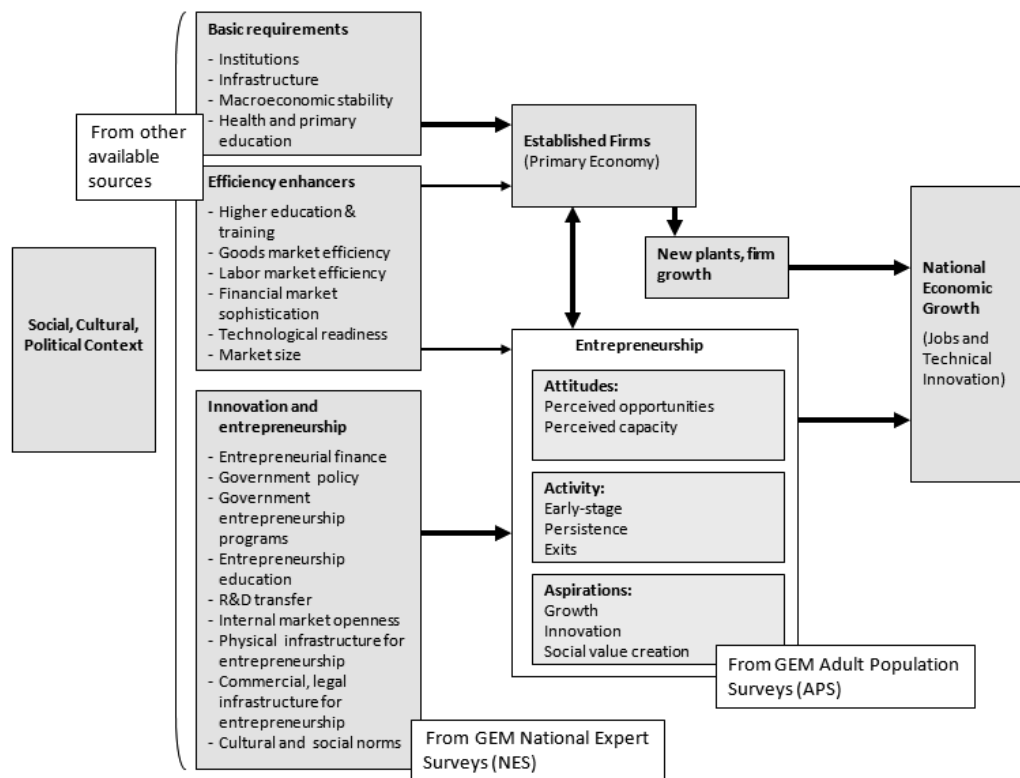
## 2. Entrepreneurship and economic development

There is a wide recognition that entrepreneurship provides great contribution to economic development, and this it is its main driver. Entrepreneurs are those who introduce innovation into the market fostering change in existing and established businesses and making them to be more flexible in order to respond to innovations in the market and sustain their competitiveness. Entrepreneurship is closely associated with knowledge and flexibility, which are factors that has become significant in terms of competitiveness in the world economy.

Recent thesis states that contribution of entrepreneurs to economy varies in relation to phase of economic development of certain country that is of the economy. Most popular and respectable typology of economies related to previously mentioned issue is one introduced by Michael Porter, who groups economies by the phases of economic development into “factor- driven economies,” “efficiency-driven economies” and “innovation-driven economies”. Every phase of economic development of the country (factor-driven, efficiency-driven and innovation-driven) has its specifics and contribution of entrepreneurship to economic development varies depending on the certain phase.

Factor-driven economies are in most cases agricultural, and most population lives out of agriculture and is generally situated in the countryside. With development of the country, industrial sectors start to develop, which influence on migration of labor from extraction of natural resources to industrial sectors. However, industrial sector in this phase is not developed enough to accumulate labor supply, so many people start their own businesses in order to provide existence to themselves and their families, and it is called “necessity entrepreneurship”. As industrial sector develops further, within economy emerge institutions in order to support development of economic activity and build up of scale in reaching higher level of productivity through economy of scale. This is characteristic of efficiency-driven economies, where large national businesses are favored by national economic policies. In innovation-driven phase, industrial sector starts to improve and experiences additional improvements in variety and sophistication, which is mainly related to improvement of knowledge base, and accompanying issues such as improved research and development, knowledge and technology. These improvements enable space for innovative small businesses that use previously mentioned sources, to use opportunity and create competition for large national businesses. Very often case is that those small innovative firms gain innovative advantage over large businesses in the economy. So, innovation-driven economies are characterized by innovative businesses that play significant role in economic development of the country and wealth creation of the same.

Typology of economies on the basis of phases of economic development is useful for all relevant subjects in the field of entrepreneurship, especially for policy makers in process of policies creation and decision-making process, because on the basis of this typology and its characteristics they can create adequate programs for fostering entrepreneurship in the country. There are three sets of entrepreneurial framework conditions (basic requirements, efficiency enhancers and entrepreneurial conditions), on which key focus should be in the country in relation to its phase of economic development. In factor-driven economies key focus should be on basic requirements such as primary education, health care, infrastructure, establishment of institutions, and ensuring macroeconomic stability in order to make strong basis for entrepreneurship development. As economy develops, key development focus turn on efficiency enhancers, that is conditions that enable proper functioning of the market. When economy gets to innovation-driven phase, key development focus moves to entrepreneurship conditions that foster opportunity-driven entrepreneurship in the country and drive dynamic, innovation-driven behavior. Every economy, no matter in which phase of economic development is, key focus should keep on certain framework condition, but other two framework conditions should be at the same time, developed or maintained, depending on phase of economic development.



**Figure 4** The GEM model<sup>19</sup>

Previously described typology of economies is also used for creation of the GEM model (Figure 2), that involves distinction between phases of economic development. Global Entrepreneurship Monitor (GEM) is the world's largest study on entrepreneurial activity. GEM model shows relationships between cultural, social and political context and previously mentioned three sets of framework conditions. Framework conditions influence of entrepreneurial attitudes, activity and aspirations, than entrepreneurial activity and growth of established businesses affect the national economic growth.

### 3. Basic information on Global Entrepreneurship and Development Index

Entrepreneurship is a complex phenomenon which is defined in a various ways, so the attempts to measure entrepreneurship within and among the countries were difficult, and not so successful, because in order to do this, the wide spectrum of different determining factors should have been considered. Taking in consideration the advantages and lacks of previous attempts to create unique measure of entrepreneurship, two respectable researchers Zoltán J. Ács (School of Public Policy, George Mason University, VA, USA) 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. So, they developed the Global Entrepreneurship and Development Index which incorporates the essence of the contextual characteristics of entrepreneurship and fills the gap in measuring of entrepreneurship and development.

<sup>19</sup> Kelley D., Bosma N., Amorós J.E., Global Entrepreneurship Monitor 2010 Global Report", Global Entrepreneurship Research Association (GERA), 2011., pg. 15

The Global Entrepreneurship and Development Index captures the contextual characteristics of entrepreneurship by focusing on entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations. Construction of the Global Entrepreneurship and Development Index involves 31 variables, 17 from the Global Entrepreneurship Monitor and 14 from other data sources, from which 14 pillars, three sub indexes Entrepreneurial attitudes sub-index (ATTINDEX), Entrepreneurial activity sub-index (ACTINDEX) and Entrepreneurial aspirations sub-index (ASPINDEX) and finally the Global Entrepreneurship and Development Index is built.

Fourteen pillars out of which three sub-indexes and the Global Entrepreneurship and Development Index are built, contains individual-level and institutional-level variables.

Global Entrepreneurship Monitor's variables, that is the Adult Population Survey, was used as a source of individual-level variables for creation of Global Entrepreneurship and Development Index, while different sources were used for institutional level variables including World Economic Forum, Transparency International, United Nations etc. These institutional variables correspond to macro level of entrepreneurial aspects.

Criteria for selection of certain institutional level variable was that institutional variable should have had logical link and relevance with entrepreneurship variable, should have been clear which would enable better interpretation and explanation, while special attention was given to avoid that the same factor is repeated in different variables.

Variables of individual and institutional level were used for calculation of pillars that are the consisting parts of sub-indexes: Entrepreneurial activity sub-index (ACTINDEX), Entrepreneurial attitudes sub-index (ATTINDEX) and Entrepreneurial aspirations sub-index (ASPINDEX). Global Entrepreneurship and Development Index is the average of three sub-indexes.

There are fourteen pillars that create three sub-indexes. Five pillars construct sub-index "Entrepreneurial aspirations", four pillars construct sub-index "Entrepreneurial activity" and five pillars construct sub-index "Entrepreneurial attitudes".

Entrepreneurial attitudes are defined as general national attitudes 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 attitudes are extremely important since they refer to general attitude of the population in certain country towards entrepreneurs and entrepreneurship.

Sub-index entrepreneurial attitudes consist of five pillars: Opportunity perception, Start up skills, Non-fear of failure, Networking and Cultural support.

Entrepreneurial activity, in this context, can be defined as start up entrepreneurial activity in sector of medium or high technology, initiated by educated entrepreneurs motivated by opportunity in not so competitive environment. Differences on quality of entrepreneurial activity are quantified according to achieved level of education of entrepreneur, and uniqueness of the product or service, which is measured by the level of competitiveness.

"Entrepreneurial activity sub-index" consists of four following pillars: Opportunity start up, Tech sector, Quality of human resources and Competition.

Entrepreneurial aspirations present efforts made by entrepreneurs that are in early stage of entrepreneurial activity to introduce new products and services, develop new production processes, increase the number of employees, enter the foreign markets and to finance their business with formal and/or informal capital.

Sub-index "Entrepreneurial aspirations" consists of five pillars: New product, New Technology, High Growth, Internationalization and Risk capital.

Structure of the Global Entrepreneurship and Development Index, showing three sub-indexes, 14 pillars and consisting variables is presented in Table 1.



**Table 1** Structure of the Global Entrepreneurship and Development Index

GLOBAL ENTREPRENEURSHIP AND DEVELOPMENT INDEX	aspirations	RISK CAPITAL	INFINV
			VENTCAP
		INTERNATIONALIZATION	EXPORT
			GLOB
	Entrepreneurial sub-index	HIGH GROWTH	GAZELLE
			BUSS STRATEGY
		NEW TECHNOLOGY	NEWT
			INNOV
		NEW PRODUCT	NEWP
			GERD
	Entrepreneurial activity sub-index	COMPETITION	COMPET
			MARKDOM
		QUALITY OF HUMAN RESOURCES	HIGHEDUC
			STAFFTRAIN
		TECH	TECHSECT
			TECHABSORP
		OPPORTUNITY STARTUP	TEAOPPORT
			FREEDOM
	Entrepreneurial attitudes sub-index	CULTURAL SUPPORT	CARSTAT
			CORRUPTION
		NETWORKING	KNOWENT
			INTERNETUSAGE
		NONFEAR OF FAILURE	NONFEAR
			BUSINESS RISK
		STARTUP SKILLS	SKILL
			EDUCPOSTSEC
		OPPORTUNITY PERCEPTION	OPPORTUNITY
			MARKETAGGLOM

#### 4. Global Entrepreneurship and Development Index for South-eastern European countries

Global Entrepreneurship and Development Index combines individual and institutional variables and considers the interdependencies of the system. Combination of institutional-level and individual-level variables that create the fourteen pillars of the sub-indexes reflecting the state of entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations, and review of the achieved scores for mentioned consisting parts of the Global Entrepreneurship and Development Index and its overall score for the country of interest, provides very useful insight in state of entrepreneurship in certain country. Additionally, the Global Entrepreneurship and Development Index is useful policy implication tool, implying towards which fields policy actions in certain country should be directed for improvement of state of entrepreneurship.

As it was previously described the Adult Population Survey of the Global Entrepreneurship Monitor was the source of the individual-level variables. South-eastern European countries Bosnia and Herzegovina, Croatia, Greece, Macedonia, Romania, Serbia, Slovenia and Turkey participated in the project Global Entrepreneurship Monitor for the relevant period used for calculation of the Global Entrepreneurship and Development Index 2011, which enabled its construction for mentioned countries. Table 2 contains values of pillars, sub-indexes and the Global Entrepreneurship and Development Index for the South-eastern European countries included in the analysis.

**Table 2** Values of pillars, sub-indexes and the Global Entrepreneurship and Development Index for South-eastern European countries

Country	Opportunity perception	Start up skills	Non-fear of failure	Networking	Cultural support	Sub-index "Entrepreneurial attitudes"	Opportunity start up	Tech sector	Quality of human resources	Competition	Sub-index "Entrepreneurial activity"	New product	New technology	High growth	Internationalization	Risk capital	Sub-index "Entrepreneurial aspirations"	GLOBAL ENTREPRENEURSHIP AND DEVELOPMENT INDEX
Bosnia and Herz.	0.19	0.37	0.07	0.24	0.25	0.21	0.06	0.09	0.10	0.18	0.11	0.00	0.09	0.21	0.51	0.47	0.21	0.18
Croatia	0.17	0.43	0.43	0.41	0.26	0.32	0.10	0.33	0.16	0.33	0.22	0.12	0.36	0.37	0.70	0.19	0.31	0.28
Greece	0.21	0.94	0.46	0.13	0.39	0.37	0.35	0.29	0.36	0.31	0.32	0.10	0.37	0.13	0.42	0.40	0.26	0.32
Macedonia	0.27	0.38	0.18	0.14	0.30	0.24	0.09	0.24	0.30	0.25	0.21	0.03	0.19	0.28	0.48	0.64	0.27	0.24
Romania	0.17	0.22	0.45	0.31	0.23	0.27	0.27	0.13	0.69	0.19	0.29	0.08	0.00	0.32	0.69	0.02	0.18	0.25
Serbia	0.31	0.57	0.21	0.21	0.23	0.29	0.04	0.19	0.13	0.19	0.13	0.03	0.11	0.24	0.15	0.12	0.12	0.18
Slovenia	0.16	0.74	0.91	0.76	0.54	0.52	0.56	0.69	0.45	0.58	0.56	0.46	0.27	0.41	0.71	0.21	0.38	0.49
Turkey	0.51	0.32	0.33	0.11	0.39	0.31	0.21	0.40	0.39	0.17	0.28	0.30	0.03	0.56	0.36	0.09	0.23	0.27

Among all countries presented in the Table 2, only Slovenia is innovation-driven economy while other countries are efficiency-driven economies. Bosnia and Herzegovina has the lowest scores among all countries included in the analysis for four pillars, two sub-indexes and the Global Entrepreneurship and Development Index, together with Serbia with score for GEDI of 0.18. The worst pillar for Bosnia and Herzegovina is the pillar "New product", followed with very low scores for the pillars "Non fear of failure", "Tech sector" and "Quality of human resources". Taking in consideration current economic situation and level of development of Bosnia and Herzegovina, followed with poor support of government to entrepreneurship development, these results are not surprising. Especially low results Serbia

achieved for the field of entrepreneurial activity and entrepreneurial aspirations with extremely low scores regarding opportunities for business start up and new products. Croatia, country with similar political and economic background as Bosnia and Herzegovina, Serbia and Macedonia, which were all together part of the former Yugoslav republic, achieved better, but not satisfactory scores for three sub-indexes and the Global Entrepreneurship and Development Index, especially for the "Entrepreneurial activity sub-index" with overall result for the Global Entrepreneurship and Development Index of 0.28. Greece has better results for the "Entrepreneurial attitudes sub-index", "Entrepreneurial activity sub-index" and the Global Entrepreneurship and Development Index in relation to other analysed countries except Slovenia. The pillar with best score for Greece is "Start up skills", while its pillar with the lowest score is "New product". Macedonia and Romania achieved similar scores for the Global Entrepreneurship and Development Index, Macedonia 0.24, Romania 0.25. However, Romania has better score for the "Entrepreneurial attitudes sub-index" and "Entrepreneurial activity sub-index" in relation to Macedonia. Scores for Turkey are at approximate level as the ones for Croatia, with the best score for the sub-indexes related to entrepreneurial attitudes, among three sub-indexes for this country, and overall score for the Global Entrepreneurship and Development Index of 0.27. Finally, Slovenia, innovation-driven economy achieved the best scores for all three sub-indexes which resulted in the highest score for the Global Entrepreneurship and Development Index in relation to other South-eastern European countries included in the analysis. These results of Slovenia are not surprising, since Slovenia is one of the most developed countries in South-eastern Europe, innovation-driven economy which entrepreneurship framework conditions support the entrepreneurship development in the country contributing to overall economic development of this country. Presented data confirm the notion that state of entrepreneurship in the country is in accordance with the level of economic development of the country, since efficiency-driven economies included in the analysis has lower scores for the Global Entrepreneurship and Development Index and its consisting parts in relation to Slovenia, innovation-driven economy.

Through analysis of scores for pillars, sub-indexes and the Global Entrepreneurship and Development Index for South-eastern European countries it is possible to gain insight in important implications regarding entrepreneurship in these countries. Through placing focus on improvement of the pillars with the lowest score, and on the sub-index and conditions that correspond with the level of economic development of the country, country can improve certain entrepreneurial aspect contributing also to its overall economic development, as it was presented in Figure 1. According to this, key development focus of the efficiency-driven economies should be on entrepreneurial activity, and efficiency enhancers with continuous improvement and maintenance of entrepreneurial attitudes and implementation of actions related to enabling the entrepreneurial aspirations. At the other hand, innovation-driven economies should pay the main attention to entrepreneurial aspirations, and at the same time maintain and continuously improve conditions that affect entrepreneurial attitudes and entrepreneurial activity. Since all South-eastern European countries analysed in the paper, except Slovenia are in the efficiency-driven stage, implication arises that the key development of these countries should be on entrepreneurial activity and conditions called "efficiency enhancers" in order to enable improvement from efficiency-driven to innovation – driven stage. Additionally, presented data showed that all these countries have relatively low scores of the "Entrepreneurial activity sub-index". Slovenia, innovation-driven South-eastern European economy key focus should place on the field of entrepreneurial aspirations, additionally taking in consideration that for this field Slovenia achieved the lowest score among three sub-indexes.

Presented results indicated correlation between level of economic development and level of development of entrepreneurship in the country. Review of the results of the South-eastern European countries implicated certain similarities regarding recorded problems and obstacles to entrepreneurship and economic development, which emphasize need for mutual

efforts and policies in the region that would ensure improvement of entrepreneurship and exchange of good practices.

In context of achieved level of development, Slovenia has the highest values, which is the reason why indicators of entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations are in most cases better than for other South-eastern European countries included in the analysis. These countries can use good practices from Slovenia as examples, and with certain adjustment eventually implement them in their business practice ensuring improvement of entrepreneurship in the country and through that also providing contribution to economic development.

## 5. Conclusions

Entrepreneurship has been recognised as one of the main drivers of economic development. Practice has proved and most of the scientist, researchers, professors and practioners from the field of economy support the notion that entrepreneurship is one of the key drivers of economic development and new jobs creation. For the purpose of ensuring and supporting the entrepreneurship development policy makers as well as other relevant subjects should have insight and understand which are the conditions that support development of entrepreneurship in the country, as well as the lacks of those conditions. It is very important to measure the state of conditions that affect entrepreneurship in the country as a basis for creation and implementation of improvements of those conditions in order to ensure the development of entrepreneurship as well as economy in whole.

In relation to this, professor Zoltán J. Ács and László Szerb have developed the Global Entrepreneurship and Development Index with the will to fill the gap in measurement of entrepreneurship and to contribute to better understanding of economic development through building of entrepreneurship index. This index captures multifunctional characteristics of entrepreneurship, besides the quantity it is the indicator which refers to differences related to the quality and incorporates variables of the individual level as well as the institutional variables. Analysis of scores that certain country achieves for the Global Entrepreneurship and Development Index and its consisting variables provides very useful insight in state of entrepreneurship in certain country. Additionally, this index provides basis for vertical and horizontal comparison for the country, that is comparison with other countries, and comparison of own results during the time, for tracking results of implemented activities aimed at improvement of certain entrepreneurship related field.

Analysis of achieved scores of South-eastern European countries for Global Entrepreneurship and Development Index and its consisting parts showed that all countries of this region, except Slovenia, achieved relatively low results for GEDI and for three sub-indexes (Entrepreneurial attitudes sub-index, Entrepreneurial activity sub-index and Entrepreneurial aspirations sub-index) what implies insufficiently developed and insufficiently supportive entrepreneurship environment in these countries which mostly has negative effect on population to enter entrepreneurial activity, to have high growth aspirations and to posses positive attitudes towards entrepreneurship as a career choice. Important task for all relevant subjects related to entrepreneurship in South-eastern European countries that are efficiency-driven economies is to make stronger efforts and create programs for improvement of entrepreneurship as one of the drivers of economic development in the country.

Results of the South-eastern European countries for the Global Entrepreneurship and Development Index implied that the state of entrepreneurship is in accordance with the level of economic development of the country. Slovenia, which is the only innovation-driven economy included in the analysis has better results for the three sub-indexes related to entrepreneurial attitudes, entrepreneurial activity and entrepreneurial aspirations in relation to other South-eastern European countries, which are efficiency-driven economies. In order to improve overall entrepreneurship state in the country and move to innovation-driven phase,

efficiency-driven economies, should place key focus on improvement on the entrepreneurial activity, with continuous improvement of entrepreneurial attitudes and enabling of entrepreneurial aspirations, that is the key focus should be on efficiency enhancers which are the conditions that enable proper functioning of the market, with continuous improvement and maintenance of basic requirements and enabling of entrepreneurship conditions. Innovation-driven economies, group to which Slovenia belongs, should place key focus on entrepreneurial aspirations, with continuous improvement and maintenance of entrepreneurial attitudes and entrepreneurial activity, that is its key focus should be on entrepreneurship conditions, with continuous improvement of basic requirements and efficiency enhancers.

Entrepreneurship in South-eastern European countries presents very important factor of generating the economic development and employment. It is of great importance for governments and other policy makers in these countries to recognize the importance of the information that Global Entrepreneurship and Development Index provides and use it during the process of creation of entrepreneurship policies and programs.

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# ICT and Education Efficiency in Selected EU and OECD Countries: a DEA Approach

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The purpose of the paper is to review some previous researches examining ICT efficiency and the impact of ICT on educational output/outcome as well as different conceptual and methodological issues related to performance measurement. Moreover, a definition, measurements and the empirical application of a model measuring the efficiency of ICT use and its impact at national levels will be considered. For this purpose, the Data Envelopment Analysis (DEA) technique is presented and then applied to selected EU-27 and OECD countries. The empirical results show that the efficiency of ICT, when taking educational outputs/outcomes into consideration, differs significantly across the great majority of EU and OECD countries. The analysis of the varying levels of (output-oriented) efficiency (under the VRS framework) shows that Finland, Norway, Belgium and Korea are the most efficient countries in terms of their ICT sectors (when considering educational output/outcome). The empirical results also suggest that, in general, some less developed EU countries such as Slovakia and Poland show a relatively high level of ICT efficiency due to the low level of their ICT inputs. Therefore, a significant increase in ICT expenditures is needed in those countries. All in all, the analysis finds evidence that most of the countries under consideration hold great potential for increased efficiency in ICT and for improving their educational outputs and outcomes. However, a few limitations of the presented empirical study should be pointed out. Firstly, the application of the presented techniques is hampered by a lack of suitable data. Quality data are called for because the techniques available to measure efficiency are sensitive to outliers and may be influenced by exogenous factors. Secondly, the precise definition of inputs, outputs and outcomes may significantly influence the results. Finally, it seems important to bear in mind that by using a non-parametric approach, and in spite of DEA being an established and valid methodology, differences across countries are not statistically assessed and this may be considered a limitation of the methodology. Hence, further research is clearly needed to eliminate the above deficiencies, in particular to test the influence of environmental factors on ICT efficiency.

## **Keywords**

Information and Communication Technology (ICT), Education, efficiency, DEA, EU, OECD

## **1. Introduction**

Information and communication technology (ICT) is one of the most important driving forces promoting economic growth in the economy. However, there is less of a consensus among economists on whether the impact of ICT also stems from higher total factor productivity (TFP) growth and improved efficiency of production (due to a better educated population). During the last two decades countries have invested heavily in ICT. Indeed, the use of ICT in education and training has been a key priority in most EU and OECD countries in the last decade, although progress has been uneven. ICT has had a major impact on the education

sector, on organisation and on teaching and learning methods. Yet there are considerably different ICT expenditure levels within and between countries, as well as between institutions within countries. In some countries schools have embedded ICT into the curriculum, and demonstrate high levels of effective and appropriate ICT use to support teaching and learning across a wide range of subject areas. However, in other countries schools are in the early phase of adopting ICT, characterised by important enhancements of the learning process, some developments of e-learning (ICT-enabled learning), but without any profound improvements in learning and teaching [1].

One puzzling question concerns the effective impact of these technologies on educational outputs and outcomes. As ICTs are being increasingly used in education, indicators to monitor their impact and demonstrate accountability to funding sources and the public are ever more needed. Indicators are required to show the relationships between technology use and educational performance. There is also a need to show that education should be seen as using technology not only as an end in itself, but as a means to promote creativity, empowerment and equality and produce efficient learners and problem solvers. Many academic researchers have tried to answer this question at theoretical and empirical levels. They have faced two main difficulties. On one hand, student performance is hard to observe and there is still confusion about its definition. On the other, ICT entails evolving technologies and their effects are difficult to isolate from their environment. Consequently, the relationship between the use of ICT and educational performance is unclear, and contradictory results are presented in the literature [2].

Accordingly, the paper's purpose is to discuss and review some previous researches on ICT efficiency and ICT's impact on educational outcomes as well as different conceptual and methodological issues related to measuring performance in education. Moreover, a definition, measurements and an empirical application of a model measuring the efficiency of ICT at national levels will be considered, with a special focus on educational variables as outputs/outcomes. In this context, the Data Envelopment Analysis (DEA) technique will be presented and then applied to selected EU-27 and OECD countries.

The paper is structured as follows: first, a brief survey of the literature relating to ICTs and their impact on education performance is presented, then the methodology is established and the specifications of the models are defined. The next section outlines the results of the non-parametric efficiency analysis and presents partial correlation coefficients in order to assess the impact of ICT on educational performance. The final section provides concluding remarks and some policy implications.

## **2. Literature Review**

Many theoretical and empirical efforts have been made to assess the impact of ICT on educational performance in various settings. Recent approaches to evaluating ICT in education often only focus on a few aspects such as input, output and outcome/impact. The use of indicators can help assess how the input (e.g. monetary, infrastructure, resources) relates to the impact. However, an evaluation must consider different stages in the implementation process and analyse changes in the culture of the school system – at the micro level (pupils) as well as at the meso (institutions/schools) and macro (national) levels. At national and institutional levels, educational policies and regulations have been established to support the educational use of ICT. In school and classroom settings, teachers and school administrators are attempting to find the best ways to harness ICT technology to support their teaching and students' success. However, accomplishments that are convincingly the result of the direct causal impact of ICT use are not always easily identifiable [3].

Currently, there is a significant number of initiatives to assess and monitor the efficiency of ICT use and its impact on education. SITES (the second information technology in educational study), sponsored by the International Association for the Evaluation of Educational Achievement (IEA), is an exemplary study which identifies and describes the educational use of ICT across 26 countries in the world. The study explores the use of computers in teaching through sampling teachers, principals and ICT responsibility in schools. While it does not look into student achievement, it does look at the perceived impact of ICT on students from the teacher's perspective [4], [5]. Moreover, Balanskat et al. [1] reviewed several studies on the impact of ICT on schools in Europe. They conclude that the evidence is scarce and comparability is limited. Each study employs a different methodology and approach, and comparisons between countries must be made cautiously. In addition, in several other studies (see [6], [7], [8], [9]) it is argued that ICT helps to improve the quality of learning and educational outcomes. Some other surveys (e.g., [10], [11], [12], [13]) argue that, in order to be successful, a country should improve its education system by implementing effective and robust ICT policies.

In contrast, Trucano [14] reviews a series of studies on ICT's impact on schools and concludes that the impact of ICT use on learning outcomes is unclear. Moreover, Cox and Marshall [15] point out that ICT studies and indicators do not demonstrate solid effects. Empirica [16] also explores the access and use of ICT in European schools in 2006. It presents information for 25 EU member states, Norway and Iceland, but does not look into student results so it is impossible to study this important aspect of ICT impact. Machin et al. [17] state that, while there is a clear case for using ICT to enhance the computer skills of students, the role of technology-enhanced learning (TEL) is more controversial (Machin et al. [17]). There is neither a strong and well-developed theoretical case nor much empirical evidence supporting the expected benefits accruing from the use of ICT in schools since different studies find mixed results (Kirkpatrick and Cuban [18]). Indeed, while Becta [19] and Kulik [20] find a positive effect on the use of ICT and educational attainment, researches by Fuchs and Woessman [21], Leuven et al. [22] or Goolsbee and Guryan [23] find no real positive effect of the use of ICT on educational results once other factors, such as school characteristics or socioeconomic background, are taken into account.

A few previous studies on the performance and efficiency of the education sector (at the national level) applied non-parametric methods. For instance, Clements [24] does so for Europe, St. Aubyn [25] for education spending in the OECD, and Afonso and St. Aubyn ([26], [27], [28]) in OECD countries. Most studies apply the Data Envelopment Analysis (DEA) method, while Afonso and St. Aubyn [27] undertake a two-step DEA/Tobit analysis in the context of a cross-country analysis of secondary education efficiency. However, very few recent studies have examined the efficiency of countries in utilising their ICT resources for educational outputs and outcomes and the impact of ICT on education in a particular country, for instance in Turkey (Tondeur et al. [29]) and Belgium (Gulbahar [30]). Since very insightful, cross-country analyses have rarely been used for ICT policy analysis, the present research addresses this gap in the literature.

### 3. Methodology and Data

A common non-parametric technique that has recently started to be commonly applied to expenditure analysis is Data Envelopment Analysis (DEA). DEA is a non-parametric frontier estimation methodology originally introduced by Charnes et al. [31] that compares functionally similar entities described by a common set of multiple numerical attributes. DEA classifies entities into "efficient" or "performers" versus "inefficient" or "non-performers." According to the DEA framework, inefficiencies are degrees of deviance from the frontier. Input inefficiencies show the degree to which inputs must be reduced for an inefficient country to lie on the efficient practice frontier. Output inefficiencies are the increase in outputs needed for a country to become efficient. If a particular country either reduces its



inputs by the inefficiency values or increases its outputs by the amount of inefficiency, it can become efficient; that is, it can obtain an efficiency score of one. The criterion for classification is determined by the location of an entity's data point with respect to the efficient frontier of the production possibility set. The classification of any particular entity can be achieved by solving a linear program (LP).

Various types of DEA models can be used, depending upon the problem at hand. The DEA model we use can be distinguished by the scale and orientation of the model. If one cannot assume that economies of scale do not change, then a variable returns- to-scale (VRSTE) type of DEA model, the one selected here, is an appropriate choice (as opposed to a constant-returns-to-scale, (CRS) model). Furthermore, if in order to achieve better efficiency, economies' priorities are to adjust their outputs (before inputs), then an output-oriented DEA model rather than an input-oriented model is appropriate. The way in which the DEA program computes efficiency scores can be explained briefly using mathematical notation (adapted from Ozcan [32]). The VRSTE envelopment formulation is expressed as follows:

$$VRS_p(Y_i, X_i, u^1, v^1): \min-(u^1s + v^1e)$$

$$Y\lambda - s = Y_1$$

$$-X\lambda - e = -X_1$$

$$1\lambda = 1$$

$$\lambda \geq 0, e \geq 0, s \geq 0$$

For decision making unit 1,  $x_{i1} \geq 0$  denotes the  $i^{\text{th}}$  input value, and  $y_{r1} \geq 0$  denotes the  $r^{\text{th}}$  output value.  $X_1$  and  $Y_1$  denote, respectively, the vectors of input and output values. Units that lie on (determine) the surface is deemed *efficient* in DEA terminology. Units that do not lie on the surface are termed *inefficient*. Optimal values of variables for decision making unit 1 are denoted by the  $s$ -vector  $s^1$ , the  $m$ -vector  $e^1$ , and the  $n$ -vector  $\lambda^1$ .

Although DEA is a powerful optimization technique that can assess the performance of each country, it has certain limitations. When one has to deal with large numbers of inputs and outputs, and a small number of countries are under evaluation, the discriminatory power of the DEA is limited. However, analysts can overcome this limitation by including only those factors (input and output) that provide the essential components of "production", thus avoiding distortion of the DEA results. This is usually done by eliminating one of a pair of factors that are strongly positively correlated with each other.

In the majority of studies using DEA the data are analysed cross-sectionally, with each decision-making unit (DMU) – in this case a country – being observed only once. Nevertheless, data on DMUs are often available over multiple time periods. In such cases, it is possible to perform DEA over time where each DMU in each time period is treated as if it were a distinct DMU. However, in our case the data set for all the tests in the study includes average data for the 1999–2007 period (including PISA 2006 average scores) in order to evaluate long-term efficiency measures as the effects of ICT are characterised by time lags in 27 EU and OECD countries. The program used for calculating the technical efficiencies is the *DEA Frontier* software. The data are provided by the World Bank [33], UNESCO [34] and OECD [35] databases (for Summary statistics see Table 1).

The specification of the outputs and inputs is a crucial first step in DEA since the larger the number of outputs and inputs included in any DEA, the higher will be the expected proportion of efficient DMUs, and the greater will be the expected overall average efficiency (Chalos, [36]). Common measures of teaching output in education used in previous studies are based on graduation and/or completion rates (see Johnes [37]; Jafarov and Gunnarsson [38]), PISA scores (see Afonso and St. Aubyn [26]; Jafarov and Gunnarsson [38]), pupil-teacher ratios and enrolment rates (see Jafarov and Gunnarsson [38]). Nevertheless, these studies also demonstrate that DEA is an effective research tool for evaluating the efficiency of ICT and its

impact on the education sector given the varying input mixes and types and numbers of outputs.

**Table 1** Summary Statistics

	Average	St. Dev.	Min.	Max.
<i>Inputs</i>				
Information and communication technology expenditure (% of GDP)	6.0885	0.9366	3.702 (MEX)	7.722 (BUL)
Information and communication technology expenditure (per capita, in USD)	1,682.4	950.9926	247.416 (SLK)	3,152.654 (USA)
Internet users (per 100 people)	40.3071	18.4235	9.5133 (MEX)	68,43111 (SWE)
International Internet bandwidth (bits per person)	4,722.9	5,756.232	84.81889 (MEX)	21,214.81 (DEN)
<i>Outputs</i>				
School enrolment, primary (% gross)	102.972	4.0724	98.7438 (GRE)	119,6688 (POR)
School enrolment, secondary (% gross)	104.6418	13.0841	79.74 (MEX)	133.0922 (BEL)
School enrolment, tertiary (% gross)	59.2622	15.8078	22.7644 (MEX)	87.75778 (FIN)
Teachers per 100 pupils, secondary	8.5925	1.5601	5.2672 (JPN)	12.0387 (POL)
<i>Outcomes</i>				
PISA average (2006)	491.2264	34.6888	408.601 (MEX)	552.8498 (FIN)
Labor force with tertiary education (% of total)	24.7961	9.2459	10.7429 (POR)	50.475 (USA)

Sources: World Bank [33]; UNESCO [34]; OECD [35]; own calculations.

In this analysis the data set to evaluate the efficiency of ICT includes input/output/outcome data, i.e. information and communication technology expenditure (% of GDP), Internet users (per 100 people), teacher-pupil ratio (secondary), school enrolment, all levels (% gross), labour force with tertiary education (% of total) and the PISA 2006 average score. Up to 28 countries are included in the analysis (selected EU and OECD countries). Different inputs and outputs/outcomes are tested in four models (see Table 1). In addition, to evaluate the impact of ICT on education, we calculate partial correlation coefficients for different ICT and education variables.

**Table 2** Input and output/outcome set for the DEA

Model	Inputs	Outputs/Outcomes
I	Information and communication technology expenditure (% of GDP) <sub>1</sub>	PISA average (2006) <sup>2</sup>

II	Information and communication technology expenditure (% of GDP) Internet users (per 100 people) <sup>1</sup>	PISA average (2006) Labour force with tertiary education (% of total) <sup>1</sup>
III	Information and communication technology expenditure (% of GDP) Internet users (per 100 people)	PISA average (2006) School enrolment, secondary (% gross) <sup>1</sup> Teacher-pupil ratio, secondary <sup>3</sup>
IV	Information and communication technology expenditure (% of GDP) Internet users (per 100 people)	PISA average (2006) School enrolment, primary (% gross) <sup>1</sup> School enrolment, secondary (% gross) School enrolment, tertiary (% gross) <sup>1</sup>

Sources: <sup>1</sup>World Bank; <sup>2</sup>UNESCO; <sup>3</sup>OECD.

## 4. Empirical Results

To see whether ICT has any impact on educational outputs and outcomes, we calculate the partial correlations between different variables, while controlling for the other(s) variable(s) (see Table 3). All educational output and outcome variables show a weak and positive (but not statistically significant) correlation with ICT expenditures (in % of GDP) when controlling for the number of Internet users. The impact of the number of Internet users is strong and positive as the partial coefficient ranges from 0.53 to 0.71. An important ICT variable which also influences PISA scores is ICT (per capita) as the partial coefficient reached 0.53. There are also some educational output variables which positively influence the PISA scores, such as the teacher-pupil ratio (primary and secondary). Nevertheless, the single most important related variable is the quality of the basic telecommunications infrastructure and broadband penetration. Indeed, a strong ICT infrastructure and its use alone already have an effect on perceived ICT-induced efficiency improvements but does not guarantee a good educational performance in itself. The government and policymakers should not be interested in simply introducing technology into educational institutions, but also in making sure that it is used effectively by teachers and students in order to enhance educational outputs and outcomes.

The results of the output-oriented VRSTE formulation of the DEA analysis (based on Models I–IV in Table 2) suggest a relatively high level of inefficiency of ICT in selected EU and OECD countries and, correspondingly, that there is significant room to improve educational outputs and outcomes (see Table 4). Indeed, the empirical results show that the total number of efficient countries varies significantly from one model to another. There are only two technically efficient countries in Model I, i.e. Finland and Slovakia. However, at 4.424% of GDP Slovakia has the lowest level of ICT expenditure (in % of GDP) among all countries in the sample. The least efficient nations are Bulgaria, Romania and Greece as a result of their relatively low PISA test scores, ranging from 410 (Romania) to 464 (Greece) (for instance, the EU/OECD group average is around 494). In order to enhance the reliability of the findings, additional inputs and outputs/outcomes were introduced, resulting in models II, III - and IV (for details also see Table 2).

Adding another input and output in the form (Model II) of Internet users (per 100 people) and labour force with tertiary education (% of total), respectively, the results show Finland, Iceland, Norway, Slovakia and the USA to be the technically most efficient countries. Not surprisingly, increasing the number of outputs/outcomes in a relatively small sample leads to a higher number of efficient countries. In general, the rankings remain relatively stable in comparison to Model I (with the USA, Italy, Poland and Iceland being the only significant exceptions).

**Table 3** Partial correlation coefficients

Output/outcome variables	Input variables			
Completion rate – primary (n=24)	ICT (GDP)	IU		
	0.012	-0.09		
Enrolment rate – secondary (n=27)	ICT (GDP)	IIB		
	0.005	0.684***		
Enrolment rate - tertiary (n=27)	ICT (GDP)	IU		
	0.083	0.709***		
Labour force with tertiary education (n=27)	ICT (GDP)	IU		
	0.075	0.525***		
PISA score (n=28)	ICT (GDP)	IU		
	0.128	0.687***		
PISA scores (n=27)	ICT (p.c.)	T/P (secondary)		
	0.530***	0.292		
PISA scores (n=26)	ICT (p.c.)	T/P (primary)	T/P (secondary)	
	0.555***	-0.268	0.339*	
PISA scores (n=23)	ICT (GDP)	IU	T/P (primary)	COMPL (primary)
	-0.014	0.701***	0.410*	-0.1724

Note: \*\*\*, \*\*, \* denote significance at the levels of 1%, 5% and 10%, respectively. ICT (GDP) - Information and communication technology expenditure (% of GDP); IU - Internet users (per 100 people); ICT (p.c.) - Information and communication technology expenditure (per capita); T/P - Teacher-pupil ratio; IIB - International Internet bandwidth (bits per person); COMPL - completion rate (% of relevant age group).

Sources: World Bank [33]; UNESCO [34]; OECD [35]; own calculations.

Model III includes additional output/outcome variables to PISA scores, i.e. school enrolment (secondary) and teacher-pupil ratio (secondary). According to this model there are two additional efficient nations, i.e. Belgium and Poland. Interestingly, the biggest improvement in the ranking is shown by Denmark, with one of the highest levels of school enrolment (secondary) averages accounting for around 125% in the 1999–2007 period (the EU/OECD average is around 106%). In order to become an efficient nation, selected countries should significantly increase the level of their PISA scores (particularly in Romania), the level of their school enrolment (secondary) (particularly in highly populated countries, such as Korea and the USA), and the teacher-pupil ratio (secondary) (in Japan, Sweden and the UK).

In terms of the efficiency scores for ICT in Model IV, up to 12 of the analysed countries are labelled efficient (see Table 4). The average output efficiency score is 1.01511, meaning that the average country could increase its outputs/outcomes by around 1.5% if it were efficient. The worst efficiency performers are Italy, the USA and the UK, with the last two having well above-average ICT expenditures and Internet users (per 100 people) and well below-average PISA scores (in the USA), school enrolment (primary and secondary) (in the USA) and school enrolment (tertiary) (in the UK). On the other hand, Italy has below-average levels of its inputs and outputs/outcomes and therefore an increase in ICT expenditures and Internet users alongside a significant efficiency improvement is needed in the country. Indeed, all three countries should increase their outputs by 4.4% to 7.9 in order to become an efficient.

**Table 4** DEA results for ICT efficiency in selected OECD and EU countries

No	Country	Model I		Model II		Model III		Model IV	
		VRSTE	Rank	VRSTE	Rank	VRSTE	Rank	VRSTE	Rank
1	Australia	1.06339	7	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
2	Austria	1.10092	13	1.06040	13	1.05115	21	1.03784	22
3	Belgium	1.08288	9	1.01999	7	1.00000	1	1.00000	1
4	Bulgaria	1.32790	27	n.a.	n.a.	1.00000	1	1.00000	1
5	Czech R.	1.10171	14	1.00869	6	1.00596	8	1.00258	13
6	Denmark	1.10320	16	1.10320	21	1.01339	10	1.02449	19
7	Finland	1.00000	1	1.00000	1	1.00000	1	1.00000	1
8	France	1.12181	19	1.03470	9	1.02663	18	1.01070	16
9	Germany	1.09520	11	n.a.	n.a.	1.02570	17	1.04204	23
10	Greece	1.19124	25	n.a.	n.a.	1.02556	16	1.00000	1
11	Hungary	1.12273	20	1.08677	19	1.02372	14	1.02153	18
12	Iceland	1.11989	18	1.00000	1	1.02275	13	1.01361	17
13	Italy	1.17995	24	1.05702	12	1.11064	25	1.07881	26
14	Japan	1.06834	8	1.08181	18	1.04171	20	1.03091	21
15	Korea	1.02025	4	1.06586	15	1.00656	9	1.00000	1
16	Netherlands	1.06163	6	1.06163	14	1.03030	19	1.00000	1
17	New Zealand	1.05411	5	1.04909	11	1.00000	1	1.02618	20
18	Norway	1.01909	3	1.00000	1	1.00000	1	1.00000	1
19	Poland	1.10506	17	1.00507	5	1.00000	1	1.00000	1
20	Portugal	1.17397	23	1.07200	16	1.05337	22	1.00000	1
21	Romania	1.31120	26	1.18268	22	1.10368	24	1.00293	1
22	Slovakia	1.00000	1	1.00000	1	1.00000	1	1.00000	1
23	Slovenia	1.09282	10	1.02316	8	1.02193	12	1.00473	15
24	Spain	1.16046	22	1.04906	10	1.01584	11	1.00000	1

2 5	Sweden	1.096 20	12	1.096 20	20	1.025 07	15	1.000 00	1
2 6	UK	1.101 81	15	1.076 18	17	1.078 07	23	1.044 06	24
2 7	USA	1.147 87	21	1.000 00	1	1.124 80	26	1.052 56	25
Number of efficient countries		2		5		7		12	
Mean		1.111 99		1.049 28		1.031 03		1.015 11	
Std. dev.		0.078 309		0.045 084		0.036 037		0.021 181	

Note: Relative efficiency scores (models I–IV; see Table 2). Twenty-seven countries are included in the analysis (Mexico is excluded as an outlier).

Sources: World Bank [33]; UNESCO [34]; OECD [35]; own calculations.

**Table 5** Relative Efficiency of ICT in Selected OECD and EU countries (Distribution by quartiles of the ranking of efficiency scores in three models)

1 <sup>st</sup> quartile	2 <sup>nd</sup> quartile	3 <sup>rd</sup> quartile	4 <sup>th</sup> quartile
Finland Slovakia Norway Belgium Korea Poland	Netherlands New Zealand Sweden Bulgaria Spain Czech R. Slovenia	Greece Denmark Portugal Iceland Japan Germany Romania	Hungary France Austria UK USA Italy

Note: Relative efficiency scores (models I, II and IV; see Table 2). Twenty-seven countries are included in the analysis.

Sources: World Bank [33]; UNESCO [34]; OECD [35]; own calculations.

According to the above empirical analysis, it is obvious that the use of ICT in many of the countries considered suffers from relatively low technical efficiency. This inefficiency is particularly highlighted in some highly developed OECD members, i.e. the USA, the UK and Austria (see Table 5). Since all of these countries use significantly above-average ICT resources, it will be crucial for them to increase their educational outputs and outcomes. On the other hand, Italy, France and Hungary reveal low efficiency despite using a relatively low level of ICT inputs. Hence, an improvement of the efficiency of ICT, which could significantly contribute to a country's stronger development and growth should therefore be a top priority - in the near future for most countries, particularly those in the third and fourth quartiles.

## 5. Conclusions

The empirical results show that the efficiency of ICT, when taking educational outputs/outcomes into consideration, differs significantly across the great majority of EU and OECD countries. The analysis of the varying levels of (output-oriented) efficiency (under the VRS framework) shows that Finland, Norway, Belgium and Korea are the most efficient countries in terms of their ICT sectors (when considering educational output/outcome). The empirical results also suggest that, in general, some less developed EU countries such as Slovakia and Poland show a relatively high level of ICT efficiency due to the low level of their ICT inputs. Therefore, a significant increase in ICT expenditures is needed in those countries. All in all, the analysis finds evidence that most of the countries under consideration

hold great potential for increased efficiency in ICT and for improving their educational outputs and outcomes.

However, a few limitations of the presented empirical study should be pointed out. Firstly, the application of the presented techniques is hampered by a lack of suitable data. Quality data are called for because the techniques available to measure efficiency are sensitive to outliers and may be influenced by exogenous factors. Secondly, the precise definition of inputs, outputs and outcomes may significantly influence the results. Finally, it seems important to bear in mind that by using a non-parametric approach, and in spite of DEA being an established and valid methodology, differences across countries are not statistically assessed and this may be considered a limitation of the methodology. Hence, further research is clearly needed to eliminate the above deficiencies, in particular to test the influence of environmental factors on ICT efficiency.

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# The Influence of Collaboration on Effectiveness of Innovation Activity in Polish Regions

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Innovation process is interactive and multidisciplinary, composed of functionally separate yet combined and interdependent phases. Complexity of this process causes that its every stage requires an access to sophisticated knowledge. Successfully accomplished introduction of innovation to the market often involves usage of results of scientific research, acquiring information regarding consumer demand, conducting test research in the market, as well as ensuring patent protection. The mentioned conditions imply therefore the necessity of undertaking collaboration between enterprises conducting innovative activities, scientific and research units, clients, suppliers or consulting units. The paper aims to determine the influence of collaboration on the effectiveness of innovation activity on regional level in Poland. The analysis was conducted for 16 Polish voivodships, which are NUTS 2 regions, during the period 2008-2010, on the base of statistical data provided by Central Statistical Office of Poland. In order to achieve the aim of the paper the comparative analysis of the share of enterprises which collaborated on innovation activity on regional level was conducted. There were also examined the effects of innovation activity, measured by the market value of the new or significantly improved products in regions. Finally, correlation between the share of enterprises which collaborated on innovation activity and the effects of innovation activity in regions was estimated. The results of the analysis indicate the positive correlation between the number of the enterprises undertaking collaboration on innovation activity and its effectiveness, measured by the market value of the new and improved products. These results confirm the important role of collaboration in a successfully accomplished innovation process and imply the necessity of creating favourable conditions for interactions between innovation-active entities. A key part in this field is undoubtedly assigned to regional authorities, which should facilitate emergence of networks of collaboration, by using mechanisms and instruments of regional and innovation policies.

## Keywords

Innovation activity, Interorganisational collaboration, Networking, Polish regions

## 1. Introduction

Effective innovation activity, aiming at commercially successful introduction of new or significantly improved products or services to the market, in order to satisfy dynamically changing clients' needs, is nowadays an inevitable condition for achieving market success by enterprises. Increasingly, innovation is regarded as an evolutionary, non-linear, and interactive process between firms as well as between the firm and its environment [1,2,3]. Innovation activities do not proceed in isolation, but depend on access to wide range of sophisticated knowledge. This implies that innovation is stimulated and influenced by many actors of innovation system and sources of information [4]. The ability to create and absorb innovation by enterprises depends on the possession of human, financial and technological resources. However, the capacity to innovate depends not only from resources possessed by

enterprises but also from the interactions between these resources and feedbacks between enterprises, which occur in dynamically emerging and evolving networks of cooperation.

Interactions between organizations contribute to diffusion of knowledge and experience, and to appearance of spillover and synergic effects. The collaboration between entities leads to creation of inner network of connections and to emergence of relational capital, which ensures the access to specific resources of the given area and enables creation of innovations.

Given the above mentioned circumstances, the aim of the paper is to examine the relationship between the interorganizational collaboration and effectiveness of innovation activity. The paper is structured into two sections. The first portrays the role of the interorganizational collaboration on innovation activity basing on the results of theoretical and empirical evidences. The second presents the analysis of the influence of collaboration on effectiveness of innovation activity of industrial enterprises in Polish regions.

## **2. The role of collaboration in innovation activity**

According to Oslo Manual innovation activity includes scientific, technological, organizational, financial and commercial activities and aims at introduction to the market new or significantly improved products and processes [5]. Complexity of the innovation process causes that ensuring its effective course on its every stage requires of enterprises undertaking collaboration with numerous entities in order to gain access to a wide range of resources, especially a sophisticated knowledge. A wide range of partners may contribute to a firm's capacity to innovate: research units, universities, suppliers, consulting units, customers, competitors and other firms with complementary resources.

Contemporarily it is commonly considered that the main space of innovation processes and collaboration in the field of innovative activity is region [6]. As Pavitt suggests [cited by 7], new technological knowledge, due to its informal, uncodified nature, should flow locally more easily than over great distances. This implies that collocation facilitates knowledge spillovers by providing opportunities for interactions. The importance of the regional level results from the fact that the transfer of tacit knowledge is tied to individuals which requires either face-to-face interaction or the mobility of human capital between organizations, mainly within rather limited area [8].

The results of many studies in developed countries revealed positive correlation between collaboration of enterprises on innovation activity and their innovation performance [9, 10, 11, 12, 13, and 14].

There is a variety of reasons for firms to enter into collaborative arrangements for innovation. First of all, linkages and collaboration networks are key vehicles through which firms could obtain access to external resources, especially knowledge, which they cannot acquire by themselves. Interaction between market entities affects consequently the rate of innovation diffusion in the market [15].

Interorganizational interactions contribute to diffusion of knowledge and experience and to emergence of social capital that ensures the access to specific resources of the area of enterprises' activities. The synergic effects occur due to the learning process in the network of cooperation that makes the process of creation and absorption of innovation easier. Diffusion of linkages within the network contributes to more than proportional increase of benefits and linear increase of costs. As Metcalfe points out the value of the network rises with the squared number of its nodes [cited by 16].

As Ahuja points out [14] the number of direct ties can positively affect innovative output of the firm by providing three benefits: knowledge sharing, complementarity and scale. Firstly, due to interactions each partner can receive potentially a greater amount of knowledge from collaborative project in comparison to independently conducted research. Secondly, collaboration facilitates bringing together complementary skills from different firms. And

thirdly, collaboration enables firms to take advantage of economies of scale, as the larger research projects generate significantly more knowledge than smaller ones.

Moreover, the high costs and uncertainty related to innovation process constitute another impulse encouraging firms to undertake cooperation, which facilitates the information exchange and distributes the risk, immanently connected with innovative activity, between all cooperating entities. Collaboration plays a significant role especially in first stages of innovation process, characterized with the highest risk, mainly in the research and development activities, as it is hard to predict the results of conducted researches. The key features of innovation outputs are approximation, relatively long gestation period, inequality and absence of recurrence. These factors imply therefore, as far as the high costs of innovation activity are concerned, the collaboration on innovation activity is especially important for small and medium size enterprises which are not able to conduct innovation activities on their own due to limited financial resources.

It is important to emphasize the role of interactions between enterprises in possession of complementary technological or knowledge resources. Ascending differentiation of products and services in the market, due to structural changes in the economy and emergence of the economy of scope, requires of enterprises to acquire the wide range of skills, which enables them immediate adaptation to constantly evolving demand. Cooperation between enterprises of the same group increases elasticity and provide faster adaptation to new market conditions. On the other hand, the collaboration with customers aiming at implementation of adequate products or services guarantees better adjustment to their specific needs [17].

An important role in building firm's innovativeness plays the collaboration with research units and universities. These linkages are crucial for enterprises with limited financial, human or technological resources, which are not able to undertake the research and development activities on their own. The collaboration with research units enables them the absorption of already created technological innovations and adaptation to their specific internal conditions. In spite of the relatively easy access to scientific publications implementation of innovation usually requires interactions with scientists, who can transform information into knowledge [18]. The most current and crucial information are acquired in advance due to face-to-face personal contacts with scientists in comparison to access to published sources of knowledge [19]. This is caused by the fact that knowledge, besides other attributes could have tacit or codified nature. Codified knowledge is available through academic journals and information systems, such as Internet, whereas tacit knowledge is difficult to transmit by mentioned ways and need face to face contact. These attributes cause that the effectiveness of the transmission of tacit knowledge decreases with distance [20].

The important linkages in the innovations process are also those between enterprises and the consulting units. Complexity of innovation process imply that successfully accomplished introduction of innovation to the market often involves usage of results of scientific research, acquiring information regarding consumer demand, conducting test research in the market, as well as ensuring patent protection. Only few, usually large enterprises possess departments within their organizational structures, which could acquire and provide the needed information. The results of the research conducted by Davelaar and Nijkamp [21] as well as Brody and Florida [cited by 22] implicate that enterprises with limited access to external sources of information and acquiring knowledge relying on internal activities generate higher costs. The proximity of services complementary to innovation process conduce knowledge transfer, which additionally decrease costs and risk related to this process. Empirical evidence confirms positive relation between the implementation of innovation and the existence of the business services [23]. Moreover, the comparative analysis of the determinants of emergence of high-tech innovation economy between Silicon Valley, California and Cambridge, UK, shows that it is the lack of a business services sector that prevents Cambridge from becoming the European "Silicon Valley". Kenney remarks that what makes Silicon Valley unique is the large number of specialized organizations, which

assist in the establishment of new firms and attract human and financial resources to accelerate their growth [cited by 20].

### **3. The Analysis of the Relationship between Interorganizational Collaboration and Effectiveness of Innovation Activity**

#### **3.1 Data and Methodology**

The analysis was conducted for the industrial enterprises from 16 Polish voivodships, which are NUTS 2 regions, during the period 2008-2010, on the base of statistical data provided by Central Statistical Office of Poland [25].

In order to achieve the aim of the paper the comparative analysis of the share of enterprises which collaborated on innovation activity and share of enterprises which introduced new or significantly improved products on regional level was conducted.

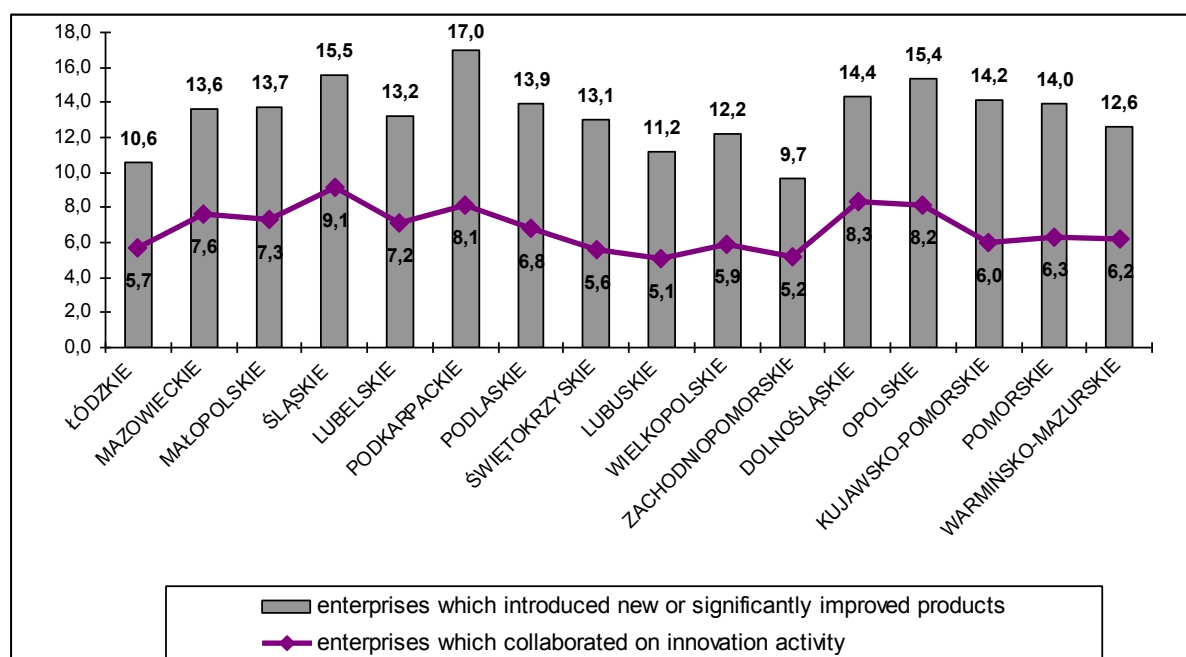
The analysis of the influence of collaboration on effectiveness of innovation activity was conducted on the base of linear regression model. Assuming that effectiveness is the ability to achieve determined aims and the fundamental aim of innovation activity of industrial enterprise is introduction of new or significantly improved products, the market value of new or significantly improved products was chosen as the indicator of the effectiveness of innovation activity. Whereas the number of industrial enterprises, which collaborated on innovation activity was chosen as the indicator of interorganisational collaboration. The number of collaborating enterprises in each region was estimated on the base of the indicator of their share in the total number of industrial enterprises. Similarly, revenues from sales of new or significantly improved products were estimated on the base of indicators of their share in total revenues from sales.

The research was also extended on the examination of possible non-linear relationship between the analysed variables.

#### **3.2 Results**

The Figure 1 presents the mean share of industrial enterprises which introduced new or significantly improved products and the mean share of industrial enterprises which collaborated on innovation activities (as % of total industrial enterprises) in Polish regions in 2008-2010 periods. On this base the conclusion could be drawn that there is a positive correlation between the share of industrial enterprises which collaborated on innovation activity and the effects of innovation activity achieved by industrial enterprises in regions (the estimated coefficient of determination was equal 0,65).

The proneness to collaborate among industrial enterprises in Polish regions during the examined period was relatively low (the share of enterprises collaborating on innovation activity varied from 5,1 to 9,1%). It is also worth to point out that divergence between regions in analysed field is relatively low – the estimated variability coefficient for the share of collaborating enterprises was equal 17,3% and for the share of enterprises which introduced innovation to the market was equal 13,4%.



**Figure 5** The mean share of industrial enterprises which introduced new or significantly improved products and which collaborated on innovation activities (as % of total industrial enterprises) in Polish regions in 2008-2010

In the next stage of the research the analysis of the influence of collaboration on effectiveness of innovation activity was conducted. For every year of the analysed period the number of industrial enterprises which collaborated on innovative activity in each region and the corresponding revenues from sales of new or significantly improved products was combined. The estimated linear regression model between analysed variables took the following form:

$$\hat{R} = -1.737 + 5.142 \cdot n$$

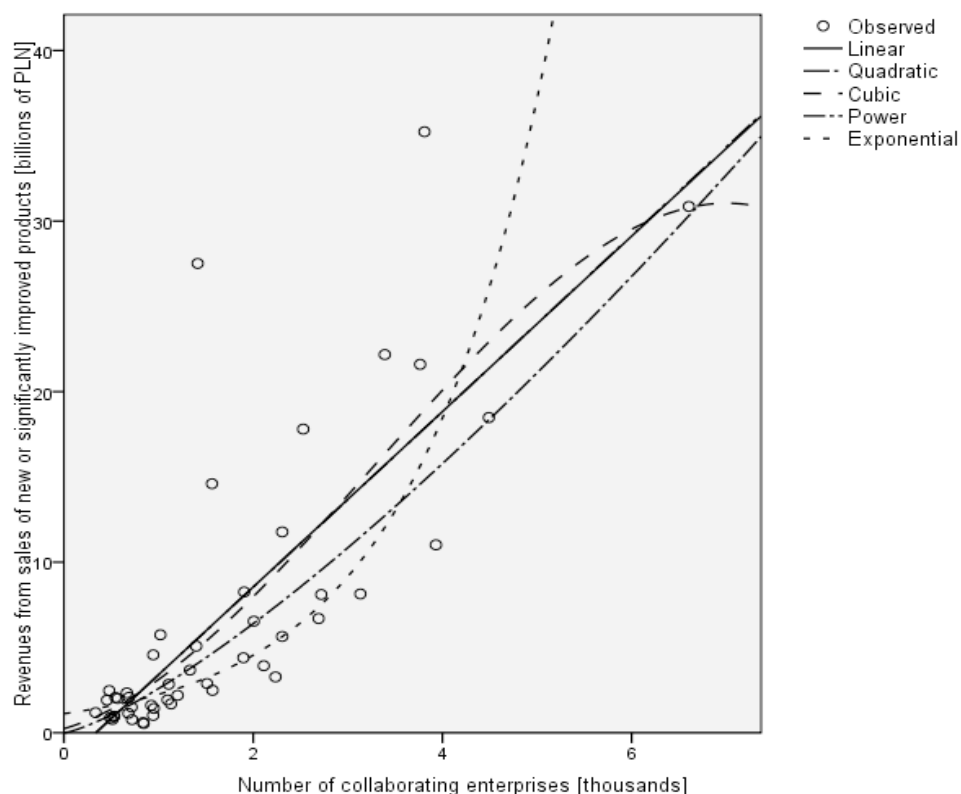
(1,251)                      (0,598)

Where:

$\hat{R}$  - Estimated revenues from sales of new or significantly improved products in billions of PLN,

$n$  – Number of industrial enterprises which collaborated on innovative activity in thousands.

On the basis of the constructed model it is possible to state that the increase of the number of collaborating enterprises by a thousand led to an average increase in the revenues from the sales of new or significantly improved products by 5.14 billion PLN. The regression model as well as the regression coefficient proved statistically significant on the significance level below 0.01. The adjusted coefficient of determination equaled 0.608, which means that the model explained almost 61% of the total variability of the dependent variable. It is therefore possible to state that the density of networks of collaboration in the field of innovative activity was an important factor determining the effectiveness of this activity.



**Figure 6** Scatter plot and curve fitting for analyzed variables

Interesting results were also obtained in the curve fitting analysis (Figure 2). They show that the relationship between the number of enterprises collaborating on innovative activities and the market value of the new or significantly improved products may in fact not be linear. The coefficients of determination varied from 0.616 for linear and quadratic functions up to 0.688 for the power function (Table 1). All estimated models proved statistically significant. These results indicate that the increase of the number of enterprises collaborating on innovative activities results in a more than proportional increase of the market value of the new products. This observation is consistent with Metcalfe's law on the value of network and support the position that emergence of innovative networks has positive impact on the effectiveness of innovation activity.

**Table1** Curve estimation results

Regression type	Model summary			Parameter estimates			
	R <sup>2</sup>	F-statistic	Significance level	Constant	b1	b2	b3
Linear	0.616	73.945	0.000	-1.737	5.142	-	-
Quadratic	0.616	36.169	0.000	-1.711	5.113	0.005	-
Cubic	0.622	24.086	0.000	0.241	1.606	1.424	-0,146
Power	0.688	101.454	0.000	2.595	1.302	-	-
Exponential	0.640	81.905	0.000	1.120	0.701	-	-

Note: dependent variable expressed in billions PLN, independent variable expressed in thousands of enterprises.

## 4. Conclusions

Basing on the theoretical and empirical evidence the collaboration on innovation activity has a significant impact on its effectiveness. The benefits the enterprises could obtain from the interorganisational collaboration on innovation activity are mainly: obtaining access to new sophisticated knowledge and complementary resources and skills, possibility to absorb already created technologies, risk sharing, increased elasticity, or possibility of acquiring wide range of information which are inevitable to conduct innovation activity effectively.

The main conclusions derived from the conducted research are as follows:

1. In Polish regions the share of industrial enterprises engaged in interorganizational agreements within the field of innovation activity is relatively low. However the results of conducted analysis revealed that in the regions where more enterprises collaborated on innovation activity relatively more enterprises introduced new or significantly improved products on the market.
2. The results of the analysis indicate the positive correlation between the number of the enterprises undertaking collaboration on innovation activity and its effectiveness, measured by the market value of the new and improved products. Furthermore, the increase of the number of collaborating enterprises led to more than proportional increase of the market value of innovative products.
3. The results confirm the important role of collaboration in a successfully accomplished innovation process and imply the necessity of creating favourable conditions for interactions between innovation-active entities. A key role in this field is undoubtedly assigned to regional authorities, which should facilitate emergence of networks of collaboration, by using mechanisms and instruments of regional and innovation policies.

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# Intellectual Property Practices of New Technology Companies

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Intellectual property (IP) management has been identified as one of the typical challenges for every company, but in particular for technology start-ups and newly created companies. The challenges are usually associated with a variety of issues including the lack of financial, human and technological resources. The objective of this paper is to use empirical data for the development of practical insights about the management of IP issues by young technology start-ups. We examine if there is a link between IP practices and the specific choice of a commercialization strategy. The intent is to make the existing knowledge about IP practices more tangible for new companies by providing clear insights. An interview-based qualitative research approach has been used to address the issues of young start-ups that are no more than 3 years old. The data from the interviews have been analyzed and key insights have been extracted. As a result of completing the above procedure it has been found out that there is a link between the IP practices and the commercialization strategy of a young start-up. It has also been found out that patents represent a key corporate asset that are used for both protection of knowledge but also as part of the overall business strategy. Finally key insights of IP practices in technology start-ups have been formulated.

## **Keywords**

Intellectual property rights, IP practices, commercialization strategy, technology start-ups

## **1. Introduction**

Intellectual property (IP) is central to technology oriented start-ups but is only one factor in ensuring success in a competitive market context. In practice many factors are used to define an effective IP strategy such as the technology, industry, market size and dependence on incumbents (Wilton, 2011). IP is seen as one of the most valuable assets of any business so it is important to ensure that a long-term strategy is in place to maximize value through efficient IP management (Macdonald, 2009). To maximize the full potential of the IP investment an effective strategy to manage, protect and exploit intellectual property is therefore crucial.

IP management has been identified as one of the typical challenges for every company, but in particular for technology start-ups and newly created companies (Junghans & Levy, 2006). The challenges associated with the IP strategies of young technology start-ups are related to a variety of issues including the lack of financial, human and technological resources. It is therefore important to study how young companies and entrepreneurs are dealing with specific IP issues. However, there is a lack of research studies focusing on the IP management practices of young start-ups.

## **1.1 Objective**

The objective of this paper is to use empirical data for the formulation of practical insights about the IP issues of new companies by focusing on their potential relevance for the overall business strategy of the firms. The research insights are based on the analysis of case studies of young innovation companies associated with the Syddansk Teknologisk Innovation, Odense, Denmark.

## **1.2 Contributions**

The intent of the research project is to make the existing knowledge about IP more tangible for new companies. It is also expected to contribute to the body of knowledge about IP practices in technology driven start-ups. The project will also provide insights about the relationship between IP practices and the specific choice of a commercialization strategy.

## **1.3 Relevance**

The topic discussed here will be of high relevance for both new entrepreneurs and existing companies who are currently struggling and dealing with IP issues. It will be equally relevant for organizations having the mission to drive the creation and support the evolution of newly created companies. It will also be relevant for researchers in the field of entrepreneurship who are interested in IP management practices.

# **2. Summary of insights from the literature review**

This section includes two parts. The first one summarizes the key insights formulated on the basis of the literature review. The second part focuses in more details on a framework describing the relationship between IP management and commercialization strategies.

## **2.1 Summary of key insights extracted from the literature review**

- There is a lack of systematic research focusing on the IP issues of start-up firms. The majority of existing research focuses predominantly on the IP issues of larger firms.
- The ideal type of protection depends on the type of technology that needs to be protected. Different technology sectors may differ in terms of the most suitable format of IP protection (trade secrets, patents etc).
- The specifics of a given technology domain make it very hard to find out what should be protected and what should not be.
- It is very difficult to find the right timing for engaging into the patent process.
- Companies tend not to maximize or know their IP-related revenues.
- It is expensive and quite resourceful for a start-up to acquire patents and trademarks.
- Start-ups do not tend to perform proper IP protection cost-revenue balances.
- The high costs related to the enforcement of IP rights could leave start-ups with no options.
- Issues of ownership rights and employee confidentiality can occur if there are no proper agreements. This is especially true for technology-driven start-ups.
- Alignment between the technology development issues within and outside the company (suppliers and partners) helps the articulation of the best possible IP strategy.
- Choice of commercialization strategy is related to type of IP appropriability within the specific industry and the dependence on incumbents' assets.

## ***2.2 Relationship between IP management and commercialization strategies***

Finding the right way of commercializing a company's technology innovation is deeply linked to the IP strategy. Gans and Stern (2003) have discussed the overall commercialization strategies of young and small-sized start-ups, which usually have little experience in the market. These are innovative firms with two or three technologies having a great potential for market introduction.

Gans and Stern (2003) suggest a framework that could be used by such firms to translating their technologies into a stream of economic returns, as the problem for most new start-up isn't invention but commercialization. The two major aspects in the framework are whether to compete against the incumbents or choose to cooperate with them: "Our framework is premised on the insight that, for many start-up innovators, those firms that control key complementary assets are precisely those that are the most likely and/or most effective potential product market imitators" (Gans & Stern, 2003, p. 334). Therefore, when start-ups have to choose a specific commercialization strategy, they have to treat their IP wisely in order to eliminate potential imitation by competitors. Gans and Stern (2003) see the strategy for start-ups as a tradeoff between establishing a novel value chain where they compete against established firms, versus leveraging an existing value chain controlled by the incumbents and by that make money through the market for ideas. Often the market for ideas is facilitated by the use of intermediaries like venture capitalists who handle the transaction with incumbent players. If a start-up chooses the last option and wants to cooperate with the incumbents, the innovator has to control formal IP like patents in order to reduce potential expropriation. This kind of appropriability is the key driver of an effective commercialization strategy as inventions only covered by secrecy will often be undermined in the market for ideas, and increase the potential for expropriation. Gans and Stern (2003) also see the commercialization stage for technology entrepreneurs as the first opportunity to truly define the firm's strategy and positioning at the market. "Because of their limited financial and human resources, start-up innovators usually can only pursue a small number of strategic options at any time without losing effectiveness in delivering consumer value", (Gans & Stern, 2003, p. 336). Therefore as start-ups are often limited in funds, it is crucial that the money is spent well when it comes to what IP to protect and what not to protect.

The actual framework by Gans and Stern (2003) focuses on two essential elements of the commercialization environment; the excludability environment and the role of complementary assets.

### ***Excludability environment***

Is it possible for the start-up to prevent effective development by an incumbent, who has gained insights about the technological innovation? There are no start-up executives willing their ideas to be imitated by the competitors, and as Gans and Stern (2003) discuss, not all appropriability mechanisms are useful when it comes to eliminate potential expropriation from for example ideas buyers. Speed-to-market or traditional trade secrecy will usually not be enough for keeping knowledge safe, as competitors are still able to copy the idea and imitation is therefore still present. Instead, two alternative appropriability mechanisms are chosen by Gans and Stern (2003) as the ones that may allow a firm to disclose technology, while still preventing bargaining power. These are IP protection and technology design. If the design is sophisticated enough, reverse engineering would still be possible but imitation remains a costly affair, and start-up innovators would be able to exploit the cost and market power advantages of cooperating with incumbents and still keep their bargaining power.

## ***The role of complementary assets***

Do the complementary assets of the incumbent's play a role in the development of the start-ups innovation, or does it contribute to the value proposition of the technology? One of the most important factors between established companies and a start-up is the costly-to-build complementary assets that incumbents already possess. For a start-up it might be very difficult to acquire such assets cost-effectively. Therefore, the need of specialized complementary assets may have a huge impact on the bargaining position of the start-up when competing or negotiating with established companies (Gans & Stern, 2003). A cooperation strategy could avoid costly duplications of investments, however the total amount of income the start-up can earn will be reduced.

**Table 1** Commercialization strategy environments (Gans & Stern, 2003)

		<b>Do incumbent's complementary assets contribute to the value proposition from the new technology?</b>	
		No	Yes
<b>Can innovation by the start-up preclude effective development by the incumbent?</b>	No	The Attackers advantage	Reputation-based ideas trading
	yes	Greenfield competition	Ideas factories

The analysis of the two elements of the commercialization environment results in the emergence of four different strategy approaches (Table ): the attackers' advantage, Greenfield competition, reputation-based ideas trading and ideas factories.

## **3. Research method**

The thesis adopts a qualitative research strategy which is based on a limited number of cases and the basic principles of grounded theory development (Strauss, 1987). Grounded theory development is a method for analyzing qualitative data systematically and intensively by using unstructured or semi-structured interviews and going through each sentence from the interviews one by one. The process results in the identification of all relevant terms, phenomena or issues that are then coded and grouped into different categories. The analysis of the relationship between the different categories results in research insights that can be seen as part of a theory that accounts for a pattern of behavior, which is relevant for all the cases involved, in our case - the start-up companies. The main reason for selecting the grounded theory approach was the fact that there is very little known about the IP challenges faced by start-up firms.

The development of grounded theory uses data triangulation (or research loops) for generating better insights. In this thesis the researcher has chosen to make two research loops. The first loop consists of interviews with young start-up companies that are not more than 3 years old. This first loop results in coding, categorization and development of insights. The second loop starts with the analysis of qualitative data collected through an additional interview with an older company (over 3 years old). This step will act as a reference case providing a mechanism enabling the refinement of the initial insights. It could be considered as part of a theoretical sampling procedure (Strauss, 1987). This approach has been chosen, as a start-up company with some more years of practice as compared to the younger companies, might have had the time and the opportunity to experience and reflect upon the impact of their own IP decisions from their start-up phase.

It should be pointed out that scholars are ambivalent on the role of insights from existing literature on the grounded theory development approach. Some of them point out that, since grounded theory development is usually used to study new phenomena, it should stay away

from literature so that it does not get biased by existing theory. Others choose a more balanced attitude towards the use of existing literature by pointing out that it could be reasonably used as a way of generating the main issues to be discussed in the interviews. In this thesis the second alternative was found to be more appropriate which resulted in the detailed literature review focusing on IP issues that could be of relevance for start-ups.

## **4. Discussion of results**

In this section, the insights from the analyses will be evaluated and discussed against the issues found in the literature review.

### **4.1 Development**

In the literature review the categorization of accessible and exclusive domain of knowledge by Gollin (2008) was used to examine how the IP domain is put together. Gollin (2008) pointed out the difficulties related to examining the market and the issues an innovator may face when existing IPR was not covered and examined before the patent application was sent in. The firms included in our sample have problems examining the market because of multiple types of IPR protection formats needed to cover their inventions in the IP domain. If a patent is also covered by trade secrets it can be extremely difficult to perform a novelty test. In these situations agencies or the patent offices are the only means of finding out if an invention is already protected by another company. In this situation a start-up has no chance of examining the patent market on its own as the application is not a part of the public domain before the application is finalized.

The next insight that needs to be discussed relates to the challenge of determining the right timing of engaging into the protection process. The issues faced by the firms in the research sample are very much related to the dilemma stated by Junghans and Levy (2006) - they want to protect their idea early, but they also want to make sure that the patent claims cover as much as possible. Gollin (2008) suggests an innovation triage model suggesting that patents which only advance organizational goals and not add high value to others should use a low protection strategy. However, this suggestion runs counter to the strategies chosen by the start-ups, as it could be seen that start-ups which take patents in order to attract investors (they want to advance organizational goal) are choosing a high protection strategy even though the patents may not add any value to others. Junghans and Levy (2006) also point out that the alignment between legal, R&D and financial departments are important for determining the right timing of entry. But as all the start-ups are quite small-sized, none of them has a dedicated legal department and it was impossible to identify any alignment problems.

The last major issue that was discovered in this category was about patent drafting. The benefit of an early filling strategy (Junghans & Levy, 2006) is that additional technology can be protected after the first filling. But this requires extraordinary clever work when it comes to forming the first claims in the patent applications. If the first claims are too narrow, additional technology cannot be added, and the benefit of an early filling is ruined. Instead, as it was seen in one of the firms in our sample, it can lead to the patent applications being cancelled which make the total cost of patenting even more expensive. The issue here is related to the need of making broader patent claims which cover the current technology being developed and eventually additions that will be developed in the following 12 months. The hard part is then to avoid citation of prior art, as it can be seen negatively by the investors, as well as become a troublesome procedure to rewrite the claims afterwards.

In general, it could be seen that the start-ups are using the IP protection types that are more easily available for them. The literature review showed that electromechanically companies

have their focus on patents (and not on trade secrets) as electronic or mechanical components can be difficult to protect by trade secrets Gollin (2008). The same applied to the case companies. One of the firms focused on trade secrets as it was easy for them to protect their key competences, while two other firms, both dealing with mechanical constructions, have focus on patents as main priority. An important factor for the new companies dealing with trade secrets is to make sure that their knowledge is not moved to the public domain, as secrecy will be lost and competitors can exploit the knowledge Gollin (2008). One of our firms faced such situation, as they were afraid of cooperating with another company in China where they do not have full control of their trade secrets. Once trade secrets are lost, especially in a young start-up, the company will be weakened as it may be the only IP they own.

## **4.2 Finances**

One of the previous insights indicated that it is important to prioritize what to patent. This was found to be important for most of the companies in the research sample as their funds were limited, and they therefore carefully had to prioritize how much knowledge they can afford to patent, and what instead should be kept as trade secrets. The literature by Gollin (2008) stated that this dilemma causes early start-ups to have a disadvantage compared to multinational corporations with high IP budgets. This is correct when you want to compete against incumbents, but all of the start-ups operate either with disruptive innovations or in niche markets where the competition isn't very high. Therefore the focus of patents has not been to eliminate competitors, but to attract investors by showing a sumptuous patent portfolio. Only one of the companies in our sample has mentioned the importance of keeping competition away.

Dealing with cost-revenue balances was not something the case companies were very familiar with. Junghans and Levy (2006) point out that lone investors or start-ups are having trouble with planning of costs and explains that they are most likely to make miscalculations with a consequence of poor budgeting. It could be seen from the interviews, that using fixed price strategies or basic calculations was more the rule than the exception among the interviewees, which very much clarifies that there is an issue here for start-ups. Junghans and Levy (2006) indicate that it is important to keep a positive cash flow throughout the application process. This can be done by, for example, having license negotiations with third-parties. The worst scenario is if a company (like one of the companies in our case) does not plan for the possibility of getting their investment back and end up with heavy and unpredicted patent cost burdens as it is described by Cahill and Rose (2009).

## **4.3 Human Resources**

In general, human resource issues do not seem to be a concern for the start-ups. Gollin (2008) addresses the issue related to process of granting ownership rights, but as the start-ups are usually working with contracts, this issue is usually settled from the beginning, i.e. before any dispute could arise. Non-disclosure agreements (NDA) are also something that is being traditionally used as an important factor in securing especially trade secrets. In our case, almost all of the companies were aware of having trade secrets, but not all were fully aware of what exactly was a trade secret. If trade secrets are not made clear for the employees, someone may leak valuable information without knowing it, despite being subject to a NDA (Gollin 2008).

One of the larger HR issues described in the literature review is how every type of IP protection can be violated at some point. There are clear recommendations about the best type of action that could be taken (Gollin, 2008). But as none of the start-ups have had the need

to enforce, it was not possible to examine how they have handled such situation. In general, enforcement was not among the biggest concerns for the start-ups.

#### **4.4 Strategy**

What was most interesting here was that the IP cockpit did not take investor relations into account. In our case the majority of the companies use patents as a value-driven factor for attracting new investors. Instead the cockpit focus on licensing income, share in revenues and administrative costs just to name a few, which is factors that the start-ups have disregarded at this stage of their business strategy. The companies indeed want to generate money through their patents in the future, but it has not been a factor at this early stage and other factors have instead driven the value of their IP. What generates value in the start-up phase of a young company is therefore not the same as for an older innovation company.

It is interesting to see the issues that start-ups are too young to have experienced and therefore do not use time on. For example enforcement has not been a problem for the case companies and it is not an area of interest for the start-ups. This can be a drawback later in the companies' life, as they have not calculated in the cost of enforcement. On the other hand may it might not always be necessary to react on copyist, and it can be useful for a start-up to have a strategy about when to engage in enforcement. Clifford and Bill (1996) recommend a "Do Nothing" strategy based on a cost/benefit analysis. If the cost associated with enforcement are too high and the infringing country is a small market, or part of the least developed markets, a company may consider not to do anything and instead enjoy their brand name being spread.

The companies have not dealt with licensing of their inventions yet, therefore haven't any of them experienced problems with blocking rights as it was described by Gollin (2008) or problems regarding drafting of license agreements. It was only one of the companies that were seriously considering licensing to third-parties and the issue was not how to shape the agreement, but whether they could trust that their knowledge do not leak from the third-parties, especially when it comes to countries like China or India.

Junghans and Levy (2006) use the term 'strategic alignment' to describe the synergy between the internal and external environment in a company. When asking the companies about their personal goals versus the goals from investors most of the companies stated that there was a good balance. Not because their goals were the same, but because the diversity in goals was seen as a positive thing. One of the firms explained, that if it was all up to them they would never get the products out as they would be stuck in the developing progress. On the other hand the investors are pushing to release the products as fast as possible so they can generate an income.

A topic not disused in the literature but related to the IP strategy of the start-up is the level of openness. Most of the interviewed start-ups find it difficult to find a balance between keeping the idea secret or talking and discussing the idea with other people or companies. When discussing this issue with one of the firms, one of the executive managers suggested another level of openness. He disregards patents as they eliminate the best practices. He has therefore considered the possibilities of following an open-source strategy instead. Most of the literature mentions open-source as a strategy for software developers but the firm on our sample is from the transportation industry and develops physical products. Would an open business model as it is described by Chesbrough (2006) be more interesting? Chesbrough (2006) mentions two perspectives; the defensive and the offensive. What the firm under question is doing now is following a defensive strategy, where only they can utilize their patents by eliminating others from using their knowledge. If they instead switched to an offensive strategy other companies could utilize their patents and the firm would still be in control of the rights. This approach would reduce some of the R&D expenses as the firm would have other companies helping with getting the best out of their patents. Chesbrough

(2006) suggest using innovation intermediaries for the communication between the parties as it gives many opportunities for companies to open up their innovation processes.

#### **4.5 Commercialization**

The idea of adding the commercialization aspect is to see if a company's IP practices have an effect on the choice of commercialization strategy. The framework suggested by Gans and Stern (2003) could be used to see if a company has followed an appropriate commercialization strategy according to their specific market situation, dependence of incumbents or competitors and imitation aspects.

One of the firms in our sample has chosen a collaboration strategy with a partner - an engineering service. At the same time, the partner is also their competitor as they are offering a competing technology/service. The benefit of the new service from our firm is that it can perform the service faster and cheaper than the old method provided by the partner. Therefore it is also in the interest of the partner to license out the patent so they can provide a better service for their customers. It be seen that in this case the collaboration strategy and IP strategy were very much interrelated. Our firm had a good business idea but due to various reasons it was not possible for them to start a company on their own. Therefore it was necessary to partner with the company holding the licenses that were necessary for the commercialization of their business idea.

During the interview it was found out that the partner was the incumbent and, according to them, preventing incumbents from imitating their innovation was completely possible. If incumbents wanted to imitate what our firm was doing, they would have needed to hire new employees and develop an equally good testing method. The next step is to look at the factors that drive the commercialization strategy. Gans and Stern (2003) suggest that the company has to demonstrate that their solution adds value to incumbents' customers. This has already been demonstrated as the solution by the firm in our sample is both quicker and cheaper which is a benefit for both the customers and the incumbent.

### **5. Conclusion**

The objective of this paper has been to address the IP issues and practices related to new technology start-ups. This has been done by interviewing young start-ups and generating insights by adopting a grounded theory approach. The questions and structure of the interviews have been generated via insights from the literature review. The commercialization strategy of one of the companies has been examined to find out if there was a link between the strategy and the company's IP practices. For most of the interviewed technology start-ups, patents represented a key corporate asset and were used for both protecting and as a part of the overall business strategy. Most of the issues addressed in the literature review were also something that the start-ups themselves had experienced. However there were some issues that were not part of the companies' considerations at this time, or some issues were not seen as problems at all. Most noticeable was that cost-revenue balances were not a practice familiar to the startups. Instead patents are used as a means in attracting investors and taking without keeping attention to the scope of license opportunities, i.e. without focusing on enforcement and without getting a revenue stream from each patent. This is a big issue as the patents may end up being a high cost burden for the start-ups if they do not use the means available to generate an income.



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# S. Beer's Viable System Model Application in Furniture Industry-A Case Study

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**Systems thinking are the process of understanding how things influence one another within a whole. This consists a ground on which the cybernetician S. Beer gave birth to the Viable System Model (VSM). One of the prime features of systems that survive is that they are adaptable. Another key component is Ashby's "law of requisite variety", according to which one should always try to maximize systems' internal variety and diversity, so as to be optimally prepared for any foreseeable or unforeseeable contingency. To this extend, we use the classic VSM display, to divide each department of production and management. This serves the fact that we need to analyze a system to its subsystems, in order to better understand and manipulate it. In the presented work, we utilize the principal functions and components of the VSM, i.e., System 1 – System 5. Elaborating on the given issue, we recognize the different functions of a furniture industry, which mostly produces customized products. We define the hierarchy of the system, its hyper system and subsystems. We also focus on production and management functional units, aiming to reach the source of any underlying discontinuity. Using the VS Model as a manual, we did the Systemic Analysis, and the weaker points of the whole procedure emerged. Above all, the ultimate effort is to conclude to a holistic management view, to end up in adopting a systemic solution for such a systemic underlying discontinuity.**

## **Keywords**

Cybernetics, System, System Analysis, Viable System Model

## **1. Introduction**

The Greek word "system", in Greek "*sistima*" (it comes from the ancient Greek verb "*συνίστημι*", pronounced "*sinistimi*" and means coexist), means a set of elements and their relationships, which also has its boundaries and other surrounding systems too. The characteristics of each system are not equal to the characteristics of all its components and this is because there are strong binds and relationships between them. This attribute is called "emergence" [1] and it's been in use since Aristotle. But the term "emergent" was coined by the pioneer psychologist G.H. Lewes [2] and since then, this term is commonly used for complex systems. Integrated systems seem to be the state of the art, as life becomes more complex and there are sophisticated emerging human needs. Besides, integrated systems prevail due to their high variety. Namely, Ashby's [3] "Law of requisite Variety", implies that only variety can absorb variety. This is a vital cybernetic principle according to which, in order to manage or control something effectively, you need to be able to at least equal the variety that the thing itself exhibits.

The world we live in is a system, or a family of systems. Hoverstadt [4] created a simple and understandable example, to imply systems functions and their key role to our own lives: "If I (referring to Hoverstadt) as an individual am the system we are interested in, I have a set of structural relationships with other people and organizations in my environment that can be used to define me as a system. I have relationships as a part of a family, within my business, with clients, with other consultants, with other systems people, with academics, with friends, with people I sail with, with others that I do other sports with, with people in my village and so on. Those couplings mould me as a system and I affect all of them. Some of them may be new, some may be old, some may be very tight, others much looser, but they are all relationships that help define who I am."

The Viable System Model is a model of the organisational structure of any viable or autonomous system. To this extend, we use the classic VSM display, to divide each department of production and management. This serves the fact that we need to analyze a system to its subsystems, we utilize the principal functions and components of the VSM, i.e., System 1 – System 5 and the Algedonic alert, from the Greek "άλγος" (in Greek pronounced "algos"), which means pain, and represents the alarms and rewards that escalate through the levels of recursion, when actual performance fails or exceeds capability.

The biggest Greek furniture industry provided us with information about the basic and more usual stages of production. By using the VS Model, we did the Systemic Analysis, and the weaker points of the whole procedure emerged.

It is understandable that such kind of tools can be used to consult companies, drive them to a more holistic management and coordination. Above all, the ultimate effort is to conclude to a new management model and after a respectable sequence of surveys and applications end up in establishing a systemic solution of a systemic problem.

## 2. The VSM Basics

During the 1950s Stafford Beer was working as a manager in British Steel and had become dissatisfied with traditional methods of organization. Rather than attempt to modify what seemed to be a system of fundamentally flawed ideas he took a dramatically fresh approach. He began to study organizations which were obviously several light years ahead in the way they functioned. Beer's studies of the human form, the muscles and organs and all the various nervous systems were the inspiration for the VSM. It may be considered as a generalization of the way that we all "manage" ourselves in response to a changing environment. Apparently he strongly supported his research including the following words [5]: "We will seek the source of effective organization in the cybernetics of natural processes - the brain itself. We can study the extraordinary beauty of the human form, and base an organizational model on the methods used by the central and autonomic nervous systems to manage the workings of the organs and muscles".

When Beer first developed the VSM he was seeking to encapsulate a set of fundamental laws in a science of organization. So far, there has not been found any sort of organization to which it does not apply. Although all organizations may be different in what they do and how they do it, the principles of an organization define whether it will be viable or whether it will die. And viability demands that organizations have the capacity to balance the demands of their environment but it also demands systems that can act coherently so as to be effective.

The overall purpose of performance management in a systemic model is quite different from the traditional model. In the former, what we are looking for is adherence or deviation from a specific target. In the latter, what we are interested in is to find out how to maintain viability [4]. This means that we focus on the relationships between each primary or subsequent activity and its environment.

The job of strategy is to ensure the viability of the organization by creating or maintaining the fit between the organization and its environment. If this relationship breaks, the organization

will collapse. Thus, by managing strategic risks is about spotting things that can disrupt the structural coupling between the organization and the different individuals. In addressing strategic risk, innovation has a key role. Namely, it allows organizations to create new structural coupling with their environments. It also builds stronger relationships with existing markets and provides openings to new ones. To manage strategic risk requires to manage a portfolio of innovation that can provide a set of options to create new future. This means that we need organizations capable of multiple innovations and different types of innovation at the same time. In the ideal strategic risk management approach, when a product dies, there are others to take over.

These procedures require a set of conversations between levels so that each management team can check the consistency of their proposals. On this basis, teams can and should modify their own plans, influence others and come up with a strategy that fits their part in a company. As for the environment, messages come into the organization all the time, some good, some bad, but the organization can only hear sorts of messages, if it is structured to hear. Individuals within the organization can hear the messages, but the organization cannot, if there isn't any structured department for hearing them.

Management also includes monitoring [4], which is a big chapter in Systems Analysis once it is the fundamental tool that it is used to assess and apprise risks. The word "monitoring" is loosely used in management. In fact, it is an in-depth, occasional check by management, of the reality of their operations. What monitoring does, is let the manager who gets the monthly reports experience the chaos of customer persistent demands to be prioritized on the last Friday of the month, while it seems chimera, for the manager and the production line, to hit their targets. The purpose of monitoring is three fold. Firstly, it reassures managers that what they think is happening is what is happening indeed. It also provides managers with a sufficiently deep understanding of what occurs and trust what is reported to them by their staff. Thirdly, it allows to increase the intimacy of the staff-manager relationship.

In a nutshell, good management of an organization is the one that operates efficiently. Without it, it will struggle to survive in the short term. Equally important is the need to envisage and create a future, aiming to development and adaption, in order to fit the environment.

## **2.1 The Five Vital Systems**

Beer's first insight was to consider the human organism as three main interacting parts: the muscles & organs (Operations), the nervous systems (Metasystem), and the external environment (Environment) [5]. Or a little more crudely, body, brain and environment. These are generalized in the VSM as follows in this section.

VSM works like a filtering procedure. The filters are those which assess opportunities for existing systemic problems. At each stage of the filtration process, more information and better assessments of the probability of success would become available. These filters are hidden in the relationships between the five systems.

The five systems according to human body functions are presented below [5]:

- **SYSTEM 1 (Operations):** All the muscles and organs, the parts that actually do something, the basic activities of the system.
- **SYSTEM 2 (Metasystem):** The sympathetic nervous system which monitors the muscles and organs and ensures that their interaction is kept stable.
- **SYSTEM 3 (Metasystem):** The Base Brain which oversees the entire complex of muscles and organs and optimizes the internal environment. There is S3\*, which examines the amount of the achieved cohesion and synergy of S1 operational units.
- **SYSTEM 4 (Metasystem):** The Mid Brain, the connection to the outside world through the senses, future planning, projections, forecasting.

- SYSTEM 5 (Metasystem): Higher brain functions, formulation of policy decisions, identity.
- Finally, it is the Environment, all the parts of the outside world which are of direct relevance to the system in focus.

The match between the human body systems and an organization is as follows.

**Table 1** Interpretation of the VSM Systems

System	Functionality
5	Policy, ultimate authority, identity
4	Adaption, forward planning, strategy
3	Internal regulation, optimization, synergy
2	Conflict resolution, stability
1	Primary activities

These systems form the basis of the VSM and the functions are general enough to make it applicable to any organization, which is viable in that it can maintain a separate existence.

### 3. The Application

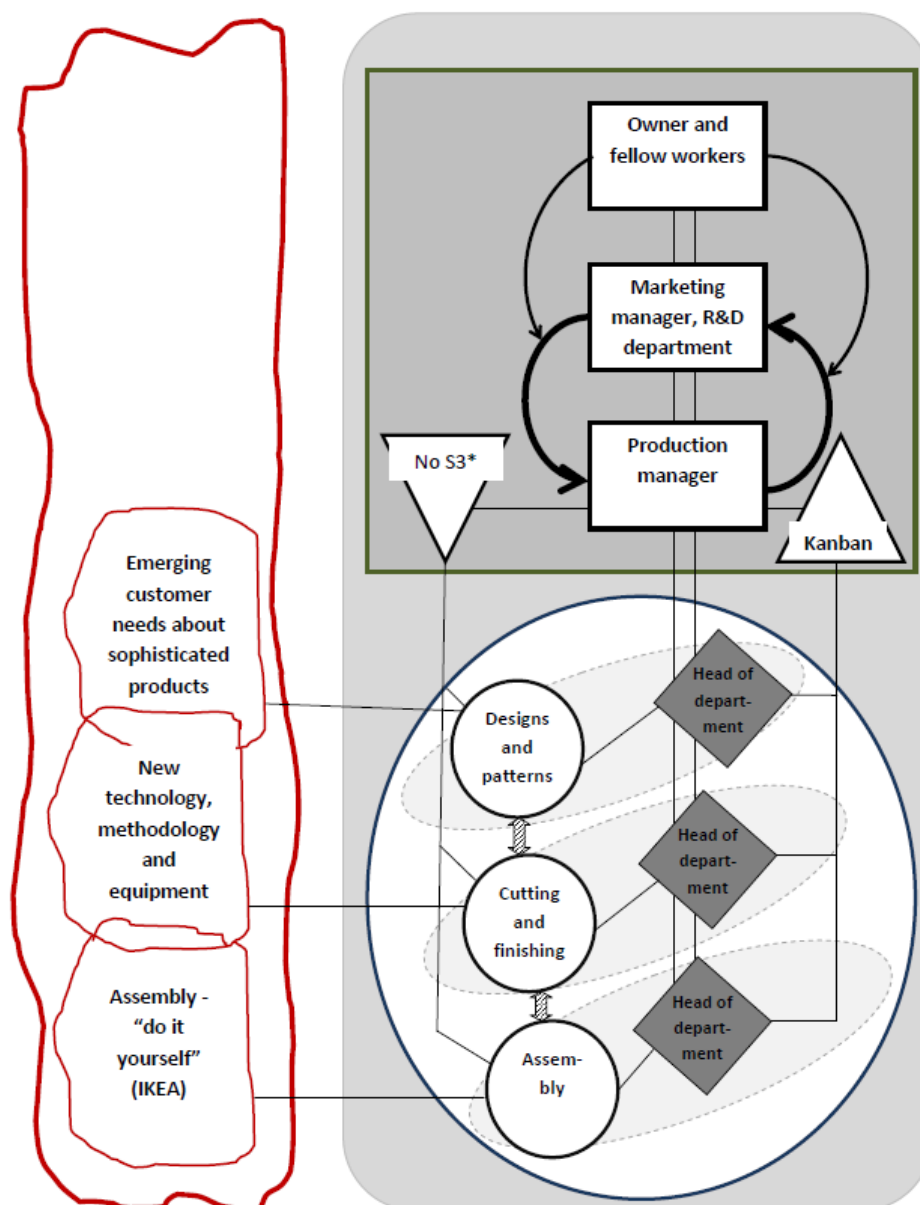
The understanding of the systemic linkages is critically important and also gives the opportunity to deal with many organizational weaknesses and actual problems. This relies on understanding how different aspects of decision making need to interact and understanding how these relate to operations and to the environment. In short, it depends on understanding how the organization operates as a system.

While applying the VSM in a company we should carefully balance between internal and external Environment. We should first record the “best practices” and the change of the markets, so as to choose the strategy that will serve the needs of the Environment, and by saying Environment we mean customers and competitors. Then, the Operation system should be accurate regarding to the orders, as variety in demand increases and customers become more sophisticated. At the same time, Operation departments should be capable to manage destabilized operations by increased complexity. The last word belongs to the Metasystem, which is able to change a plan, formulate it and finally ask the rest or the organization to implement it.

In this section we are going to present the VSM of the aforementioned industry. The survey includes all the five systems with the matrices of elaboration. The model was based on Beers’ templates [5] about modelling and organization according to VSM.

As far as you can observe, Fig.1 includes all 5 systems. “Design and patterns”, “Cutting and finishing” and “Assembly” as S1 and each of these departments has its chief who communicates with S3, i.e., the production manager, and there is a Kanban system, which is the company’s real-time Information System. Unfortunately, there is no S3\*, which means that there is not any person inspecting the production line while it is in progress. Production manager informs marketing manager and R&D (S4) department and then they report the owner – chief (S5) of the company. As for the external environment, this consists of emerging customer needs concerning sophisticated and personalized products, new technology, methodologies and production equipment and there are finally some competitors, such as IKEA with its customized products, which can be assembled at customers’ own home.

Next, we synoptically present the VSM analysis, including the basic VS Model, Fig.1, and the system matrices, S1, S2, S3, S4, S5, Table 2 and 3.



**Figure 1** The VSM of the Furniture Industry.

As for the S1, S2, S3, S4 and S5 systems, they are conducted as follows:

**Table 2 A, B, C** Elaborating on S1 Operations.

A	<b>S1<sub>A</sub>: “Department of Technical Design”</b>
<b>Functions:</b>	1. Prepare the designs (CAD) 2. Prepare the patterns for crash tests 3. Estimated cost for a new product
<b>Management (Metasystem)</b>	
<b>Chief:</b>	Engineer
<b>Liabilities:</b>	1. Labor division 2. Cooperate with Marketing and R&D departments 3. Work progress

	4. Recording of problems
<b>Diagnosis</b>	1. The chief is authoritatively dependent upon the Marketing. No space for initiatives.
<b>B</b>	<b>S1<sub>B</sub>: "Cutting Department"</b>
<b>Functions:</b>	1. Cutting wooden frames 2. Finishing the frames
<b>Management (Metasystem)</b>	
<b>Chief:</b>	Engineers
<b>Liabilities:</b>	1. Monitoring workflow 2. Report damage to materials and equipment to the factory director/production manager
<b>Diagnosis:</b>	1. Limited qualification of machine operators and lack of flexibility.
<b>C</b>	<b>S1<sub>C</sub>: "Assembly Department"</b>
<b>Functions:</b>	1. Connect wooden frames to metallic hookups 2. Add other parts needed for a furniture
<b>Management (Metasystem)</b>	
<b>Chief:</b>	Engineer
<b>Liabilities:</b>	1. Monitoring workflow 2. Record any misuse of tools
<b>Diagnosis:</b>	1. No automation during the assembly line.

**Table 3 S2, S3, S4, S5 The VSM Systems and the Diagnosis.**

S2			
No.	Functions	Managers	Interaction with other operational departments
1	Plan what product to produce, when and in what quantity	Kanban Information System	Interacts with all the operational units
Diagnosis:		1. The company only relies on the Kanban IS, so when it crashes the production line stops for a while.	
S3			
No.	Functions	Managers	Interaction with other operational departments
1	Sets specific objectives of each department and monitor their progress	Production Manager	Cooperation with all S1 departments
2	Monitor the progress of the orders	Production Manager	Cooperation with the warehouse manager
3	Sets the strategic plans for the whole company – expresses owner's desires	Production Manager	Affects the coordination between the upper and the lower layers of the company
4	Contacts with the franchisees	Production Manager	Inform marketing after franchisees' feedback
Inspection S3*		Lack of S3* there is no production inspector except from the production manager who deals with all the production and management problems of the plant	
Diagnosis:		1. Difficult coordination between departments in case of director's inability (illness, dismissal)	
S4			
No.	Functions	Managers	Interaction with other operational departments
1	Inner and external marketing (present a new to the departments, commercials)	Marketing and R&D	Close coordination with S5
2	Innovation and new markets management	Marketing and R&D	Cooperate with S3 to decide on the viability and the feasibility of a

				new product
<b>Diagnosis:</b>		1. There is no bidirectional informing between Marketing and S1 2. There is no CEO, S3and S4 undertakes this role		
<b>S5</b>				
<b>No.</b>	<b>Functions</b>	<b>Managers</b>	<b>Interaction with other operational departments</b>	
<b>1</b>	Carries the vision and culture in business	Owner and fellow workers	He informs S4 and S4informs S3, S2 and S1	
<b>2</b>	Determines and addresses the purposes and the objectives of the company	Owner and fellow workers	He informs S4 and S4informs S3, S2 and S1	
<b>Diagnosis:</b>		1. S5 has no substantial role 2. No direct communication between S3, S2, S1 and S.		

### 3. Diagnosis and conclusions

Generally, the individual departments work smoothly and properly, except from some slight cases. In order, for the company to work better, a more flexible and decentralized management is appropriate. The head master of the company (S5) should be more active, concerning the strategic plan and the objectives, and he should also closely cooperate with the Marketing department. As for the Kanban IS, the company could empower its workers' knowledge concerning IS, so that in case of a potential problem the overall company would be able to localize and solve it on the spot.

Besides, despite the fact that all the departments thoroughly inform the Marketing department, the marketers are not obligated to report any malfunction, except from the S5. So, the Marketing department informs the owner and chief, although its key role should be to understand the emerging need of the external environment and continuously improve knowledge about new practices, products, innovations and their opponents too. The hierarchy is vertical, relationships are not bidirectional and the departments are not given any independency, making sometimes the function rigid.

The current Production Manager, Mr. X, is the only one who really knows how the factory works and which are customers' needs. In case of him being absent, it is nearly impossible for the company to operate long term, mostly because of the poor understanding and coordination between the departments. The factory has the particular head manager for about 15 years, characterized by increased skills and experience to produce, so if he leaves, it is certain that his substitute manager will have not the same skills and capabilities.

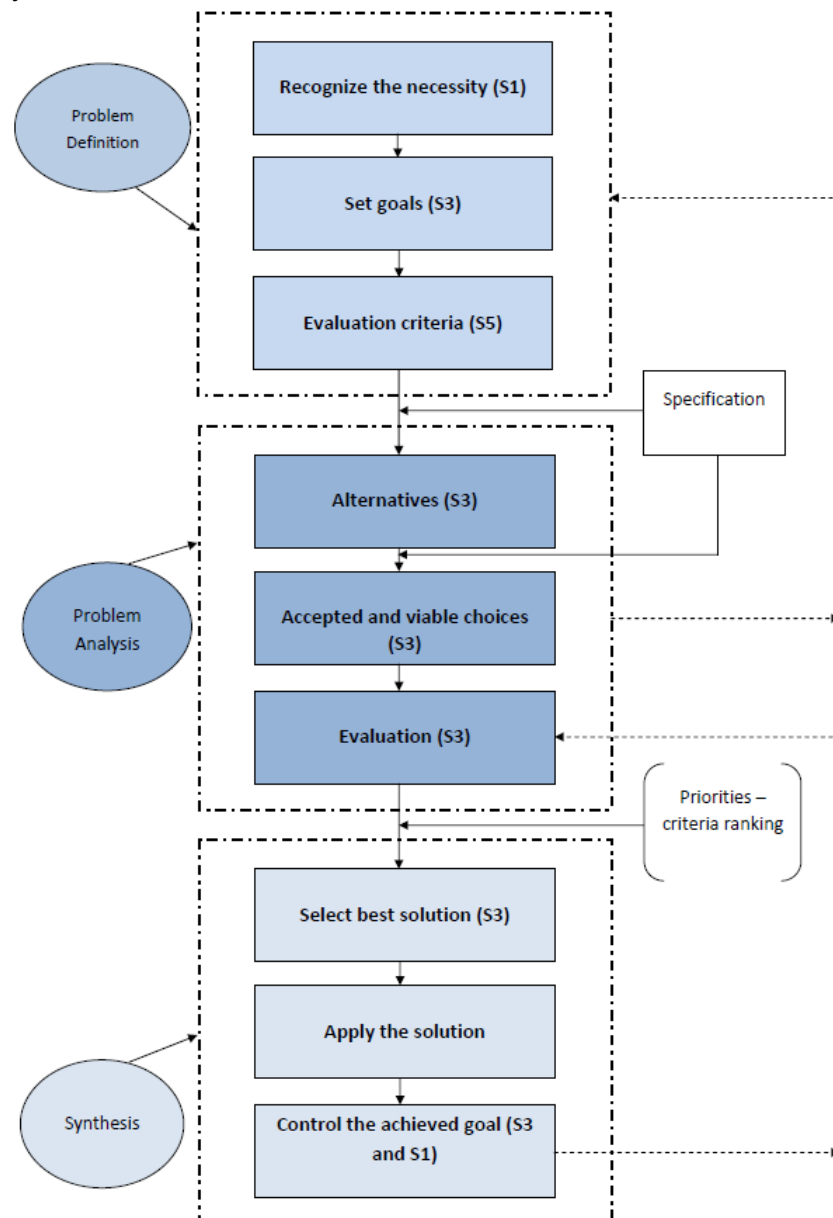
Knowledge about the Japanese Kanban is not much sufficient in Greece. Particularly, there aren't many industries that currently apply Kanban. Of course, although such a system draws the actual image of the company every moment, in terms of direct materials, semi-finished, delivered, stored, etc., if for some reason crushes, it will automatically put the entire production and distribution lines out of order. To avoid such a crisis, if there is impairment, the production will be carried out "manually" by a separate control office until the damage is restored. So in case of an emergency, the steps that the company should manually retrace are shown on the flow chart in Fig.2 [6].

In this paper we do consider System Analysis or VSM to be a panacea or a status quo, but the proposed methodology could be used to shape a new cast of mind, in order to keep the organization tightly bound and assist the managers throughout development, maintenance and innovation.

As far as future work is concerned, mathematical models, such as Grey Analysis prediction models, can also assist managerial models, to simulate and forecast the attitude of a system or a process. But before this, the crucial point is to closely and thoroughly monitor the behavior of the subject. In a nutshell, once the diagnosis is attainable, there is a high possibility to cure whatever shows malfunction. So the first stage is an organizational



analysis using the VSM as an investigative platform, to which is later added a number of subsidiary analytical tools as needed.



**Figure 2** The flowchart of systemic methodology.

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# **Demand-Driven Supply Chain using Lean & Agile Principles: a Culture for Business Excellence**

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The Demand-Driven Supply Chain systems are expected to be a notable challenge of the future. Such systems should follow the demand anticipation in order to be adaptive in any new market pretence. The dynamic character of Supply Chain could create dynamically profit or cost, depending on the management system that a company should espouse in order to handle its business duties. Process standardization in Supply Chain is an efficient method to restrain the cost, but also there is the synchronization that can standardize an adaptive structure of Supply Chain system. Lean thinking principles provide a basic framework for this necessity. Agile principles comprise the essentials of implementing tools and models that serve Demand-Driven Supply Chain. The tools impose the operation rules to diminish waste and the models impose the demand synchronized operation method. By this way, business waste can be discharged and competitiveness can be fortified. SMEs should be flexible and adaptable in accordance with market needs, concerning variety in planning, stored and sales capacity, cost effectiveness and even in quality assurance. Niche-companies, likewise SMEs, serve niche-markets. The number of niche-markets has been increased during the last decades. SMEs could be expanded in local level to satisfy local niche-markets. New SMEs could be created in order to follow the augmentation of niche-markets. Further research on this issue could enhance the implementation of Demand-Driven Supply Chain systems from SMEs. A framework of a new business culture are launched, models that are capable to support Demand-Driven are addressed, appropriate tools are described and Demand-Driven Supply Chain example is described in the current paper. Further research and business directives for regional development, concerning Demand-Driven Supply Chains are eventually proposed.

## **Keywords**

Demand-Driven Supply Chain, Lean & Agile Principles, Pull systems, Regional Development, SMEs

## 1. Introduction

The most common actors of a Supply Chain (SC) are customers, distributors and producers. They usually shape the simplest form of a SC System. SC is a network consists of producers and distributors in order to deliver goods and services to customers. Any of them needs support from other actors in order to run their operations with safety and accuracy. For example, such actors could be spare parts suppliers, technical services for IT, second, third and fourth party logistics providers, etc. Every one of them supplies materials, data or knowledge to another actor of the SC. The connection among them is dynamically changed across a period of time. A dynamic market creates unstable orders concerning unknown submission and delivery time, floating quantities and cost effectiveness. Methods of forecasting try to predict market needs in order to calculate the inventories and to plan material flow among the actors. Many cases demonstrate implementation fallacies of such methods to the real world of business.

Nowadays, markets become more and more demanding. Such markets are well-known as niche-markets and need customized products. They are small and flexible with highly unpredictable demand and price elasticity. The market segmentation is being increased. The traditional business culture of handling one big market with mass produced goods cannot handle the forthcoming niche-markets of customized products. Specific business cultures for any special Supply Chain occasion needs to be developed and implemented to handle environments of niche-markets. These modern business cultures face the common entity of handling customized products. Customized products derive from manufacturers that use Mass Customization Manufacturing Systems [1] and strategies close enough to Customer-Driven Value Creation [2], see below Figure 1. Also, a modern business culture can use Demand-Driven Supply Chain to manage the supply chain of a niche market [3].

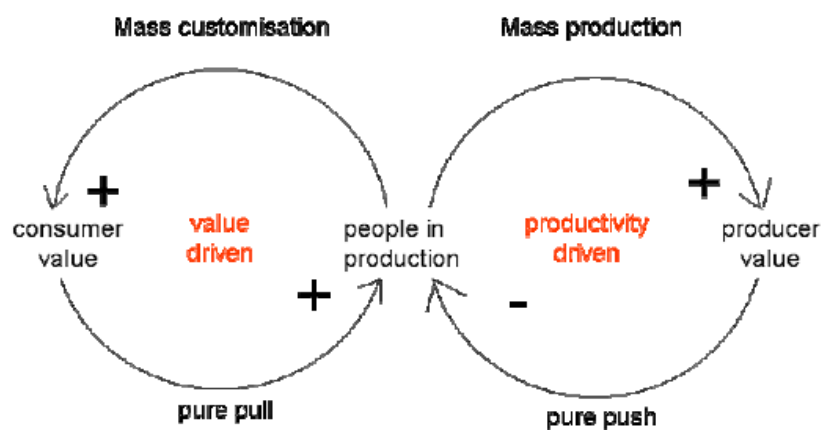
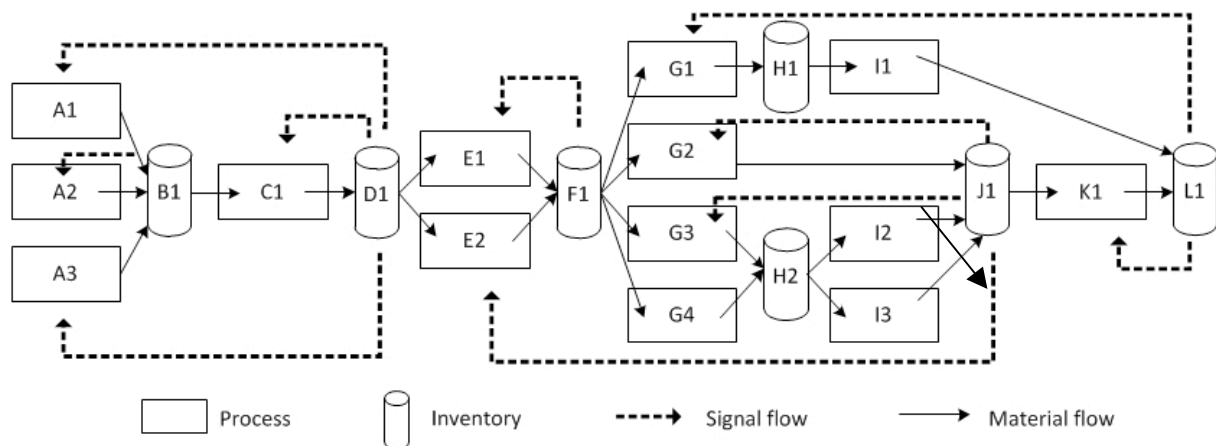


Figure 1 The post-industrial production system [4]

## 2. Demand-Driven Supply Chain or Networks

Demand-Driven Supply Chain systems or Demand-Driven Supply Networks (DDSN) reflect a close enough efficient pattern for building modern business cultures for SCs that use the method of DDSN in response to customized demand orders [5]. Appropriate pieces of information run upstream from customer's points to supplier's points (pull systems) and accurate capacity of materials run downstream from suppliers' points to customers' points, see below Figure 2.



**Figure 2** Pull Systems for DDSN - Materials and Signal-Information flow

## 2.1 Pull Systems

The concept of pull systems is based on the creation of inventory voids among actors of a SC. When this void is created, the predecessor actor has to refill it with exactly the same capacity of the same entity (a box with a certain capacity of material, a sheet outside the doctor's office, a pallet of specific products or a track with specific load of mixed goods). The inventory void is created due to the removal of an outbound stock by a successor actor [6]. Pull system can be implemented by any mechanism that provides signal feedback from the successor to a specific predecessor implying the refilling of successor's inventory void by the predecessor. In such systems, work releases are paced with the system status. Every actor in a pull system is synchronized with demand that derive from the last process, namely the pacemaker of a SC and therefore they are synchronized to each other [7]. Buffers for manufacturing and inventories for distribution can be limited by a pull system. Some examples of pull systems are Constant WIP (CONWIP), Multi-Loop CONWIP and Kanban, which are described below. Work in Process (WIP) level is set by demand with no forecasting. The level is predefined to be neither high nor low, but only demand-driven.

DDSN deals with inefficient profit and cost issues. Customized orders imply a great degree of diversity, concerning entities of production and logistics science that are related to cost. Every customized product needs special customized handling. The actors of the DDSN have to face efficiency issues due to such diversity [8]. These issues differ from period to period, even from day to day. In such dynamic environment, DDSN seeks not only for pull systems that deals with material and information flow, but also for new inventory policies. A general well-recognized principle for such environments could be the following:

"Every material flow needs at least one decoupling point, namely Inventory / Order (I/O) Interface, in order to provide customized entities in a low cost efficiency basis. The objectives determine how many decoupling points and where they should be set. Hence, policies such as postponement (customization delay) and others take place."

## 2.2 Leagile Paradigm

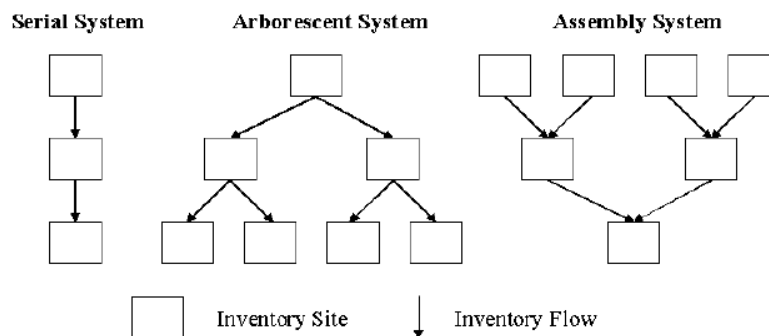
All the actors of DDSN that provide semi-finished materials to the decoupling points comply with make-to-stock principles. The actors that draw materials from decoupling points work in make-to-order mode. The actors before decoupling point can follow Lean Thinking principles. The rest can follow Agile principles. More specifically, a DDSN includes a hybrid form of lean and agile, Leagile Paradigm [9] [10]. Complex products need a high variety of suppliers. Some components are technically significant that add value to the customers. Some others are essential for security reasons, but not necessary for the customers. Some others are

standard but also expensive and bulky. Such components' diversifications require customized solutions and a hybrid supply chain that changes the decoupling point in analogy with demand. Lean SC chases to eliminate waste and keep only the value-added operations of SC Network[11]. Agile SC responds to demand fluctuations and focuses on customers' needs [12].

The cost of holding inventory for finished products mostly depends on how diversified it is. In niche-markets with customized products that are managed by a DDSN implies high inventory cost of finished goods. The way to decrease this cost is to find the appropriate decoupling point where the I/O Interface will split the flow into make to stock and make to order entities. This way is also considered as an efficient technique to coordinate DDSN. As this position is closer to raw materials, high product proliferation is fortified, on the other hand if it is located closer to customers, customer responsiveness and shorter delivery times are achieved, this method is known as postponement. Eventually, DDSN can efficiently deliver a great variety of finished goods to customers in shorter lead times.

### 2.3 Configurations of Supply Chains

Every environment has its own characteristics and therefore DDSN creates many configurations of SC in order to satisfy the dynamics of every environment. The configurations are related to the preferences of the product, the business strategy, the market characteristics and many other parameters. The structure of a DDSN system depends also on various parameters, such as inventory strategy, distribution policies, level of customization etc. Due to the pre-mentioned facts, multi-level SC systems are created and need to be managed. Some example configurations of Multi-level SC are displayed below in Figure 3.



**Figure 3** Configurations of Multi-level Supply Chains [13]

The levels are sorted top-down, starting with 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> level etc. The 1<sup>st</sup> level in Serial Systems may depict raw materials supplier, the 2<sup>nd</sup> is the manufacturer and the last one is the customer site. In the same manner, the Arboresecent system depicts materials that flow through a tree routing, from the main distribution center to regional warehouses and finally to customer sites. The Assembly System could be also a production flow. Many fabricators or manufacturers provide materials to middle-assemblers in order to build the main parts of a finished good. Eventually, they provide the main parts to the final-assembler in order to build the finished good. Many aspects of inventory handling can be implemented in a Multi-level SC System [14]. The procedure for searching the best solution for this complexity is known as Hierarchical Inventory Management. This method tries to find trade-off solutions among, inventory capacity for each level, the inventory location concerning geographical locations, lead time and cost, and finally the mixed-model variability for each level. Especially, this method can allocate inventory in a DDSN for niche-markets, by following the Multi-Echelon Inventory Location Principle:

“High product variability with low volumes should be stocked in high level of DDSN in order to minimize inventory cost.”

## 2.4 Bullwhip Effect.

The phenomenon that demand fluctuations increase inventory capacities from the bottom of Multi-Echelon SC to its top levels is known as the Bullwhip Effect [15]. This happens because of batching, forecasting errors and unexpected market behaviour. The solutions that are proposed for this phenomenon are reducing batches; sharing demand data with all actors of a SC through Vendor Management Inventory (VMI) [16], reducing lead times, reducing costs equals to keep low prices and adopting Mass Customization and Customer-Driven Value Co-Creation Strategies. The afore-mentioned methods that diminish the bullwhip effect in combination with Lean Thinking Techniques and flexible pull systems formulate the essentials of a DDSN.

## 3. Demand Driven Supply Network Design

A SC Network needs a clear understanding of the business strategy, significant features of markets and customer requirements, and competitive landscape to form its context. Appropriate steps to design a SC Network are addressed below:

**Table 1** Essential steps to form the context of a Supply Chain Network [17]

Step 1: State the Network Objective in the context of the business strategy.
Step 2: Identify Customer Requirements in the Context of the Competitive environment.
Step 3: Benchmark the Competition
Step 4: Assemble a set of Value-Adding trading partners to transverse the Network.
Step 5: Test that the Organizations in the Core Network are all Trading partners.
Step 6: Ensure that the core network aligns with the business strategy.
Step 7: Optimize the Product Cost Structure within the core network.
Step 8: Rationalize the length and the width of the core network.
Step 9: Define the set of information-to-material subcycles.
Step 10: Define the set of information-to-cash sucycles.
Step 11: Maximize the order-to-delivery-to-cash velocity among trading partners.
Step 12: Extend the core network to reach every customer, to complete the composite Bill of Materials (BOM), and to access every supplier.
Step 13: Minimize network order-to-delivery-to-cash variability.
Step 14: Generate a composite BOM
Step 15: List all Stock-keeping units (SKUs) and Pareto the list revenue and by contribution margin.
Step 16: Determine a predominant BOM Type from the composite BOM.
Step 17: Fit the BOM to the Network and decide the network operation mode.
Step 18: Locate the push/pull boundary of inventory buffers and cash buffers based on customer expectations and competitive delivery.
Step 19: Determine network capability over the expected demand uncertainty.
Step 20: Identify the network constraint and the network orchestrator.
Step 21: Position and size the inventory buffers.
Step 22: Analyse the composite BOM for Opportunities to postpone and to risk pool inventory. Use statistical safety stock on unique materials to support mix variation.
Step 23: Forecast the right things and forecast things right.
Step 24: Broadcast demand in parallel to minimize the bullwhip effect.
Step 25: Use collaborative pull planning in the pull zone.

Step 26: Use collaborative push planning in the push zone.
Step 27: Maximize the vocalization of demand across the network.
Step 28: Synchronize flows in the pull zone of the network.
Step 29: Plot the principle axis on the value circle.
Step 30: Plot the global performance measures axes on value circles.
Step 31: Maintain network alignment with the business strategy.
Step 32: Optimize inventory and cash assets in the nodes and pipelines.
Step 33: Maximize visualization throughout the network.
Step 34: Use the perfect order as a measure of value and quality to the customer.
Step 35: Use Return on Invested Capital (ROIC) to measure owner value.
Step 36: Optimize network planning and performance measurement feedback.
Step 37: Fit an information system to the network.
Step 38: Manage change continuously.

A context of a DDSN uses as basic steps the Table 1. Some steps have to be transformed according to the preferences of a DDSN. Namely, objectives in Step 1 are shaped around Mass Customization and Demand-driven Value Co-creation strategies. Customer requirements in Step 2 are based on quick response and easy to design, and build customized product platforms. Step 4 claims trading partners that accept Step 1 into their business environment. Steps 12, 14, 15, 16, 17 and 38 have to be strengthening, due to the fact that customized products could create dynamic fluctuations on cost efficiency. Even the variability in parts and orders, the network order-to-delivery-to-cash variability in Step 13 needs to be minimized in order to enhance economies of scale. Steps 18, 19 and 20 should be focused on Lean and Agile principles. Steps 21, 22, 23, 24, 25, 26, 27 and 28 are concerned about the pull system that should be implemented. By using the pre-mentioned methods of a pull system, synchronization, flexible planning and scheduling can be adopted for any demand fluctuation. Steps 32, 33 and 36 have to change course towards the demand-driven material flow that pull methods propose to. Every order is a measure of value and quality in Step 34. All the other Steps can be adapted unedited in order to design a DDSN.

## 4. Example of Demand Driven Supply Network

A conceptual model of a DDSN is displayed above, in Figure 2. Pull Systems are used for material replenishment planning across the value stream. We assume that the processes which are supposed to fabricate parts are A, C, E, G, I and K. The inventories are B, D, F, H, and J. The L1 is the Point of Sale (POS) where demand data is collected by customers' behaviour. The flow starts to run when the inventory from the POS is low and orders for materials replenishment are created. In a DDSN, an order could be unique if a company runs Customer-Driven Value Co-Creation strategy. This implies a pull system of handling unique customized materials across the last actors of the SC. The decoupling point of the SC is where the customization starts. After the decoupling point flexible material handling systems, such as Kanban Signals are implemented. Across this flow of customized products, Agile techniques need to be established on flexible actors. Actors before the decoupling point need to use Lean techniques. In some cases, lean techniques are effective after the decoupling point and the agile techniques are also effective before the decoupling point.

The orders go upstream to the predecessor actors of the SC. More specifically, L1 demands specific capacity of customized products from assembly K1. In assembly processes the setup and other non-value added times are usually low as opposed to fabrication processes. Kanban system for flexible and agile processes is affordable and also very efficient. The pull system is Kanban system that a predefined capacity of specific goods is consumed by L1

and afterwards K1 supplies L1 with this Kanban capacity. Kanban system is used for K1 to L1 material flow. The same capacity is ordered to be assembled by K1 and appropriate capacity of parts is ordered from J1 to refill the assembly K1. The L1 orders parts from G1 via a CONWIP, due to high non-value added times across G1 – H1 – I1 – L1. The order starts from G1 because of the pull system from L1, but push approach and CONWIP is used between intermediate actors. So, CONWIP is used for G1 – H1 – I1 – L1 flow. By the same way, Kanban is used for G2 – J1 flow. CONWIP is used for G3 – H2 – I2 – J1 flow. CONWIP is used for E2 – F1 – G4 – H2 – I3 – J1 flow. Kanban system is used for E1 – F1 flow. CONWIP is used for A1 – B1 – C1 – D1 and for A3 – B1 – C1 – D1 flows. Kanban system connects C1 – D1 and A2 – B1 flows.

The DDSN that is analysed is a Multi-Echelon SC with many configurations of pull flow system including Multi-Loop CONWIP for the whole DDSN and, Kanban and CONWIP pull systems among actors. If the actors agree to obey to the rules of the pull systems and follow the rules that demand flow will create, without taking personal initiatives and without accomplishing orders out of the pull system planning, SC orchestration will be succeeded and a cost effective DDSN will be created.

## 5. Conclusions

A connection between Leagile SCs, DDSN, Mass Customization and Demand-Driven Value Co-Creation is achieved. Academic and Professional directives are set for researchers and practitioners about Demand-driven supply chain networks. Essential principles of Lean Thinking and Agile Principles, methods and tools that support SMEs to establish Demand Driven Supply Networks for regional development are addressed. This comes to addendum with the fact that niche-markets are increased, spread and seek for demand-driven business concepts. Methods of inventory handling and tools for material flow planning and scheduling are described in the current work. Every SME has to personalize the pre-mentioned systems in order to fit to its business culture. Every SME can nurture new personalized business culture using essentials from this work. The new business culture relies on reducing time waste via Lean techniques and performing resources for demand-driven orders.

## Abbreviations

SC	–	Supply Chain
DDSN	–	Demand-driven Supply Network
WIP	–	Work in Process
CONWIP	–	Constant Work in Process
I/O interface	–	Inventory / Order interface
VMI	–	Vendor Management Inventory
BOM	–	Bill of Materials
SKU	–	Stock-keeping unit
ROIC	–	Return on Invested Capital

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# Value Engineering in Industrial Equipment Modeling

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**Value engineering is defined as a method of competition, organized and creative, who wishes to satisfy the user need by functional, economic and multidisciplinary demarche. The paper presents a concrete example of the application of Value engineering approach in a particular case. In the first iteration is make the modeling design and in the second iteration is make a roll crusher design optimization.**

## **Keywords**

Design, modelling, Value engineering, functional analysis

## **1. Introduction**

Value engineering (VE) is a systematic method to improve the "value" of goods or products and services by using an examination of function [1].

Value engineering is a "method of competition, organized and creative, aiming to meet user need in a specific design approach, by functional, economic and multidisciplinary demarche".

Value engineering is characterized by:

functional approach, requires the formulation of the problem in terms of purpose and not in terms of technical solutions for finding the essence and what is relevant, thus avoiding the tendency to limit the existing solutions and unconscious prohibition of many possibilities, the economic approach by systematic reference to costs, both those of previous products from the same family and their functions and what can be estimated for each function or each new solution, multidisciplinary approach by working in groups, calling for an animator and a decision maker. Working Group brings together all the skills required and people of different formations and responsibilities, allows finding a consensus on the functions, performance, principles, solutions and costs, all promoting the creativity and enrich the information available. This group allows adjustment problems concurrently, which otherwise would not only be addressed sequentially and isolated by various participants in product creation and production. Particular group should be able to provide the necessary skills in its midst to estimate costs based on the evidence at that stage. Group proposes, but the decision rests with the person who decides.

This creative approach to achieving a wide range of possibilities, allows to take into account market developments, to the environmental and technical solutions, customizes by:

- Critical analysis of data, information and solutions,
- Its iterative nature,
- Specific use of certain means and methods,
- Systematic approach, organized and participative, making use of such a work plan,
- Reasoning that leads to a user.

Value engineering method includes 7 stages, its actual application is iterative: each phase can be resumed with new additions to the latter phase.

For each of the seven phases of Value engineering methodological approaches was developed simple and general rules.

Table 1 shows the Value engineering steps, accompanied by objective factors involved and examples of used methods.

Value engineering approach consists of three successive tests, who transforming all the needs expressed by users or not, in optimal solution of a technical-economic study:

1 - The first key point of the approach, the Functional Analysis of Need is to identify and formalize needs that product, service, etc., must satisfy,

2 - Then, Functional Analysis of Product will translate those needs into technical solutions,

3 - Lastly, Value engineering (VE) is an optimization of these solutions to obtain acceptable compromise between the level of satisfaction of needs and costs.

These three tests are conducted sequentially and iteratively [1].

**Table 1** The Value engineering (VA) steps

Stages	Objectives	Who reply	Sample methods
1. Action orientation	Determining the subject of study and objectives, stakes assessment and the approach, training working group	Person who decides, VE Specialist	Profitability analysis, strategic plans, check-lists
2. Knowledge of the problem or seeking information	Classification problems, assembling technical information, trade, economic, industrial property rules. Assemble information	VE Specialist, Group VE, Other experts	Product life cycle, technical organization of the product, customer analysis applications
...			
7. Implement of the solutions	Industrialization, to-market sales, capitalization experience	VE Specialist, Group VE, Specialized business services	Plan achievements, track records, balance sheets

## 2. Value engineering Steps. Functional modelling of equipment. Iteration 1

Following the methodology outlined in table 1, should be handled in this paper how the redesign of a subset of a roll crusher for crushing various materials: roll crusher. In figure 1 shows the original version of the crushing roller. The Roll Crusher scheme can be seen in figure 2.

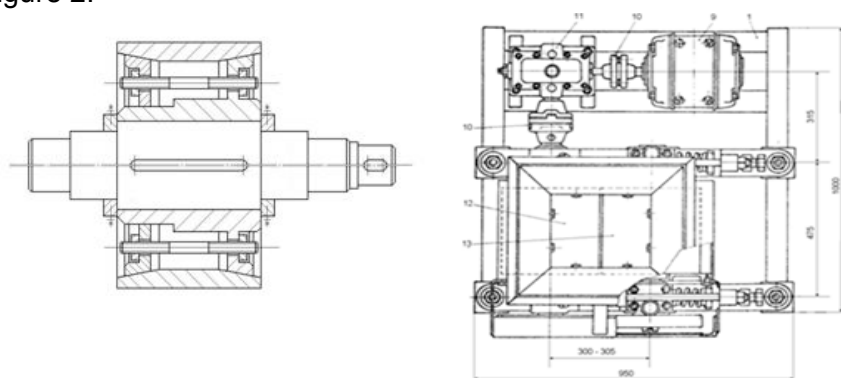


Figure 1 The roll crusher

Figure 2 The roll crusher:

1 – frame; 2 - mobile camps; 3 – compression springs; 4 – adjustment screws; 5 – medium plates; 6 – tie; 7 – fixed camps; 8 – lubrication system; 9 – electric motor; 10 – coupling; 11,14 – gear; 12, 13 – **roll sher**; 15 – charging funnel; 16 – trough

The functions of this machine are presented in table 2 [2]

**Table 2** List of functions

\*FS – Service function \*\*FC – Constraint function \*\*\*FE – Estimation function.

Symbol	Function	Type of function	Technical dimension of function		
			Name	UM	Value
F1	Ensure material crushing	FS*	blast degree	-	3 - 12
F2	Ensure protection of machinery	FC**	moment	daN*m	200
F3	Ensures adjustment	FC	length	mm	10 - 25
F4	Provides support of crusher	FS	weight	daN	2000
F5	Aesthetics	FE***	colour, form	-	-
F6	Supplies working energy	FS	moment	daN*m	100
F7	Ensure uniformity of the movement	FS	revolution	rpm	30
F8	Capability of work	FC	volume	m <sup>3</sup>	2
F9	Wear resistance	FC	eroded material	g/year	
F10	Part evacuation	FS	debit	m <sup>3</sup> /h	1 - 2
F11	Provides material supply	FS	debit	m <sup>3</sup> /h	1 - 2

### 3. THE Value weighting of the functions. ITERATION 1

Table 3 presents the value weighting of the functions and the figure 3 present the value weighting of the functions [3].

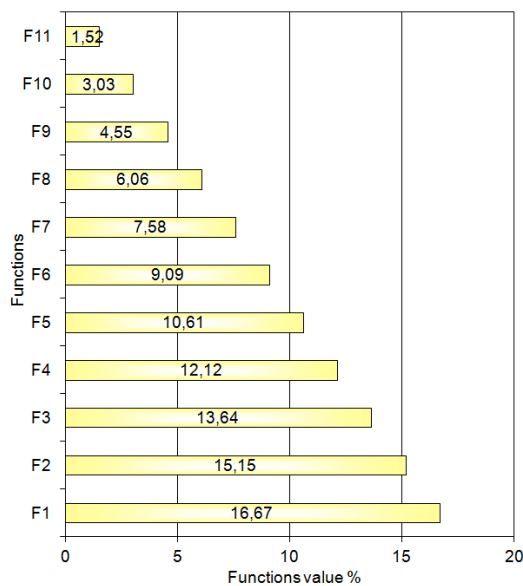
Product value is the sum of functions levels and is equal to 54.

### 4. THE Cost weighting of the functions. ITERATION 1

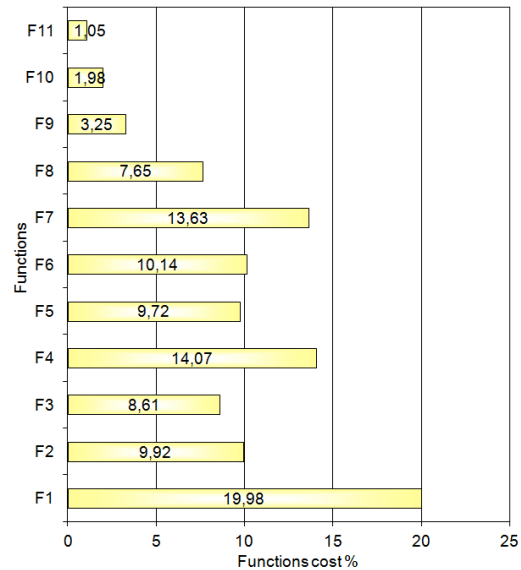
Costs were assigned to the various functions by means of the functions-costs matrix shown in table 4 and figure 4 present the diagram of the cost weighting of the functions.

**Table 3** The value weighting of the functions

Functions	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	Total
No. of points	11	10	9	8	7	6	5	4	3	2	1	66
Ratio	0,167	0,152	0,136	0,121	0,106	0,091	0,076	0,061	0,045	0,03	0,015	1
*Percentage %	16,7	15,2	13,6	12,1	10,6	9,09	7,58	6,06	4,55	3,03	1,52	100



**Figure 3** The value weighting of the functions



**Figure 4** The cost weighting of the functions

**Table 4** The cost weighting of the functions (\*Y coordinate, \*\* monetary units)

Parts	Cost part	Functions											Cost part**
		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	
1-Engine	%	20			5	15	30	10	20				100
	700	140	0	0	35	105	210	70	140	0	0	0	700
2-Gear	%	10	50	5	5	10	5		10	5			100
	200	20	100	10	10	20	10	0	20	10	0	0	200
n-...	...											...	0
Total cost	3205	640	317	276	451	311	325	437	245	104	63,4	33,6	3205
Ratio		0,2	0,09	0,08	0,14	0,09	0,1	0,13	0,07	0,03	0,02	0,01	1
*Cost of functions	%	20	9,92	8,6	14,1	9,72	10	13,6	7,65	3,2	1,98	1,05	100

## 5. Determination of the Functional Model. The value and cost weighting of the functions. Iteration 1

The construction of the diagram, the value and cost weighting is presented. Based on the values for coordinates  $x_i$  and  $y_i$  presented in table 5 the diagram of figure 5 is plotted.

The parameters have the following computed values:  $a = 0,98$ ,  $a = 44,4$  o,  $S = 111$ ,  $S' = 0$ .

Table 4 provides the necessary values for constructing the following types of diagrams:

Diagram of the value weighting of the functions shows the ranking of the functions by their value (fig. 3), diagram of the cost weighting of the functions shows the ranking of the functions by their functional cost (fig. 4), The diagram allows significant comparisons of the functions costs and within the total costs, of the work and material costs:

- The very expensive functions with the highest weighting in the total cost of the product,
- The secondary functions that are very expensive in relation to the service functions, or even more expensive than these.
- Diagram of the value and cost weighting of the functions (fig. 5).

**Table 5** Computational elements (\*the smallest squares method-SSM) for plotting the diagrams

*SSM C.E.	Functions											Total value
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	
X <sub>i</sub>	16,7	15,2	13,6	12,1	10,6	9,09	7,58	6,06	4,55	3,03	1,52	100
Y <sub>i</sub>	20	9,92	8,61	14,1	9,72	10,1	13,6	7,65	3,25	1,98	1,05	100
(X <sub>i</sub> ) <sup>2</sup>	277	229	186	146	112	82,6	57,3	36,7	20,6	9,18	2,29	1162
X <sub>i</sub> *Y <sub>i</sub>	332	150	117	170	103,	92,1	103	46,3	14,7	5,99	1,58	1139
**S	13,2	24,3	22,6	4,80	0,45	1,51	38,5	2,90	1,45	0,98	0,19	111
***S'	-121	149	129	-53,1	14,2	-22,3	-94,0	-20,6	10,9	6,01	1,32	0

\*SSM - C.E. = Computational elements; \*\*S =  $\sum(Y_i - a \cdot X_i)^2$ ; \*\*\*S' =  $\sum(2 \cdot a \cdot (X_i)^2 - 2 \cdot X_i \cdot Y_i)$ .

The diagram reveals a Pareto type distribution, meaning that 20 - 30% of the total number of functions includes 70 - 80% of the total costs of the functions. These functions are F1, F4, F7 and F8 and are considered to be very expensive functions.

The real situation is represented by the shape of the straight line ( $y = 0,70 \cdot x + 2,27$ ) in figure 5, plotted by means of the smallest squares method and showing disproportions in the distribution of costs and in the contribution of the various functions to the value of the product.

An analysis of the diagram of figure 5 shows that functions F1, F4, F7 and F8 are located above the regression lines, real and ideal, indicating high costs, not justifiable in relation to the value.

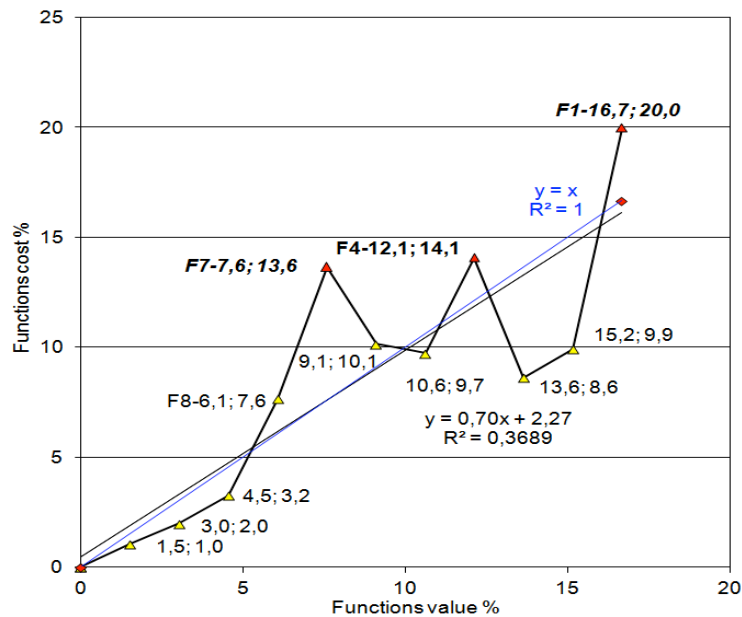
In the diagram of figure 5 can be seen following straight:

- The straight of equation  $y = x$  (first bisector), straight mediating share in value and cost functions, show the ideal situation of proportion to the two weights, the value and cost weighting of the functions and
- The straight of regression equation  $y = 0,70 \cdot x + 2,27$ , approximates arrangement of points, show the real situation of proportion to the two weights, the value and cost weighting of the functions. The  $R^2$  – squared value on chart is very small  $R^2 = 0,3689$ .

Analyzing the diagram in figure 5 shows that some functions are above the regression lines, this attests to high costs, unreasonable in relation to value. These aspects allow the assumption that these functions are deficient, hence the solutions to be identified are to focus on those assemblies, parts, materials and technological operations that contribute, within the general structure of the product, to the achievement of these functions.

In the first iteration of the Value engineering study will provide the functional model of this roll crusher, to see the deficient functions.

These functions are F1, F4, F7 and F8.



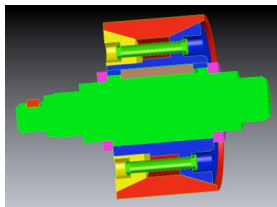
**Figure 5** The value and cost weighting of the functions

## 6. Searching for Solutions

To find simpler and cheaper alternatives, from the stage of finding new solutions, the working group have proposed 38 cylinder versions for crushing, presented in morphological box in table 6 and in figures 6, 10. Ordering of these variants, considering certain criteria, which were marked with notes from 1 to 10, shown in table 7.

**Table 6** Morphological box

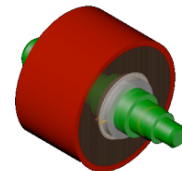
Function	No.	Constructive solutions
F 1: ensure material crushing	1	F11 – conical cylinder inside, long conical parts assembled and long screws or bolts,
	2	F12 – conical cylinder inside, long conical parts assembled and long screws,
	3	F13 – conical cylinder inside, assembled by cylindrical thread, conical parts + hexagon
	...	...
	36	F136 – shaft + cylindrical caps assembled by long screw + disk-Grower,
	37	F137 – shaft +cylinder +cylinder wear, assembled with screws on cylinder,
	38	F138 – shaft +cylinder wear, but fragmented, assembled with screws on cylinder.



**a**

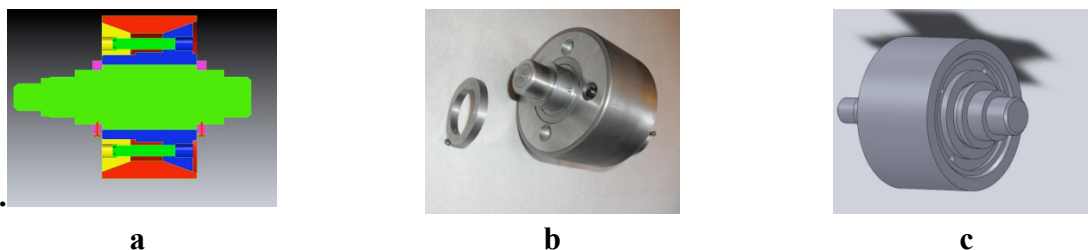


**b**

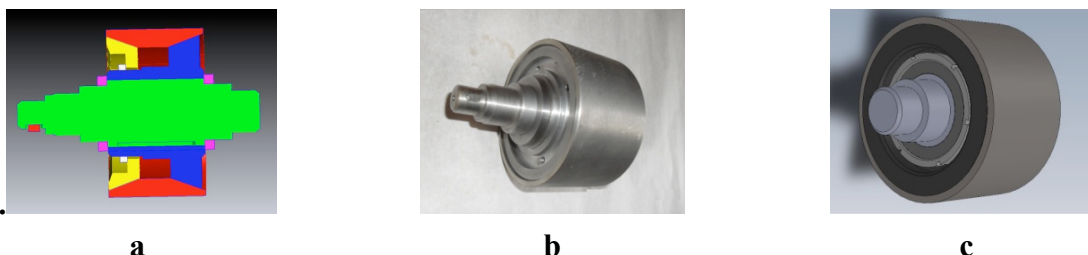


**c**

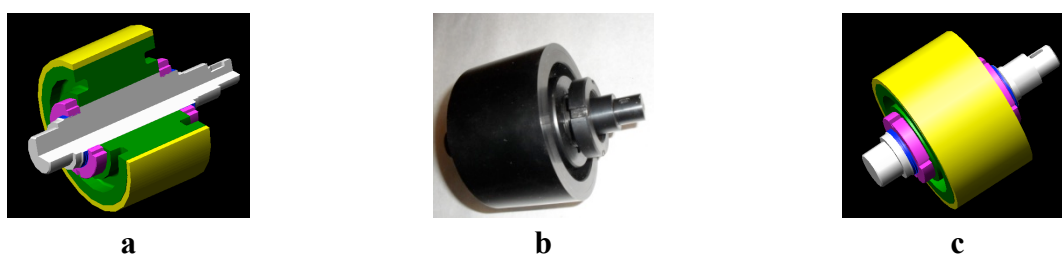
**Figure 6** Variant F11 – Conical cylinder inside, long conical parts assembled and long screws or bolts  
a – representation 2D; b – photo; c – representation 3D.



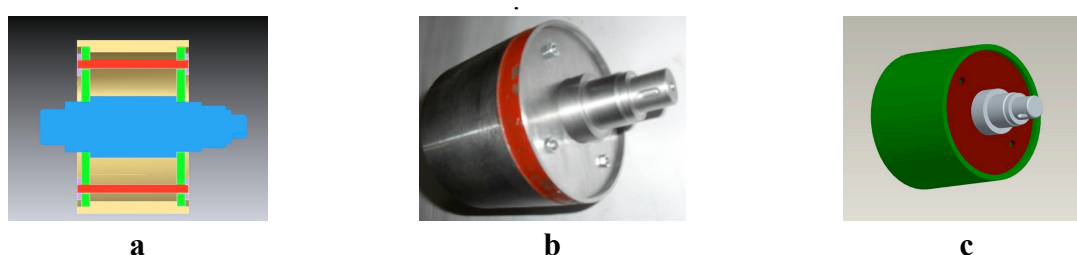
**Figure 7 Variant F<sub>12</sub>** – Conical cylinder inside, long conical parts assembled and long screws:  
**a – representation 2D; b – photo; c – representation 3D.**



**Figure 8 Variant F<sub>14</sub>** – Conical cylinder inside, assembled by long and tapered nut pieces:  
**a – representation 2D; b – photo; c – representation 3D.**



**Figure 9 Variant F<sub>112</sub>** – Cylinder + fixed on the drum shaft + screw nut + thread shaft:  
**a – representation 2D; b – photo; c – representation 3D.**



**Figure 10 Variant F<sub>113</sub>** – Cylinder + short cylindrical caps, assembled with screws or long bolts:  
**a – representation 2D; b – photo; c – representation 3D.**

**Table 7** Criteria of analysis

Criteria analysis	of	Variants								
		F1 <sub>1</sub>	F1 <sub>2</sub>	F1 <sub>3</sub>	F1 <sub>4</sub>	F1 <sub>5</sub>	F1 <sub>6</sub>	F1 <sub>7</sub>	F1 <sub>8</sub>	F1 <sub>38</sub>
Functional characteristics		10	10	10	10	10	10	10	10	10
...										
Total cost		250	250	250	250				100	
TOTAL		22	36	50	50	50	50	64	85	50

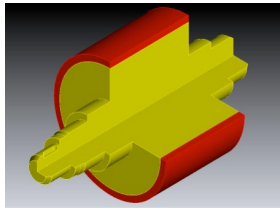
After studying the data obtained in table 7 emerged as optimal the following variants:



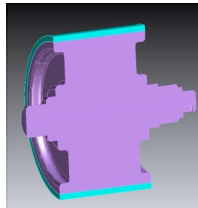
F1<sub>8</sub> – cylinder + shaft, one-piece + cylinder wear (fig. 11),

F1<sub>27</sub> – one-piece shaft, with the front channel + cylinder wear (fig. 12),

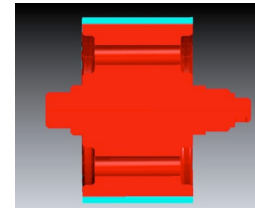
F1<sub>28</sub> – one-piece shaft, with 6 holes + cylinder wear (fig. 13),



**Figure 11** Variant F1<sub>8</sub> – Cylinder + shaft, one-piece + cylinder wear



**Figure 12** Variant F1<sub>27</sub> – One-piece shaft, with the front channel + cylinder wear



**Figure 13** Variant F1<sub>28</sub> – One-piece shaft, with 6 holes + cylinder wear

All three variants are optimal:

- Fulfill their functional role for which they were designed,
- Obtaining the semi-products is accessible,
- Machining of components does not involve issues,
- Assembly and disassembly are easily,
- These three variants provides the most rigid of all the variants presented in table 6,
- Maintenance problems are solved relatively easily,
- The wear cylinder can be replaced easily, either recondition or to be running a new one,
- The shafts recondition is done by known methods and no problems in addition to other variants presented in table 6,
- Only disadvantage is that these cylinder variants have a great weight (table 7) and:
- High consumption of metal,
- Difficulties in handling the processing and transportation operations,
- Material cost is high,
- Great pressing of support shaft.

Other advantages, in addition to those highlighted by the choice of table 7 are:

- – Labor cost is low,
- – No need for special and specialized equipment, with high precision, for processing.

## 7. Value Engineering Steps. Iteration 2

The best variants are F1<sub>8</sub>, F1<sub>27</sub> and F1<sub>28</sub>. With this option will continue in second iteration of the Value engineering study to optimize the equipment, in terms of value and cost. The goal is to optimize the value / cost [1], [2], [3], [4].

## 8. THE Value Weighting of the Functions. Iteration 2

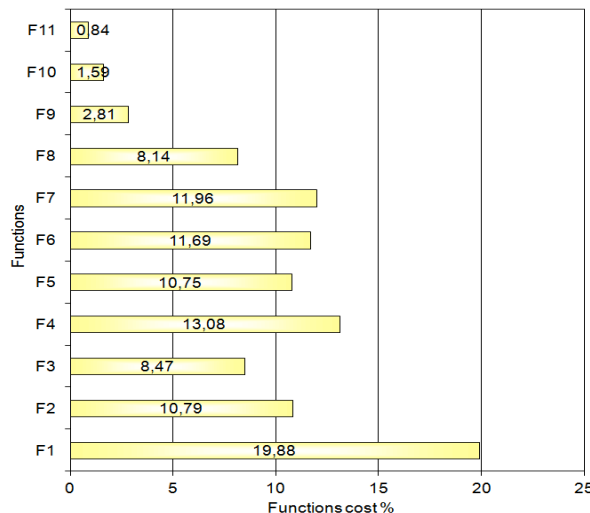
The value weighting of the functions is the same as in the first iteration, because in the system had not been inserted or removed functions. This weighting is presented in table 3 and in figure 3 show the value weighting of the functions, in the second iteration.

## 9. THE COST Weighting of the Functions. Iteration 2

The cost weighting of the functions is different in the second iteration to the first iteration, because for the function F1, ensure material crushing, involving crushing cylinders, changes have been made in the design, choice of material and mode of machining of the cylinder parts, cost changes.

In the situation presented are deficient the function F4, provides support of crusher and the function F7, ensure uniformity of the movement, but in this paper shows the changes only for the function F1, ensure material crushing.

Costs were assigned to the various functions by means of the functions-costs matrix shown in table 8 and figure 14 present the diagram of the cost weighting of the functions, for the second iteration.



**Figure 14** The cost weighting of the functions

## 10. Determination of the Functional Model. The Value and Cost Weighting of the Functions. Iteration 2

The construction of the diagram, the value and cost weighting of the functions is presented. Based on the values for coordinates  $x_i$  and  $y_i$  presented in table 9 the diagram of figure 15 is plotted. Calculations are made with the smallest squares method.

The parameters have the following computed values:  $a = 0,99$ ,  $\alpha = 44,7^\circ$ ,  $S = 92,62$ ,  $S' = 0$ .

Table 9 provides the necessary values for constructing the following types of diagrams:

- Diagram of the value weighting of the functions (identical to the diagram of fig. 3),
- Diagram of the cost weighting of the functions (fig. 14),
- Diagram of the value and cost weighting of the functions (fig. 15).

Figure 14 shows the ranking of the functions by their functional cost.

An analysis of the diagram of figure 15 shows that functions F1 and F7 are located above the regression lines, indicating high costs, not justifiable in relation to the value.

In the diagram of figure 15 can be seen following straight:

- The straight of equation  $y = x$  (first bisector), straight mediating share in value and cost functions, show the ideal situation of proportion to the two weights, the value and cost weighting of the functions
- The straight of regression equation  $y = 0,9652 * x + 0,2673$ , approximates arrangement of points, show the real situation of proportion to the two weights, the value and cost weighting of the functions. The R – squared value on chart is  $R = 0,7984$ , two times

higher than in the first iteration. This shows a large group of points of the two straight regressions.

Analyzing the diagram in figure 15 shows that some functions are above the regression lines, this attests to high costs, unreasonable in relation to value.

These aspects allow the assumption that these functions are deficient, hence the solutions to be identified are to focus on those assemblies, parts, materials and technological operations that contribute, within the general structure of the product, to the achievement of these functions.

In the second iteration of the Value engineering study will provide the functional model of this roll crusher, to see the deficient functions.

These functions are:

- The function F4, provides support of crusher; to achieve this function have the highest participation the shaft support, the frame part of the crusher,
- The function F7, ensure uniformity of movement; to achieve this function have the highest participation the flywheel of crusher.

**Table 8** The cost weighting of the functions (\*Y coordinate, \*\* monetary units)

Parts	Cost part*	Functions											Cost part**
		F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	
1-Engine	100 %	20			5	15	30	10	20				100
	700	140	0	0	35	105	210	70	140	0	0	0	700
2-Gear	100 %	10	50	5	5	10	5		10	5			100
n...													0
Total cost	2700	536	291	228	353	290	315	323	219	75,9	42,8	22,6	2700
Ratio		0,19	0,10	0,08	0,13	0,10	0,11	0,12	0,08	0,02	0,01	0,00	1
*Cost of functions %		19,9	10,8	8,47	13,1	10,7	11,7	12	8,14	2,81	1,59	0,84	100

**Table 9** Computational elements (\*the smallest squares method-SSM) for plotting the diagrams

*SSM C.E.	Functions											Total value
	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	
X <sub>i</sub>	16,7	15,2	13,6	12,1	10,6	9,09	7,58	6,06	4,55	3,03	1,52	100
Y <sub>i</sub>	19,9	10,8	8,47	13,1	10,7	11,7	12	8,14	2,81	1,59	0,84	100
(X <sub>i</sub> ) <sup>2</sup>	277,8	229,6	186	146,9	112,5	82,64	57,39	36,73	20,66	9,182	2,295	1161,6
X <sub>i</sub> * Y <sub>i</sub>	331,3	163,5	115,5	158,5	114	106,2	90,62	49,33	12,78	4,809	1,271	1148
**S	11,62	17,48	25,04	1,212	0,071	7,295	20,03	4,62	2,819	1,981	0,433	92,61
***S'	-113	126,7	136,5	-26,6	-5,65	-49,1	-67,8	-26,0	15,26	8,531	1,995	0

\*SSM - C.E. = Computational elements; \*\*S =  $\sum(Y_i - a \cdot X_i)^2$ ; \*\*\*S' =  $\sum(2 \cdot a \cdot (X_i)^2 - 2 \cdot X_i \cdot Y_i)$

## 11. Conclusions

In two iterations of Value engineering study one component of roll crusher, the cylinder who contribute at the function F1 (ensure material crushing) was redesign and optimized:

1. from engineering viewpoint:

- from variant of cylinder of figure 16 consists of 20 parts, one complicated part (many components, mechanical machining, turning of metal parts complicated, long and very

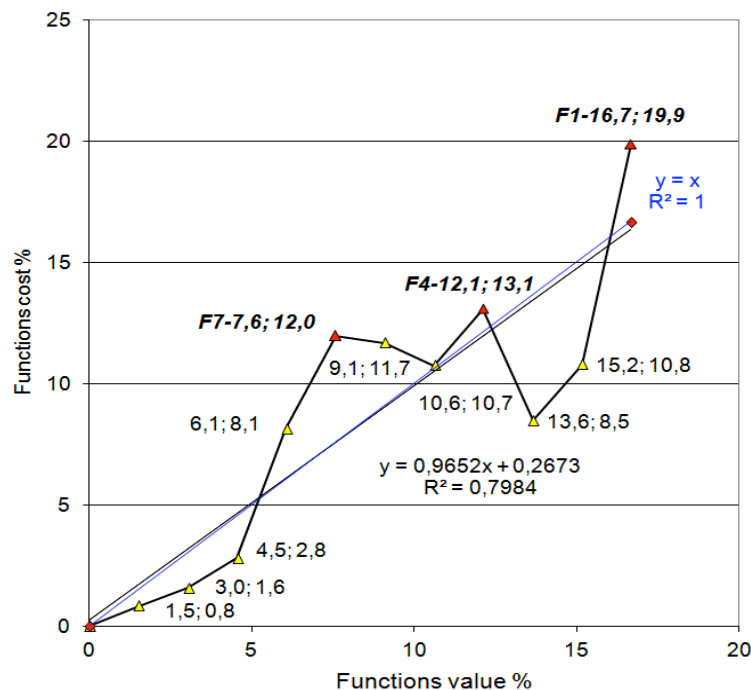
expensive, etc.) to the variant F1<sub>8</sub> (fig. 17) or to the variant F1<sub>27</sub> (fig.18) or to the variant F1<sub>28</sub> consists of 2 components (mechanical machining, turning of metal parts simple, short and less expensive than the cylinder of fig. 16, etc.).

2. from the economic viewpoint:

- the cost of function F1 decrease from 640 monetary units, representing 20 %, in the first iterations of Value engineering study (fig. 5, tables 4, 5) to 573 monetary units, representing 19,9 % in the second iterations of Value engineering study, decrease with 0,49 %, (fig. 15, table 9),
- the cost of roll crusher decrease from 450 monetary units (fig. 5, table 4), to 300 monetary units (fig. 14, table 8).
- Looking at the diagrams in Figures 5 and 15 shall conclude at first sight they are pretty similar and did not change anything. It is only at first sight.

Looking more closely diagrams, and tables 4 and 8 can be observed the following:

1 - Product costs decreased from 3205 monetary units in the first iteration at 2700 monetary units in the second iteration, a decrease of 15%,



**Figure 15** The value and cost weighting of the functions



**Figure 16** Variant F1<sub>1</sub>



**Figure 17** Variant F1<sub>8</sub>



**Figure 18** Variant F1<sub>27</sub>

2 - F1 cost function decreased to 640 monetary units in the first iteration to 536 monetary units in the second iteration, a reduction of 16%

3 - F4 function cost decreased from 451 monetary units in the first iteration to 353 monetary units in the second iteration, a decrease of 21,9%

4 - F7 function cost decreased to 437 monetary units in the first iteration to 323 monetary units in the second iteration, a decrease of 26%.

These values explain the close percentages in the two iterations:

1 - Percentage of function F1 20% in the first iteration and 13% in the second iteration,

2 - Percentage of function F4 14% in the first iteration and 19,9% in the second iteration,

3 - Percentage of function F7 13,6% in the first iteration and 12% in the second iteration,

This reduction of the cost is upon the following articles: design, type of material, quantity of material from cylinder, machining mode, how to repair after working.

In the next iterations of Value engineering study are analyzed other functions above the regression straight line,  $y = x$  (for example F4) and their cost reduced, then the regression lines are re-plotted and the functions relocated above them are noted; these functions too are analyzed in view of reducing their cost, followed by the re-plotting of the regression lines, etc.,

At the end of the Value engineering 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.

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# A Comparative Statistical Analysis of the Insurance Sector in the European Union Member States and Turkey

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Insurance sector, which is among the oldest and the most important sectors of the world, is defined in the European Union as a sector that provides long-term sources to the economy, compensates possible losses and ensures the development of the economy. In the world insurance market, the EU has made an important progress. The aim of the study is to examine the development of the insurance sector in Turkey and EU member countries through industrial data, to define homogeneous country clusters through cluster analysis that is among multivariable statistical methods, and to determine and compare the countries with which Turkey shares clusters. According to analysis results, it was determined that Turkey has a similar sectoral level with those countries in the same clusters. It was found that the Netherlands is more developed than other member countries in insurance sector and it is the only country that exhibits difference.

## **Keywords**

Cluster Analysis, European Union, Insurance Sector, Turkey

## **1. Introduction**

Insurance sector has a significant economic power in developed countries. In the whole world, especially in developed countries, it is a sector that contributes to the development of economy by providing long-term resources and compensating potential losses.

Insurance sector is seen as a living standard for individuals and as an indispensable financial system for economies with the guarantee it provides for the continuation of the contemporary economic system. Studies conducted suggest that insurance creates a positive impact in economic development. It is a financial sector that supports economies in issues of guarantee, accumulation and investment, prevents economic downfalls and provides funds to economies by transferring the collected savings into investment.

Insurance activities play the function of institutional investment sector through their task of transferring funds that become resources to investment. In countries where the sector is developed, the funds created by the insurance sector are of great importance in grand-scale institutional investments. The sector provides resources to the economy through securities and this effect constitutes an important dynamic for modern economies.

The developing economic life creates new risks and thus brings about new insurance requirements in order to prevent the losses that these new risks will create. Insurance continues to be a dynamic sector that offers new products to changing insurance demands. The demand for insurance increases day by day. In the EU and Turkey, in general, the sector is advancing with positive growth rates.

In the study, firstly, the insurance sector will be explained conceptually and its development in the recent years will be examined based on insurance data. Then, through hierarchical

and non-hierarchical cluster analysis methods, EU-member countries and Turkey will be grouped using insurance sector variables. Finally, the clusters obtained through analysis results will be evaluated and interpreted.

## **2. Conceptual Framework and Development of Insurance Sector**

Insurance is a legal agreement, which guarantees the insured's payment of premium and the compensation of a loss by the insurer, and defines the liabilities between the insurer and the insured. The insurance agreement creates a responsibility for the insured to pay premiums and for the insurer to compensate losses. The insurer finances the compensation using the premiums paid by the insured. With the insurance system, the insured becomes able to compensate large losses by paying small amounts of premium. Insurance is therefore called an economic risk transfer [1]. Insurance decreases the ambiguity to be created by losses and ensures the optimal use of capital. The lack of an insurance system causes individuals or firms to allocate an additional fund in order to protect themselves from potential losses and, in this case, these funds become inactive and ineffective. With the insurance system, on the other hand, a lower volume of funds is directed towards investment in a more efficient way [13]. Premiums collected in insurance sector branches (life/non-life) constitute a long-term asset portfolio as funds. These long-term funds support the capital market through investment activities such as stocks and bonds. Insurance firms try to maximize the values of investments by allocating long-term funds to different investments. Insurance, for this reason, plays an important role in long-term financing [4],[5]. Insurance also plays an active and significant role in the social and political life being the most important instrument of risk management. Insurance is a technical and economic activity; and its role in economic growth is undeniable [6].

In 2010, the global insurance sector yielded a positive growth. Total premium production reached up to 4.339 billion dollars by achieving a growth by 2.7%. Life insurance premiums in the world grew by 3.2% in 2010. In this growth, the contribution of developing Asian countries and European countries is great. In America, on the other hand, a decline was observed in 2010 in life insurance premiums. Global non-life insurance premiums rose by 2.1%. Strong economies of developing countries in Asia and the rest of the world contributed to this rise. In Europe and America, except for a couple of countries, non-life insurance premiums rose by lower rates [12].

Total premium production reached up to 3.689 trillion dollars in developed countries rising by 1.4%, and to 650 billion dollars in developing countries with an increase of 11%. In 2010, total premium production rose in America by 8.19%, in Europe by 1.81%, in Asia by 7.16% and in Oceania by 2.32%, whereas it declined in Africa by 1.11% [12].

As Table 1 demonstrates, Europe had the biggest share in global premium production for the 2006-2010 periods. Although its share in the world increased in 2007, it decreased in 2008, 2009 and 2010. On the other hand, the share of America dropped for the entire period. In 2010, Europe ranked first in total premium production (37.35%) whereas Africa ranked last (1.54%).

In 2010, when the premium production is reviewed on the basis of life and non-life branches, Europe ranked first in life insurance premiums (965.661 million dollars), while America ranked number one in non-life insurance premiums (723.861 million dollars) [12].

## **3. Insurance Sector in the European Union and Turkey**

The European Union (EU) aims to form a "single market" in insurance sector. With this, it is planned for insurance firms to sell their products in all member countries freely, and to create a borderless area. The EU has two main roles in the insurance sector: First, ensuring the access of all EU citizens to present insurance products and providing necessary

legal/financial protection for insurance activities. The second role is to enable an insurance company that has permit to operate in a member country to benefit from rights to settle and serve in the entire union [14].

**Table 1** Global Insurance Sector Total Premium Production (million dollars) and Share in Global Insurance Sector (%) for 2006-2010 Period

	Total Premium Production in 2006	Share in Global Insurance Sector (%) in 2006	Total Premium Production in 2007	Share in Global Insurance Sector (%) in 2007	Total Premium Production in 2008	Share in Global Insurance Sector (%) in 2008	Total Premium Production in 2009	Share in Global Insurance Sector (%) in 2009	Total Premium Production in 2010	Share in Global Insurance Sector (%) in 2010
America	1.329.729	35.71	1.417.463	34.91	1.450.749	33.98	1.349.495	33.19	1.409.530	32.49
Europe	1.484.881	39.88	1.680.693	41.39	1.753.200	41.06	1.610.620	39.61	1.620.437	37.35
Asia	800.819	21.51	840.601	20.70	933.358	21.86	989.451	24.33	1.161.118	26.76
Africa	49.667	1.33	68.818	1.69	77.716	1.82	49.287	1.21	66.719	1.54
Oceania	58.316	1.57	53.294	1.31	54.713	1.28	67.241	1.65	81.160	1.87
World	3.723.412	100	4.060.870	100	4.066.095	100	4.066.095	100	4.338.964	100

**Source:** Prepared by benefiting from "World Insurance Reports" available <http://www.swissre.com/sigma/>. [8],[9],[10],[11],[12].

In recent years, as is seen in Table 2, the insurance sector in EU member countries faces a significant rise of demand for insurance products, which causes a serious premium increase. In 2010, the insurance sector average of EU member countries rose by 1.9% and reached up to 1.482.347 million dollars. In average, countries' share in the global insurance market is 34.16%, the ratio of their premiums to GDP is 8.43% and their premium production per capita is 2736.3 dollars [12].

**Table 2** European and Turkey Insurance Sector Total Premium Production (billion dollars) for 2006-2010 and Share in Global Insurance Market (%)

Union Member States and Turkey	Total Premium Production in 2006	Share in Global Insurance Sector (%) in 2006	Total Premium Production in 2007	Share in Global Insurance Sector (%) in 2007	Total Premium Production in 2008	Share in Global Insurance Sector (%) in 2008	Total Premium Production in 2009	Share in Global Insurance Sector (%) in 2009	Total Premium Production in 2010	Share in Global Insurance Sector (%) in 2010
United Kingdom	418.366	11.24	463.686	11.42	450.152	10.54	309.241	7.61	310.022	7.15
France	251.164	6.75	268.900	6.62	273.007	6.39	283.070	6.96	280.082	6.46
Germany	204.544	5.49	222.825	5.49	243.085	5.69	238.366	5.86	239.817	5.53
Italy	138.679	3.72	142.328	3.50	140.689	3.30	169.360	4.17	174.437	4.02
Netherlands	62.669	1.68	102.831	2.53	112.611	2.64	108.144	2.66	97.057	2.24
Spain	65.813	1.77	74.696	1.84	87.038	2.04	82.775	2.04	76.082	1.75
Ireland	47.281	1.27	60.693	1.49	44.918	1.05	44.598	1.10	47.901	1.10
Belgium	37.889	1.02	45.841	1.13	49.077	1.15	40.470	1.00	41.104	0.95
Sweden	29.182	0.78	33.646	0.83	36.432	0.85	32.768	0.81	38.218	0.88



Luxembourg	16.480	0.44	17.030	0.42	19.319	0.45	27.714	0.68	33.011	0.76
Denmark	23.262	0.62	27.771	0.68	31.457	0.74	31.798	0.78	29.449	0.68
Finland	19.308	0.52	20.535	0.51	23.336	0.55	22.660	0.56	22.426	0.52
Austria	19.568	0.53	21.748	0.54	23.925	0.56	22.933	0.56	22.232	0.51
Portugal	17.679	0.47	19.000	0.47	22.704	0.53	20.312	0.50	21.780	0.50
Poland	11.947	0.32	15.626	0.38	24.403	0.57	16.286	0.40	17.763	0.41
Czech Republic	5.304	0.14	6.419	0.16	8.168	0.19	7.328	0.18	7.914	0.18
Greece	5.442	0.15	6.004	0.15	6.673	0.16	6.556	0.16	6.088	0.14
Hungary	3.789	0.10	4.945	0.12	5.028	0.12	3.986	0.10	3.999	0.09
Slovenia	2.164	0.06	2.592	0.06	2.971	0.07	2.895	0.07	2.775	0.06
Romania	2.044	0.05	2.898	0.07	3.523	0.08	2.898	0.07	2.632	0.06
Slovakia	1.820	0.05	2.336	0.06	2.940	0.07	2.794	0.07	2.608	0.06
Malta	-	-	-	-	1.167	0.03	1.226	0.03	1.465	0.03
Bulgaria	774	0.02	1.064	0.03	1.354	0.03	1.195	0.03	1.150	0.03
Cyprus	766	0.02	891	0.02	1.020	0.02	1.045	0.03	1.081	0.02
Lithuania	526	0.01	771	0.02	-	-	543	0.01	595	0.01
Estonia	375	0.01	493	0.01	518	0.01	-	-	-	-
Latvia	360	0.01	596	0.01	700	0.02	-	-	-	-
Turkey	6.618	0.18	8.297	0.20	8.807	0.21	7.853	0.19	9.220	0.21

**Source:** Prepared by benefiting from "World Insurance Reports" available at <http://www.swissre.com/sigma/>. [8],[9],[10],[11],[12].

Countries' shares in the global premium production are linked to the importance of the insurance sector in the country as an economic activity and to the country's development level [6]. As is seen in Table 2, England (7.5%) ranked first in shares in the global insurance market; followed by France (6.46%) and Germany (5.53%). Turkey ranked 16th in the list with a share of 0.21% [12].

In life branch premium production in 2010; England (213.831 million dollars), followed by France (192.428) and Italy (122.063). On the other hand, Germany (124.949 million dollars) is the top country in non-life insurance premium production, followed by England (96.191) and France (87.654) [12].

While the country with the highest premium production per capita in 2010 is Switzerland, the Netherlands (5.845,3 dollars) ranks second; followed by Luxembourg (5.653,2 dollars), Denmark (5.084.2), England (4.496.6) and Ireland (4.296.6) [12].

As for the ratio of premiums to GDP in 2010; England and the Netherlands share the first place (12.4%), followed by France (10.5%), Portugal (9.5%), Finland (9.4%), Ireland (9.2%) and Denmark (9.1%) [12].

Although Turkey recorded a positive development in insurance sector, it is seen to be below the EU average. In 2010, total premium production rose by 4.78% and reached to 9.220 million dollars; life insurance premiums increased by 11.4% and reached to 1.434 million dollars and non-life insurance premiums reached to 7.786 million dollars rising by 3.6%. In 2010, Turkey ranked 37th among world countries in terms of premium production. The ratio of total premiums to the GDP was 1.3% and the premium production per capita rose to 121.6 dollars [12].

## 4. Methodology

In the study, the cluster analysis method, which is among multivariable statistical methods, was employed in order to examine the development of insurance sectors in Turkey and EU member countries and to determine homogeneous country clusters.

Cluster analysis is a multivariable statistical method that is used for collecting similar units in the same cluster according to the selection criteria. While each cluster is homogeneous in itself, clusters are heterogeneous among themselves.

There exist two clustering methods: hierarchical and non-hierarchical. In the hierarchical one, the number of clusters is known: n number of individuals means that there exists n number of clusters. The closest two clusters are merged and the repeated distances matrix is obtained. This action is repeated n-1 times. In this method, the results shown in tree diagrams are called dendrograms. Techniques employed in the hierarchical clustering method are the following: "single-linkage technique", "complete linkage technique", "average linkage technique", "cluster centers technique", and "Ward's technique" [7]. In the non-hierarchical clustering, on the other hand, it is aimed to bring units together in appropriate clusters and for n units to divide into k clusters, and the number of clusters is pre-determined. Techniques used in non-hierarchical clustering are "maximum likelihood" and "k-means" techniques [3].

In this study, the hierarchical clustering method of "Ward's technique" and non-hierarchical clustering method of "k-means technique" were employed. In determining the distance matrix, "Euclidian distance" was used. Since the normality of distance values was adequate for clustering analysis, it was investigated whether distance measures exhibit normal distribution or not. For this purpose, the "Kolmogorov-Smirnov Z test" was applied. Moreover, in order to examine the differences of the variables for each cluster and to determine the most influential variables in the determination of clusters, "One-Way Variance Analysis (ANOVA)" results were provided. These analyses were performed on the eight insurance sector variables belonging to 25 EU member countries and Turkey. Estonia and Latvia were excluded from the analysis since we failed to access their data. In the study, the variables for the year of 2010 were used. However, as we also failed to access the 2010 data for Greece's indicators i1 and i5, 2009 data were used. The insurance sector data for Turkey and EU countries were obtained from the "World Insurance Report" available at <http://www.swissre.com/sigma/>.

Abbreviations and explanations of the variables used are presented below:

- i1: Change in the volume of life insurance premium on an inflation-adjusted basis
- i2: Share of life insurance premium production in total premium production
- i3: Life insurance premium per capita
- i4: Ratio of life insurance premiums to GDP
- i5: Change in the volume of non-life insurance premium on an inflation-adjusted basis
- i6: Share of non-life insurance premium production in total premium production
- i7: Non-life insurance premium per capita
- i8: Ratio of non-life insurance premiums to GDP

Premium is the cost paid by the insured in exchange for the guarantee provided by the insurer regarding the risks. Total premium production covers the commission and other costs prior to the amount paid to the reinsurance firm. Insurance premium production is analyzed under two categories: life and non-life. Life insurance covers annuity and retirement insurance, whereas non-life insurance covers property, casualty, health and liabilities insurances [2],[12].

The inflation-adjusted rate of change in premium production is calculated using countries' consumer price indexes and taken as USD. Share in the total premium production refers to the share of life and non-life insurance premium production in the total production in percentage and USD. Premium per capita is calculated through proportion of premiums in USD. Premiums' ratio to GDP is expressed in USD in order to assess the importance of insurance sectors in countries' economies [12].

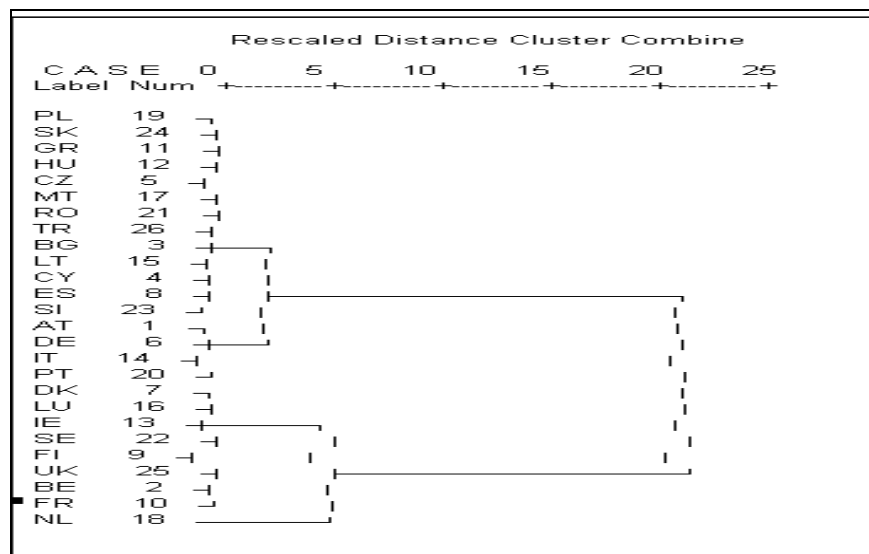
The countries and their abbreviations used in the analysis are as follows: AT: Austria; BE: Belgium; BG: Bulgaria; CY: Cyprus; CZ: Czech Republic; DE: Germany; DK: Denmark; ES: Spain; FI: Finland; FR: France; GR: Greece; HU: Hungary; IE: Ireland; IT: Italy; LT:

Lithuania; LU: Luxembourg; MT: Malta; NL: Netherlands; PL: Poland; PT: Portugal; RO: Romania; SE: Sweden; SI: Slovenia; SK: Slovakia; UK: United Kingdom; TR: Turkey.

## 5. Analysis and Results

The dendrogram method was employed in demonstrating the results of the Ward's Technique that was used for hierarchical clustering analysis. Dendrogram was scaled in 0-25 units from right to left. Distances between units are equal. Horizontal lines show distance, while vertical lines show unified clusters.

**Figure 1** Dendrogram for Ward's Technique



The clustering analysis results obtained after examining the dendrogram belonging to the Ward's Technique are given in Table 4. The cluster numbers in tables are used not to indicate the level of insurance sector for each cluster, but to differentiate clusters from each other. Analysis was performed by increasing the number of clusters by one every time, that is, taking  $k = 2, 3, 4$ ; respectively. When the number of clusters is 5, statistically significant results were obtained but not shown in tables. Since  $k$  was found to be 3,6 using the formula, which is one of the most practical methods to find the number of  $k$ , the appropriate number of clusters will probably be  $k = 3$  or 4.

**Table 4** Clustering Results for Ward's Technique

Number of Cluster	Clusters	Elements of Cluster
C=2	Cluster 1	AT,BG,CY,CZ,DE,ES,GR,HU,IT,LT,MT,PL,PT,RO,SI,SK,TR
	Cluster 2	BE,DK,FI,FR,IE,LU,NL,SE,UK
C=3	Cluster 1	AT,BG,CY,CZ,DE,ES,GR,HU,IT,LT,MT,PL,PT,RO,SI,SK,TR
	Cluster 2	BE,DK,FI,FR,IE,LU,SE,UK
	Cluster 3	NL
C=4	Cluster 1	BG,CY,CZ,ES,GR,HU,LT,MT,PL,RO,SI,SK,TR
	Cluster 2	AT,DE,IT,PT
	Cluster 3	BE,DK,FI,FR,IE,LU,SE,UK
	Cluster 4	NL

When the number of clusters is thought to be 2; Turkey shares a cluster with Austria, Bulgaria, Cyprus, Czech Republic, Germany, Spain, Greece, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Romania and Slovenia Slovakia. When it is thought to be 3, Turkey shares a cluster with Austria, Bulgaria, Cyprus, Czech Republic, Germany, Spain, Greece, Hungary, Italy, Lithuania, Malta, Poland, Portugal, Romania and Slovenia Slovakia. When it is thought to be 4; Turkey, Bulgaria, Cyprus, Czech Republic, Spain, Greece, Hungary, Lithuania, Malta, Poland, Romania, Slovenia and Slovakia are placed in the same cluster. Notable points here are that the Netherlands form separate clusters alone, and that Bulgaria, Cyprus, Czech Republic, Spain, Greece, Hungary, Lithuania, Malta, Poland, Romania, Slovenia, Slovakia and Turkey are always placed in the same cluster.

In the clustering analysis, the normality of distance values is considered adequate. The results of the Kolmogorov-Smirnov Normality Test, which was performed to determine whether distance values exhibit normal distribution according to the numbers of cluster, are presented in Table 4. When the number of clusters is 2, 3 and 4; distance values are normally distributed ( $p > 0,05$ ).

**Table 5** The Kolmogorov-Smirnov Normality Test

		C=2	C=3	C=4
N		26	26	26
average		696,28	524,15	370,09
standard deviation		589,45	348,60	205,53
extreme distance	Absolute	0,244	0,189	0,076
	Positive	0,244	0,189	0,076
	Negative	-0,192	-0,109	-0,062
Kolmogorov-Smirnov Z		1,246	0,965	0,385
p		0,090	0,309	0,998

The k-means clustering analysis results, found with respect to eight sector variables for 2010, are presented in Table 6.

**Table 6** Clustering Results for k-means Technique

Number of Cluster	Clusters	Elements of Cluster
C=2	Cluster 1	AT,BG,CY,CZ,DE,ES,GR,HU,LT,MT,PL,PT,RO,SI,SK,TR
	Cluster 2	BE,DK,FI,FR,IE,IT,LU,NL,SE,UK
C=3	Cluster 1	AT,BG,CY,CZ,DE,ES,GR,HU,LT,MT,PL,PT,RO,SI,SK,TR
	Cluster 2	BE,DK,FI,FR,IE,IT,LU,SE,UK
	Cluster 3	NL
C=4	Cluster 1	BG,CY,CZ,ES,GR,HU,LT,MT,PL,RO,SI,SK,TR
	Cluster 2	AT,DE,IT,PT
	Cluster 3	BE,DK,FI,FR,IE,LU,SE,UK
	Cluster 4	NL

When the number of clusters is thought to be 2; Turkey shares a cluster with Austria, Bulgaria, Cyprus, Czech Republic, Germany, Spain, Greece, Hungary, Lithuania, Malta , Poland, Portugal, Romania, Slovenia and Slovakia. When it is thought to be 3, Turkey shares a cluster with Austria, Bulgaria, Cyprus, Czech Republic, Germany, Spain, Greece, Hungary,

Lithuania , Malta , Poland, Portugal, Romania, Slovenia and Slovakia. When it is thought to be 4; Turkey Bulgaria, Cyprus, Czech Republic, Spain, Greece, Hungary, Lithuania, Malta, Poland, Romania, Slovenia and Slovakia are placed in the same cluster. Notable points here are that the Netherlands form separate clusters alone, and that Bulgaria, Cyprus, Czech Republic ,Spain, Greece, Hungary, Lithuania , Malta , Poland, Romania, Slovenia , Slovakia and Turkey are always in the same cluster. Although the Ward's Technique and k-means technique results are the same, the only difference is that, in the assumptions of number of clusters is 2 and 3, while Turkey and Italy are placed in the same group in the Ward's Technique, they are in different groups in the k-means technique.

One Way ANOVA Variance Analysis results, performed to examine the differences between variables for each cluster, are given in Table 6. In the ANOVA results in cluster analysis, it is normal for the variables to be found different for clusters, because clustering analysis maximizes the difference between the clusters. Through these results, the variables that are the most influential in determining clusters are found.

**Table 7 ANOVA Values\***

Indicators	C=2		C=3		C=4	
	F	p	F	p	F	p
i1	0,027	0,871	1,485	0,247	1,345	0,285
i2	18,344	0,000*	18,393	0,000*	15,241	0,000*
i3	109,142	0,000*	77,028	0,000*	168,725	0,000*
i4	36,169	0,000*	22,062	0,000*	24,230	0,000*
i5	2,240	0,147	1,074	0,358	1,667	0,203
i6	18,344	0,000*	18,393	0,000*	15,241	0,000*
i7	11,121	0,003*	39,208	0,000*	44,317	0,000*
i8	2,585	0,121	35,012	0,000*	29,607	0,000*

\*Indicators that are considered important in the classification of clusters are shown with the sign \* on the p column ( $p < 0.05$ ).

In Table 6; when the ANOVA results for the k-means technique are reviewed, it is seen that i2, i3, i4, i6 and i7 are the indicators influential in formation of all clusters. The common conclusion observed in other clustering techniques that were tried but not included in the study is that the Netherlands tend to form a separate cluster. The insurance sector data also show that the Netherlands is ahead of all other EU member countries in insurance sector. Turkey, on the other hand, is in a condition similar to those of Bulgaria, Cyprus, Czech Republic, Spain, Greece, Hungary, Lithuania, Malta, Poland, Romania, Slovenia and Slovakia.

## 6. Conclusions

Among the main priorities of the EU in the area of financial services is to form a single market in insurance sector. Formation of a large and single insurance market is of great importance in terms of improving and standardizing the insurance sector. EU standards should be implemented in Turkey in order to improve the insurance sector. Legislative works are being conducted for improving the harmony with the EU in the insurance sector and for the formation of a single insurance market.

Although there have been improvements in the adjustment of the Turkish insurance sector to the EU market, significant deficiencies still persist. These deficiencies are seen mostly in legal and financial areas. Insurance sector has been in a rising trend since 2006 and it grows faster with the rise in the premium production.

The findings of the study show that while Belgium, Denmark, Finland, Ireland, France, Luxembourg, Sweden and England form a cluster; the Netherlands forms a single separate

one. It could be stated that the Netherlands is more advanced in insurance sector than other countries. It is ahead of others especially in terms of premium production per capita and the ratio of total premiums to GDP. In Turkey, the share of the insurance sector in the economy is very low compared to EU members. Turkey has the similar sector level with countries that it shares cluster: Bulgaria, Cyprus, Czech Republic, Spain, Greece, Hungary, Lithuania, Malta, Poland, Romania, Slovenia and Slovakia. It is safe to argue that these countries relatively lag behind and pull down the EU sectoral average.

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# Combination of Academic Science Education with Methodology for Development of Communication Skills, Internal Motivation and Creativity

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**An integrated approach is proposed for combining academic science education with additional methodology for enhancement of personal skills. It aims at making students more efficient both in their studies and further career development. The scope of communication skills includes both teamwork interaction and effective presentation of ideas. Internal motivation covers knowledge and mastery of constructive reasoning and emotional intelligence. Creativity is considered as a life-long progressing mindset and corresponding practical methods are provided.**

## **Keywords**

Communication, Creativity, Education, Motivation, Science

## **1. Introduction**

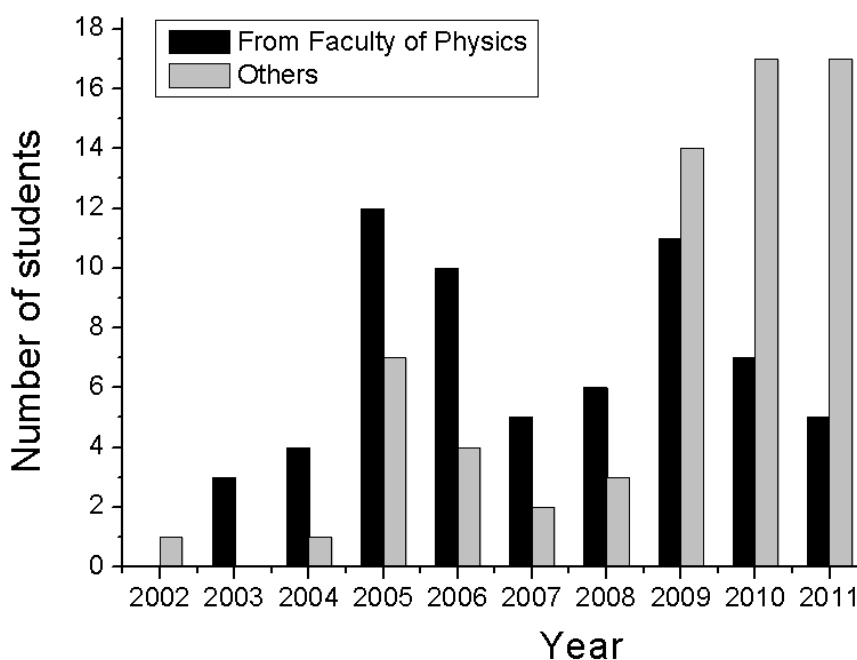
Modern times are challenging in many ways to politics, business and academic education. Although the first two provide most of the requirements and funding to the third in this row, exactly the third is supposed to guarantee an adequate inflow of human resources to the first two.

What is happening now with the interaction between these areas? Overwhelmed with crisis scenarios and emergency actions with predominantly short-term effects, EU politics and businesses pay much less attention to the Europe 2020 [1] growth strategy and its implications for academic education. Of course, this strategy needs to be reworked according to the new realities. But the overall situation is so turbulent that tested approaches in decision making and funding are more and more replaced by self-organization and emergent behaviour.

In this paper, we describe our own steps and guidelines towards efficient emergent behaviour which utilizes fundamental skills and best practices from both academic education and business. This combination is meant to provide students not only with the necessary level of applicable technical training but also with a solid set of communication skills, internal motivation and creativity. Such an approach will enable program participants to shape a favourable career path according to their individual features, establish efficient contacts with potential employees as well as integrate quickly into working teams and company cultures. Moreover, they can become more flexible in overcoming negative trends in youth unemployment in developed and developing economies.

## 2. Structure of the Host M.Sc. Program in the Area of Wireless Communications as a Basis of the Combined Approach

An interdisciplinary Masters program in microwave communication focused on innovation [2] is the tested basis of the proposed combination of academic science education and development of communication skills, internal motivation and creativity. It includes three interconnected axes: 1) networks, software, channels; 2) devices, systems, signals and 3) networks and innovation management. This program has achieved steady and sustainable growth over the last ten years (Figure 1). It has been attractive to high-scoring students also with availability of training on the basics of personal and team innovation management. The growth tendency after 2008 shows significant stability in respect to crisis influences.



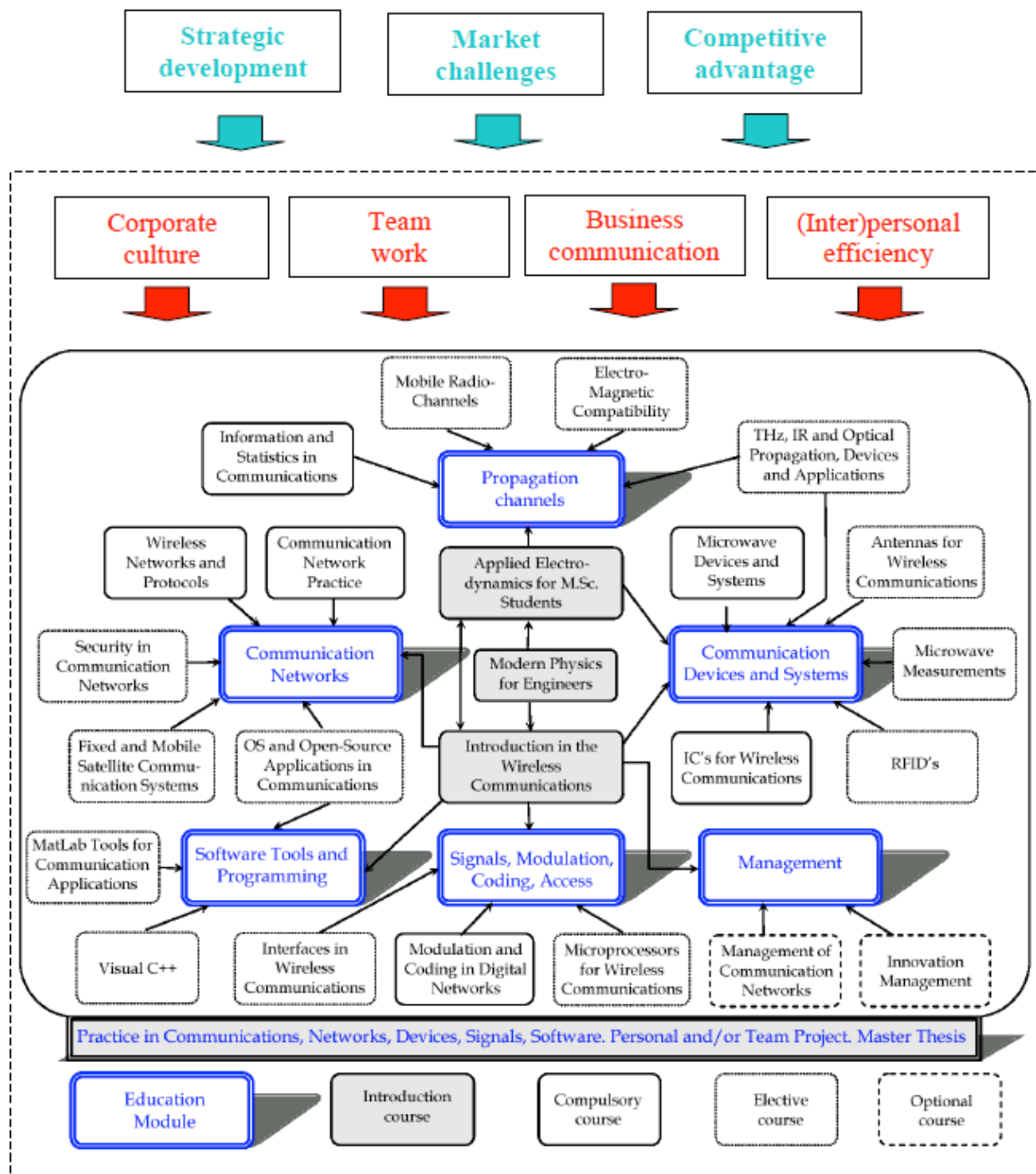
**Figure 1** Number of the students participating in the program with different bachelor degrees – from the Faculty of Physics and elsewhere

Apart from staff of the Faculty of Physics at "St. Kliment Ohridski" University of Sofia, the program includes lecturers from other faculties and higher education institutions as well as leading specialists from cooperating companies. Thus, being quite interdisciplinary, the lecturers' team has been capable of providing an efficiently balanced mixture of theoretical knowledge, practical skills and access to state-of-the-art information and technology.

In addition, constant exchange of information has been maintained between academic staff and companies about students with particular interests and skills and, on the other hand, about needs for professionals with special qualification in certain special areas. Suitable candidates have been directed towards initial contacts with corresponding companies and facilitation has been provided on reaching mutual agreements about future professional realization.

Within this process, we have been observing steady formation of a broader context for development of additional skills, predominantly originating and relevant to the area of business (Figure 2).





**Figure 2** Schematic structure of the M.Sc. program [2] and its additional skills development context

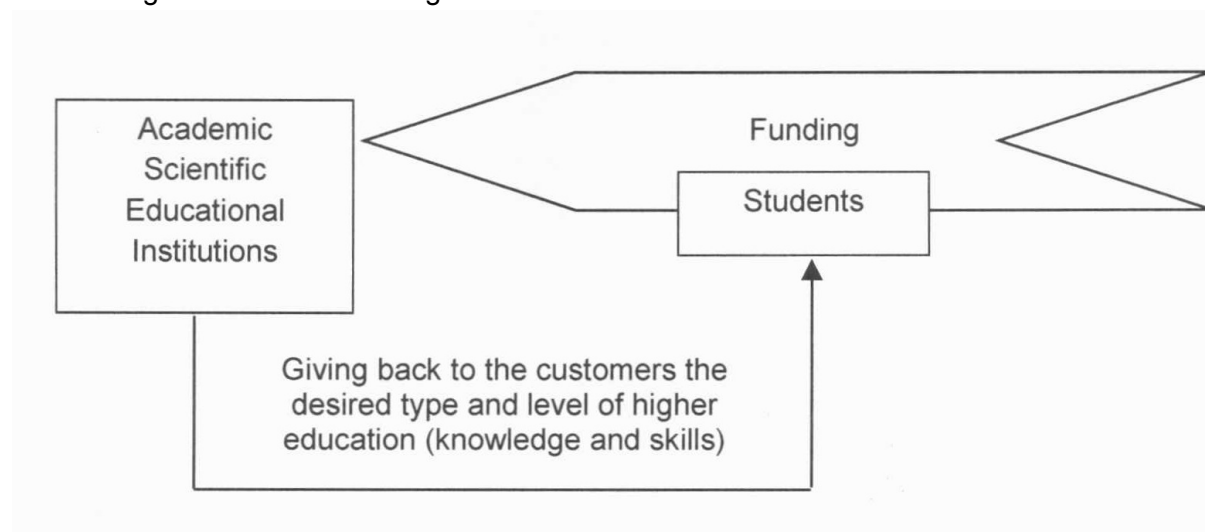
### 3. Proposed New Combination and Interpretation of Academic Science Education with Methodology for Development of Communication Skills, Internal Motivation and Creativity

The core of our idea is to induce formation of efficient business skills and attitude in students as early as during their studies through:

- Adaptation of academic teaching to state-of-the-art business training and development methodologies;
- Constant interaction and work with specialists from leading companies (preferably with management experience) according to best business practices and standards;
- Reinterpreting lecturers'-students' relationship as joint work with shared goals, commitment and responsibilities.

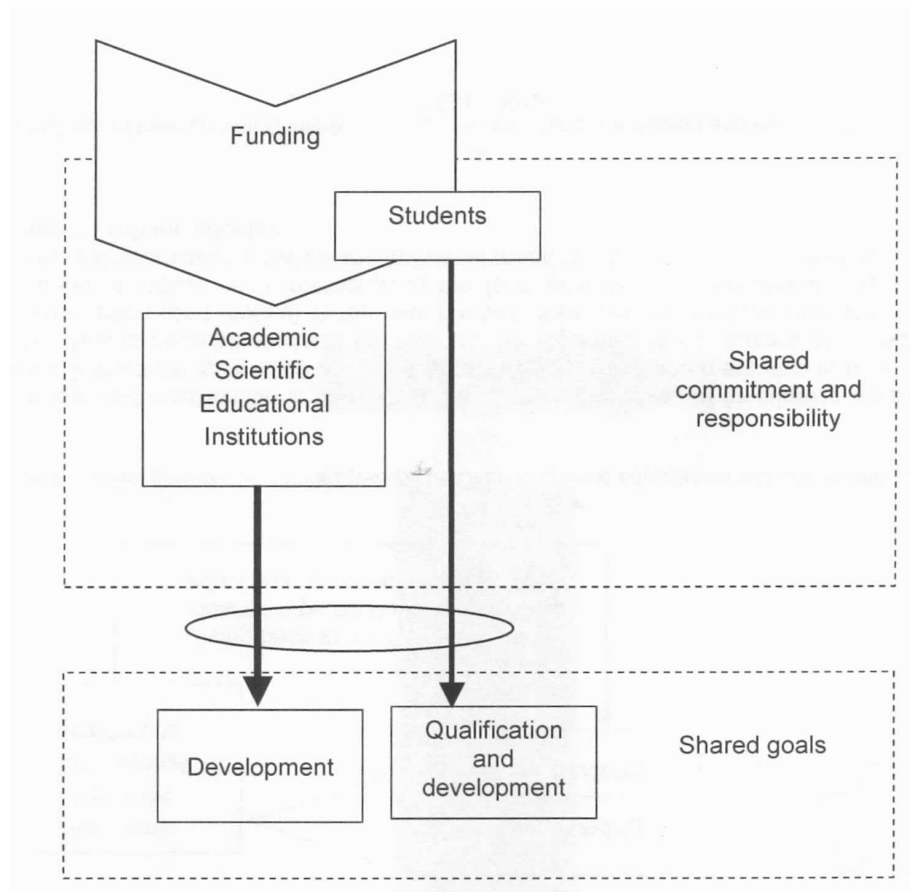
The advantages of such an approach would be acceleration of professional maturity, greater motivation to study and much greater chances for finding adequate jobs.

Current state of affairs is depicted in Figure 3. Academic educational institutions receive funding from students and/or other sources to serve them as clients by giving the desired type and level of higher education including knowledge and skills according to preset standards. Of course, this is not the standard provider-client relationship because here the client is not always right. However, being in a position of clients during present worldwide economic turbulences certainly diminishes students' chances of making efficient and farreaching decisions concerning the direction and content of their studies.



**Figure 3** Current provider-client relationships between academic educational institutions and students

Our suggested modification is depicted in Figure 4. Such a way of functioning would make possible immediate application of soft skills training, coaching and mentoring in an academic setting. This is because students will feel and be regarded as co-workers who also invest their time, effort (and money) in the final product: their own qualification and development. We intend to initiate such interaction in the form of very short modules during standard courses, extracurricular activities and individual meetings. But what should these activities be focused on with top priority?



**Figure 4** Joint work relationship between academic educational institutions and students

The first area would be business communication in its whole variety: interpersonal, writing and presentation skills. In general, such a set has always been regarded in business as a key to personal and corporate success (see for example [3]).

The second area would be internal motivation. Apart from the different motivation theories known in the literature, our observations are that deep personal awareness and practical skills for enhancement of internal motivation are needed nowadays to study natural sciences and pursue a related career path. In our opinion, a key concept here would be Emotional Intelligence and its corresponding pool of knowledge and methods [4]. Based on that, students can learn to apply constructive reasoning with all available (intellectual and emotional) information regardless of circumstances.

The third area would be creativity as the basis of discoveries, inventions and steering of one's personal life. On the one hand, it is connected with recent discoveries of neurogenesis in adult brains which is enhanced by learning [5], which gives even deeper meaning of lifelong learning as an attitude to be developed already during academic studies. On the other hand, the scientifically verified Breakout Principle [6] provides a wide range of practical methods and approaches to this goal.

## 4. Conclusions

Our challenging times need new approaches to attraction and education of students in the field of natural sciences. We are convinced that utilization of best practices for personal and professional development in academic education and business as early as possible in a

wellbalanced combination can overcome crisis influences and give rise to many new opportunities.

## **5. Acknowledgement**

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# Interactive Teaching of Modern Physics for Students of Engineering and Other Fields of Science

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**A new format for teaching of modern physics for students of engineering and other fields of science is undergoing preliminary testing. It is based on constant interaction with students which provides them with an overview of developing trends and their meaning rather than with a system of established facts and their formal mathematical description. The aim of this approach is to make the subject much more attractive while avoiding simplification. In addition, students receive individual recommendations for further development in particular fields of modern physics.**

## **Keywords**

Engineering, Interactive teaching, Modern physics, Science

## **1. Introduction**

Modern Physics is the physics of the XX<sup>th</sup> century. This "time" definition is actually based on two milestones of the early twentieth century: Einstein's relativity and quantum mechanics. Physics of earlier times (Newton's laws, Maxwell's equations, thermodynamics, etc.) is called "classical".

For many years, Modern Physics has been successively taught mainly in faculties of physics and chemistry as well as at chemical technology, technical, computer and information technology universities throughout the world. Lecturing on Modern Physics started in the USA during the 1980s as a result of extremely active and sharp debates about such a necessity. Since then, there exist lots of excellent textbooks and manuals mainly in English, some of them translated into Russian. Most of these textbooks have been titled "Modern Physics for Scientists and Engineers" and have very similar contents [1-6]. They have been written in a modern style with many examples and solved problems. Therefore, they are popular among students of other sciences (chemistry, biology, engineering, etc.) because they can find there well-explained fundamental physics knowledge of modern relativism and gravity, quantum mechanics, statistical physics, solid-state physics, charge carriers in semiconductors, atomic and nuclear physics, elementary particle physics, etc. These courses usually follow in details how such new ideas have been developing. It is important to note, that there exist many written teaching materials on Modern Physics that are freely available in the Internet: particularly Facebook and YouTube with excellent video lectures, which is very helpful for students and corresponds to their new style to quickly "absorb" information.

What is the situation in Bulgaria? In the academic year 2010/2011, a "Modern Physics for Engineers" course was started for the first time within the "Wireless Networks and Devices"

Master Program in the Faculty of Physics at “St. Kliment Ohridski” University of Sofia [7, 8]. Its goal was to cover the fundamentals of the twentieth century physics fairly rigorously, but on an adequate level for future engineers in the area of modern wireless communications. In this paper, we present our idea for a new step forward: interactive teaching of Modern Physics where curriculum is shaped according to students’ individual background, preferences and challenging topics.

## **2. The necessity of Modern Physics in a Microwave Engineering Master Program**

Higher education in the area of microwaves: wave propagation, RF components and devices, antennas, wireless communication, etc. is among the most sophisticated and costly educational processes for many reasons. First of all, electromagnetic modelling of microwave structures is based on pure circuit approximation as well as on pure wave approximation, combined to a specific extent in each particular case. Therefore, students have to acquire sound knowledge both in the areas of electronics and electrodynamics on sufficient scientific and engineering levels. In addition, practice-orientated education in microwave physics and technology requires well-selected measurement equipment, components and devices, which are generally expensive and not easy to operate. Moreover, modern RF design is based on utilization of circuit and structural (2-D and 3-D) electrodynamics simulators, which needs additional efforts for provision (licenses, upgrading) and training (computer classes, student seminars). Incessant development of research and modernization of key facilities, technical solutions and applied approximations in the microwave range also urges lecturers to continuously upgrade their own knowledge and skills.

Under such circumstances, teaching in the area of modern physics on an up-to-date level combined with interactive methodology seems to be rather feasible.

The host M.Sc. program has a wide enough but well-balanced profile, including three interconnected axes: 1) networks, software, channels; 2) devices, systems, signals and 3) networks and innovation management [7]. This program has achieved continuous growth over the last ten years. Its attractiveness to high-scoring students has been significantly enhanced by convincing incorporation of training on the basics of personal and team management towards systematic search for, design and introduction of innovations.

The schematic structure of the M.Sc. program has been presented in the literature [8, 9]. The 1.5-year education is divided into 3 stages – introduction (1 month), education in 5 modules (1 year) and final practice, individual tasks and Master thesis (1/2 year). Three introductory courses (Introduction to Wireless Communication, Applied Electrodynamics for M.Sc. Students and Modern Physics for Engineers) are essential for the launch of the education process. Students usually come from different higher education institutions and therefore have received different B.Sc. specialties and levels of training. A special goal of these courses is to align preliminary student knowledge in the area of physics, electrodynamics, technology and communications before starting the next stage of core professional education.

Over the last years the number of students receiving their bachelor degree in technical universities increases. The introductory course Modern Physics for Engineers is proposed exactly for these students. As a rule, they usually have randomly accumulated knowledge in the area of the modern physics or do not have any. The majority of these students come across the specific ideas (“beyond common sense”) of the XX<sup>th</sup>-century physics for the first time exactly during this course.

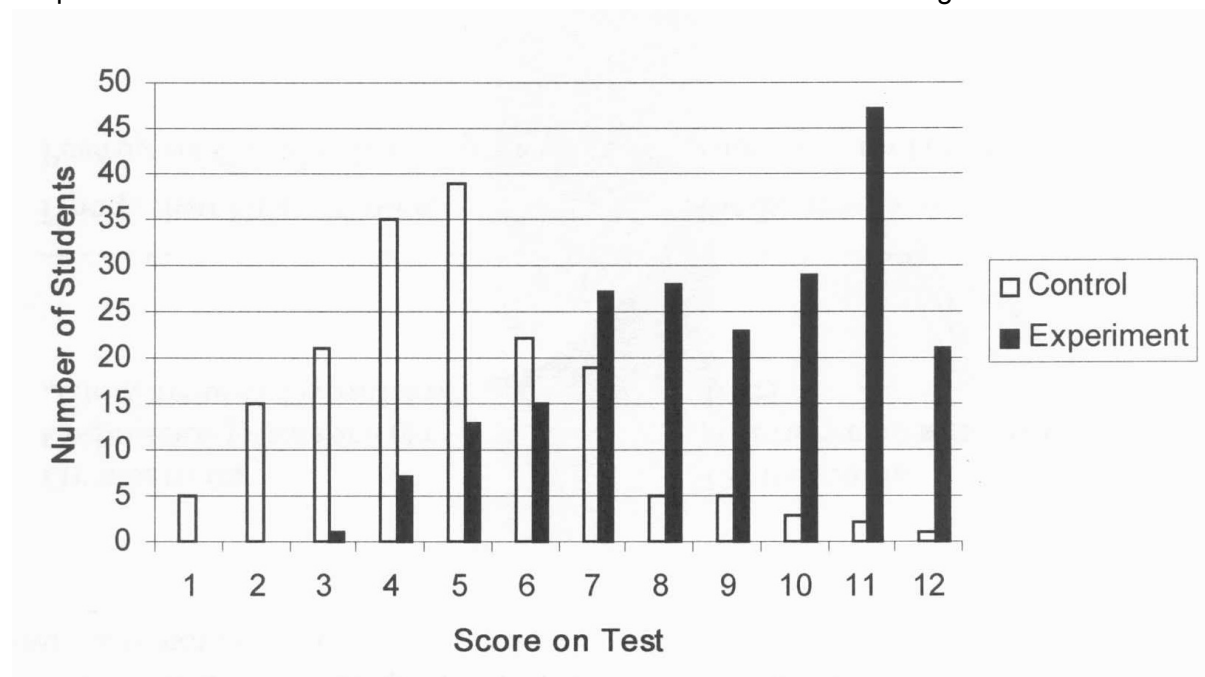
At first sight, the course Modern Physics for Engineers does not have direct relations with the other courses in the program. For example, there exist specific education modules, which fundamentals can be acquired without any knowledge of physics. But the basic ideas from Modern Physics have important place in many other areas: technology, devices, signals,

wave propagations, measurements, etc. The strength of this course is significant not only due to the step-by-step accumulation of basic ideas of modern physics; it becomes valuable mainly due to the accumulation of these ideas in their completeness, while being presented with interactive methodology.

### 3. Interactive Teaching Approach

A recent study has shown significant advantages of interactive teaching compared to traditional lecturing during the first-year physics sequence taken by all undergraduate engineering students at the University of British Columbia [10].

The authors' instructional design for the experimental section was based on "deliberate practice" methodology in the form of a series of challenging questions and tasks that require from students physicist-like reasoning and problem solving during class time, directed by frequent feedback. The distribution of student test scores is shown in Figure 1.



**Figure 1** Histogram of student test scores for the control and experiment sections [9]

The average scores were  $41 \pm 1\%$  in the control section and  $74 \pm 1\%$  in the experimental section. Random guessing would produce a score of 23%, which means that the students in the experimental section performed almost twice better on the test than those in the control section.

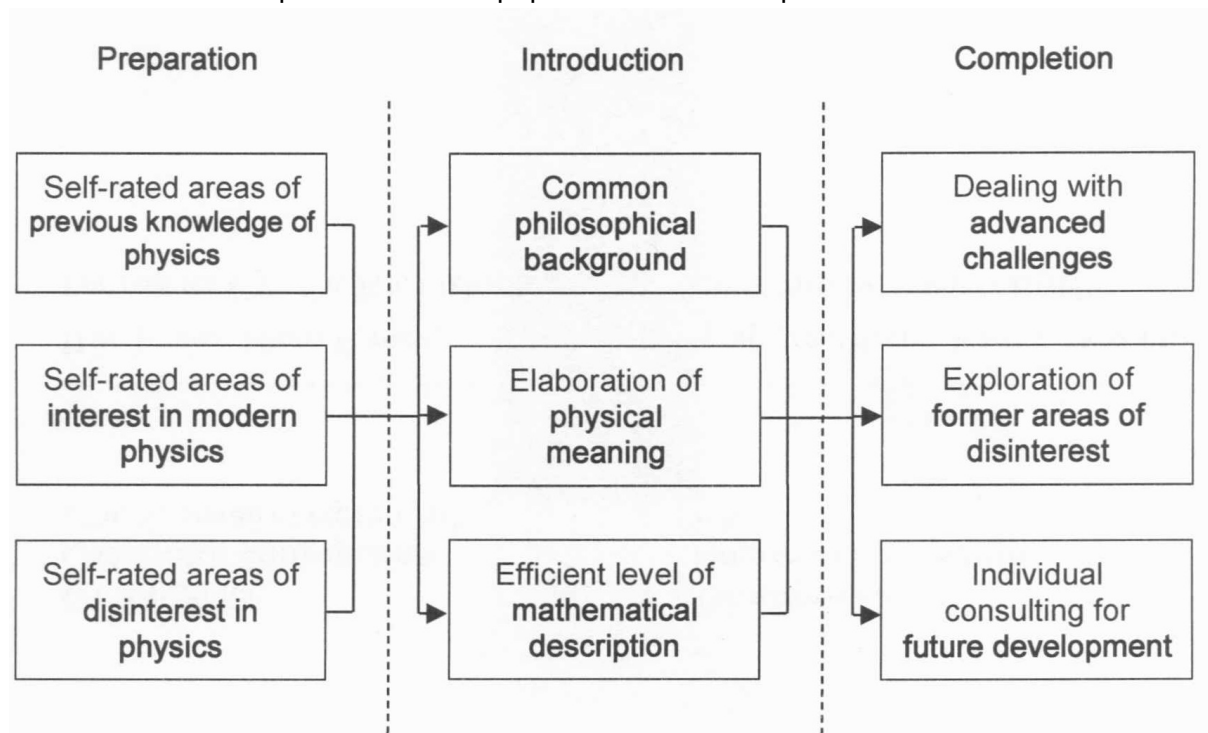
Learning content in the above work covered the area of electricity and magnetism which are more or less familiar to students from their secondary school studies. So, how can a similar teaching style be applied concerning relativity theory and quantum mechanics that are virtually "terra incognita" for them?

Our proposed modification of interactive learning consists of the following additional components:

- Flexible curriculum design according to preliminary and continuous interest assessment;
- Finding proper combinations of physical meaning, philosophical background and
- Mathematical description.

## 4. Flexible Curriculum Design

Proposed stages of curriculum design are shown in Figure 2. The preparation phase is based on self-rating by the students of the following areas: previous knowledge of physics, interest in modern physics and disinterest in physics. Topics from these areas are first enumerated and then rated on separate sheets of paper in the same sequence.



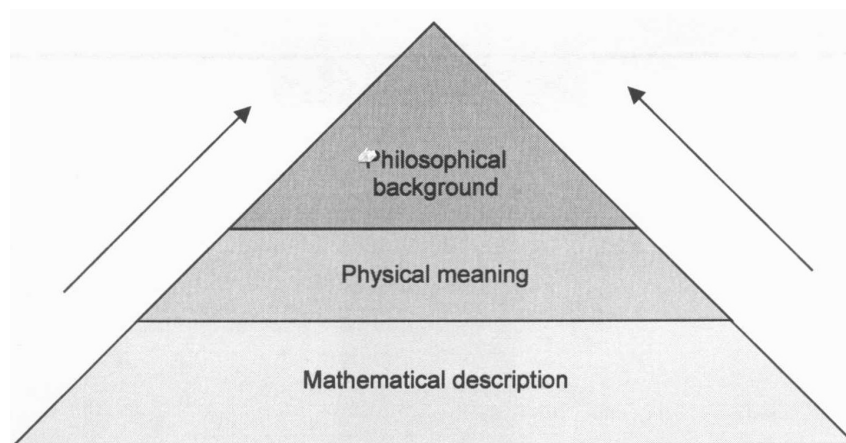
**Figure 2** Stages of course curriculum design

Collected information from the whole group is analysed for shaping the introduction phase with common philosophical background for understanding of Modern Physics, elaboration of physical meaning related concepts and magnitudes as well as setting the efficient common level of mathematical description. The completion phase then includes dealing with advanced challenges beyond students' "comfort zone", exploration of former areas of disinterest for gaining useful knowledge and individual consulting for future development on the basis of observed skills, qualities and tendencies.

## 5. Proper Combinations of Physical Meaning, Philosophical Background and Mathematical Description

In general, wide-spread academic teaching approach in physics can be represented in Figure 3. It implies start with a foundation of the laws of physics and their mathematical formulation, followed by clarification of their physical meaning. Later on, it might be possible to include consideration of the relevant philosophical background which, concerning courses for engineers and students of other sciences, happens only rarely.



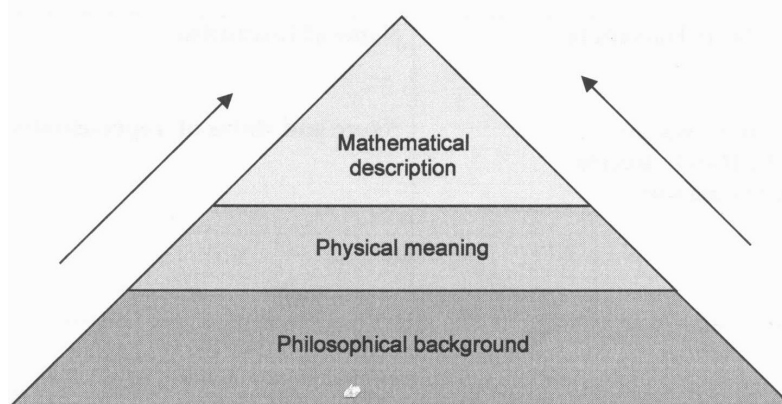


**Figure 3** Wide-spread academic teaching approach in physics

Taking this into account, our approach can be represented in Figure 4. In order to introduce students more smoothly into the subject, we propose to start with the essentials of the philosophical background of Modern Physics, continue with the physical meaning of related phenomena and only afterwards set the adequate level of mathematical description.

Along these lines, our overall strategy is to give a logically coherent and sequential account of the basic principles of relativity and quantum theories of atomic and nuclear structure as well as some topics in elementary particles, molecular and solid-state physics.

The course starts with basic treatment of special relativity, because it is the foundation of the content of almost all later chapters in which the photons are completely relativistic particles. Quantum effects are then introduced through the basis photon-electron interaction, and wave properties of material particles are considered. On the foundation of the basic principles of relativity and quantum physics, the curriculum advances into atomic, nuclear, elementary particle and solid-state physics. After clarification of the fundamental principles of wave mechanics, de Broglie's hypothesis, wave functions, the Superposition and the Uncertainty principles, students are introduced into the Schrödinger theory of quantum physics. This theory is applied to the examples of an infinite potential well, step potential and potential barrier, quantum harmonic oscillator, hydrogen atom, two-atomic molecule and interaction of magnetic field with electrons in atoms. An outline of the solution of the Schrödinger equation both for one-electron and multi-electron atoms (i.e. with three quantum numbers  $n$ ,  $l$ ,  $m$ ) as well as some general features of wave functions are considered.



**Figure 3** Proposed interactive academic teaching approach in Modern Physics

After a short presentation of physical statistics, students are ready for study of the electrical properties of the solids. A brief discussion of crystal structure precedes coverage of classical and quantum free electron models. In order to explain the big differences in electrical properties of solids as well as special properties of semiconductors, existence of allowed and forbidden energy bands is described. We also introduce the concepts of electron effective mass and "holes". Intrinsic and dope semiconductors as well as movement of their electrons and holes and their electrical properties are discussed. This helps students to understand the behavior and characteristics of semiconductor devices: diodes, bipolar transistors, field effect transistors, etc. The content in nuclear physics includes nuclear models, decay and reactions. At the end we provide a general exposition on a basic level of elementary particle physics.

Thus, in summary, the course curriculum practically includes all main topics of Modern Physics: relativity, quantum mechanics, atomic physics, statistical mechanics, solid-state physics, nuclear physics, and elementary particles. Statistical mechanics is normally not included in lectures on Modern Physics. However, we have been observing that for proper understanding of many topics in contemporary physics – such as applications of quantum mechanics – this content is essential. In our opinion, engineering students nowadays should be able to work quantitatively with the concepts of Modern Physics. Therefore, our goal is to present these in a manner, which is logical, attractive and adequately rigorous. Special attention should be given throughout the course to the physical meaning of all related phenomena.

## 4. Conclusion

So far, the Modern Physics for Engineers introductory course within our Masters program in the area of telecommunications has proved to be a successful pilot initiative. Based on that, the proposed interactive approach can effectively upgrade and extend teaching of Modern Physics also towards students of other fields of science which are essential for modern development of science and technology. We are convinced that such a teaching approach will enhance formation of unique physics-thinking style which is attractive and useful to creative and motivated students.

## 5. Acknowledgement

The authors thank to the Scientific Research Found of Sofia University "St. Kliment Ohridski" and the Faculty of Physics administration for their support.

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# The structure of GDP-indicator for economic model for development of Macedonian economy

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The global economy crisis confirmed the need for development of the production sector in Macedonia as key element for decreasing the trade deficit. The effects of the crisis show that Macedonia does not have economic structure capable for development without inflow of foreign capital. The question does Macedonian economic structure is compatible to current level of development and does Macedonia have sustainable economic development in the last ten to fifteen years can be answered negatively. In fact, the last economic crises confirmed that the development model that Macedonia has is not sustainable. Although the privatization process finished, the private ownership and liberalization do not show the expected effects. The companies are not competitive on international markets, and did not start to create new productive jobs in production and export oriented sectors. On macro level, we have development model based on fixed exchange rate of the domestic currency and weak economy, chronic trade deficit and reliance on the foreign capital inflow. Obviously, the economic model should be changed. Macedonia needs radical change of the economic policy, with fast restructuring of the economy and new economic and legal conditions for investments in production and other export-oriented economy sectors. All these should be done parallel with general development of infrastructure and human resources. In order to start the investment cycle, which will invoke faster economic development, there is a need for change in the economic structure, which can be analyzed by the structure of GDP, as main macroeconomic aggregate in the economy.

## Keywords

Economic model, industrial production, unemployment rate, trade deficit, fiscal and monetary policy

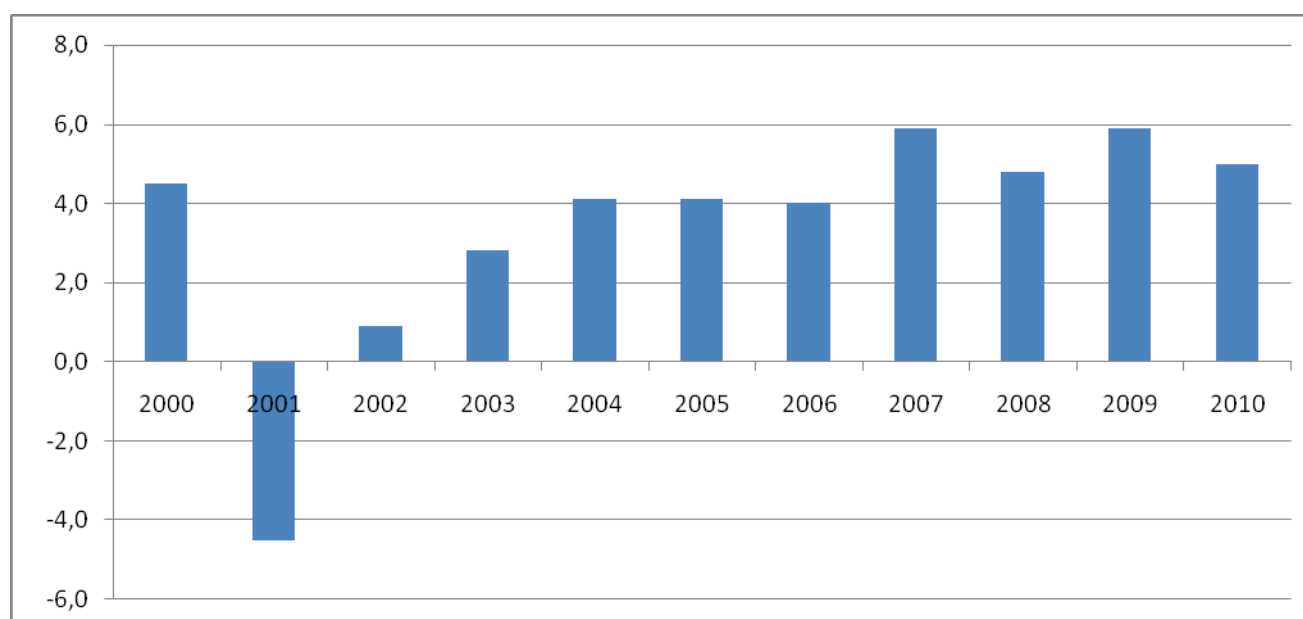
## 1. Introduction

The growth of gross domestic product as a basic macroeconomic generator in every economy is a measure of the success of the economic policy in a country. The expression of other macroeconomic aggregates relative to GDP, such as the trade deficit as a percentage of GDP or current account deficit of balance of payments as percentage of GDP are irreplaceable macroeconomic indicators in each country.

**Table 2** Real growth of GDP

YEAR	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
GDP	3,4	4,3	4,5	-4,5	0,9	2,8	4,1	4,1	4,0	5,9	4,8	5,9	5,0

Source: State Statistical Office and National Bank of the Republic of Macedonia



**Figure 1** Real growth of GDP

Source: State Statistical Office and National Bank of the Republic of Macedonia

From the table and the graph above we can see the positive trend in the GDP real growth. The positive dynamics of the real growth of GDP in the period from 1998 to 2010 can be considered as one of the basic points during the recovery period (except in 2001 during a military crisis) in the Macedonian economy. But, if the structure and the elements on which this growth is based are processed, the negative effects of the development will be obvious. The next parts will analyze and elaborate the structure of GDP according to the production model and examine the causes and consequences from the current economic policy.

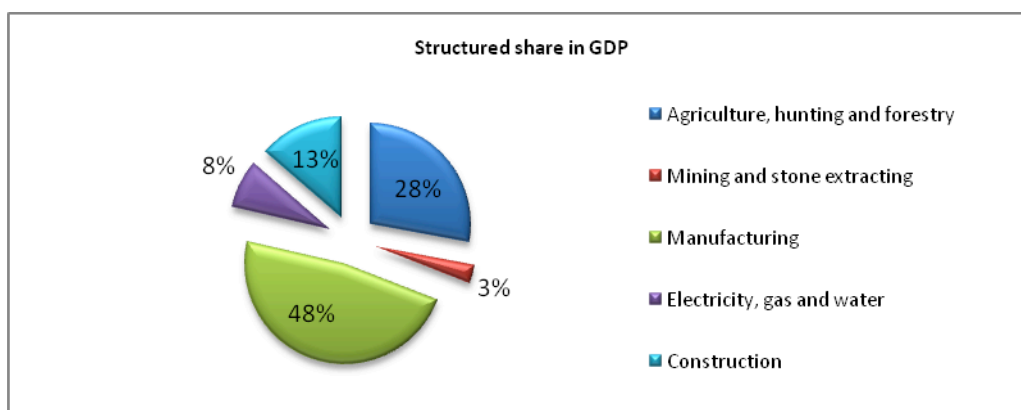
## 2. The structure of GDP according to the production model

Taking into consideration the structure of GDP according to the production model, about 37% comes from production activities, which for one or two percentage point's variation is on the same level for years before the economic crisis, and by 3.3 percentage points lower than the share in 1998. This structural percentage of production activities as part of GDP is presented in the table and graph below.

**Table 3** Structural percentage of production activities as part of GDP

Production activities	1998	2007	2008
Agriculture, hunting and forestry	11,4	9,3	10,4
Mining and quarrying	0,8	0,7	1,1
Manufacturing	18,1	18,4	17,8
Electricity, gas and water	4,5	2,7	2,9
Construction	5,8	5,9	5,1
Structural participation in GDP	40,6	37,0	37,3

Source: State Statistical Office and National Bank of the Republic of Macedonia



**Figure 2** Structural percentage of production activities as part of GDP

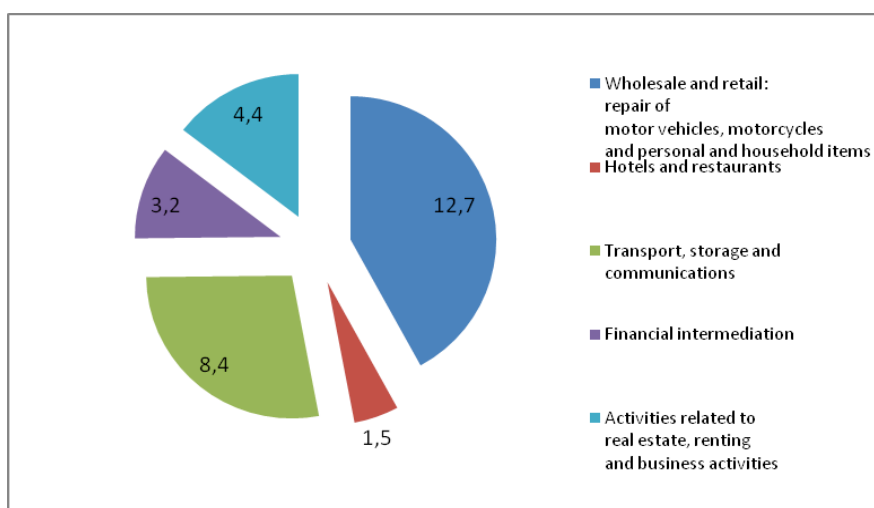
Source: State Statistical Office and National Bank of the Republic of Macedonia

Service activities also contributed over 30% in the GDP, whereas in years before the crisis there is an increase of the participation of the activities related to real estate and renting. This can be seen from the table and the graph below.

**Table 4** Structural percentage of service activities as part of GDP

Services	1998	2007	2008
Wholesale and retail: repair of motor vehicles, motorcycles and personal and household items	11,2	13,5	12,7
Hotels and restaurants	1,6	1,6	1,5
Transport, storage and communications	7,3	8,3	8,4
Financial intermediation	3,7	3,4	3,2
Activities related to real estate, renting and business activities	2,7	3,6	4,4
<b>Structural participation in GDP</b>	<b>26,5</b>	<b>30,4</b>	<b>30,2</b>

Source: State Statistical Office and National Bank of the Republic of Macedonia



Source: State Statistical Office and National Bank of the Republic of Macedonia

**Figure 3** Structural percentage of service activities as part of GDP

However, it must be noted that the structure with a higher share of service activities in comparison to production activities is present in developed countries and is a normal process when we speak about these countries. For example, in some EU countries approximately 26% of GDP comes from industry and construction, and although these countries have become rich countries with long, modern, and industry developed economy, the service activities have dominant percentage in GDP.

From the rest of 34-35% from the GDP in Macedonia derived from the activities of the public sector, through education, health care and social work, public administration and social security with about 18-20%. With a 14-15% share of the total GDP are taxes and other imposts and contributions, additional to the value added this is 85% to 86% from the whole GDP according to the production model.

**Table 5** Activities of the public sector and taxes and other imposts as part of GDP

	1998	2007	2008
Public administration and defense, compulsory social care	6,2	6,4	6,7
Education	4,1	3,2	3,1
Health care and social work	4,3	3,5	3,4
Other communal, social and personal service activities	2,5	2,1	2,7
Rents	4,6	5,0	5,4
Less: Bank service	2,6	2,5	2,6
<b>A. The added value</b>	<b>86,3</b>	<b>85,5</b>	<b>86,3</b>
B. Taxes on products	13,7	14,8	14,2
-Value Added Tax and Excise Tax	10,2	13,0	12,7
-Customs and Tariffs	3,5	1,7	1,6
C. Minus: Subsidies on products	/	0,3	0,5

Source: State Statistical Office and National Bank of the Republic of Macedonia

When we analyze the table 4, if we focus on the structure of gross domestic product without taxes and subsidies in 2008, which is taken for comparison as the year that had the highest real GDP growth, 57% of GDP comes from services, and only 43% of production activities, in which only 26.6% are from industry and construction activities. The minor role that the private production and industrial sector has in the Macedonian economy will be more obvious if we take off the part where the public authorities are entering in the economic activities with, for example, capital transfers.

Thus, it is obvious that GDP growth in recent years has been achieved outside the industry sector, and especially in the area of services, which can not be offered to the foreign market, thereby to provide rise in exports.

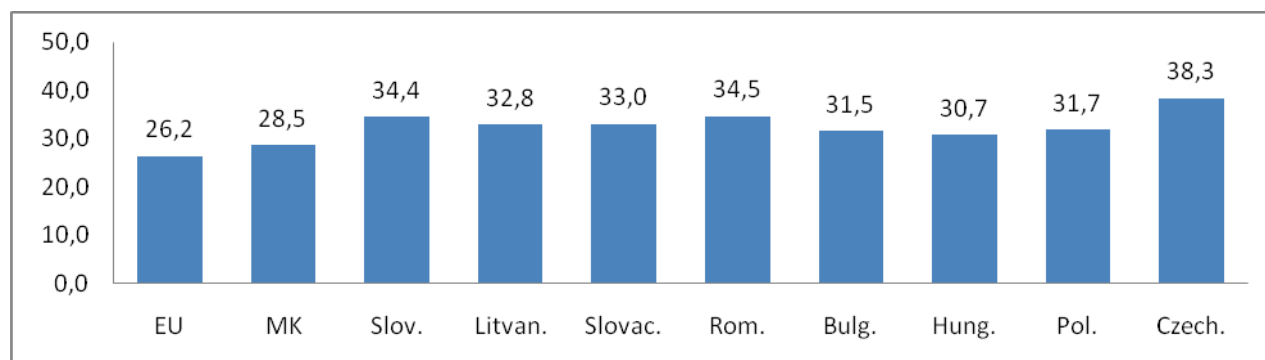
After the analysis of the structure of GDP according to the production model, it is obvious that after the privatization process the effects that should be reached from the private property in the segments of efficiency growth of domestic companies, economic recovery and restoration of economic potentials, as well as new productive employment are not at the desired level.

If there is a comparison between Republic of Macedonia and some EU countries and other countries from the region, it can be concluded that the participation of the industry and construction in GDP is at significantly higher level in comparison to the level in Macedonia, which is just 28, 5%. This conclusion can be obtained from the table and graphs presented below.

**Table 6** Industry and construction as part of GDP in Macedonia and some EU countries

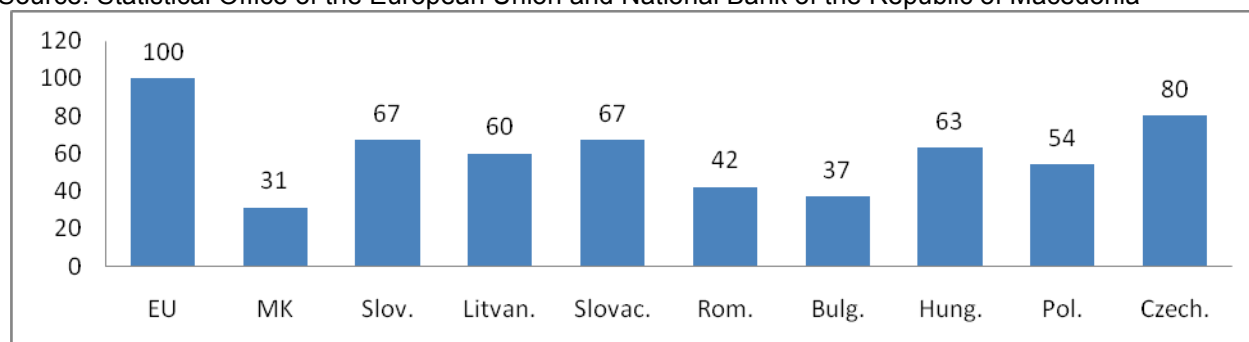
Country	EU	MK	Sloven.	Litvan.	Slovak.	Rom.	Bulg.	Hung.	Pol.	Czech.
Industry and construction	26,2	28,5	34,4	32,8	33,0	34,5	31,5	30,7	31,7	38,3
Percapita/ % from EU	100	31	67	60	67	42	37	63	54	80

Source: Statistical Office of the European Union and National Bank of the Republic of Macedonia



**Figure 4** Industry and construction as part of GDP in Macedonia and some EU countries

Source: Statistical Office of the European Union and National Bank of the Republic of Macedonia



**Figure 5** Per capita / % from EU

Source: Statistical Office of the European Union and National Bank of the Republic of Macedonia

The countries shown in the table and the graphs above have higher participation of the industry and construction in the GDP, even though they are at the higher level of economic development in comparison to the Republic of Macedonia when GDP per capita is taken into consideration, where GDP per capita in the case of Macedonia is just 31% from the average in EU.

### 3. Causes and consequences

The analysis of industrial production with detailed observation on the causes and consequences from inadequate and misleading economic model for development is giving the possible answer on the question about the level of the industrial production during the last twenty years. What was happening in Macedonia is a dramatic slowdown in the industrial production in the last twenty years, or in other words deindustrialization after 1990, from which Macedonian economy did not recover during the last decade. Even though there were

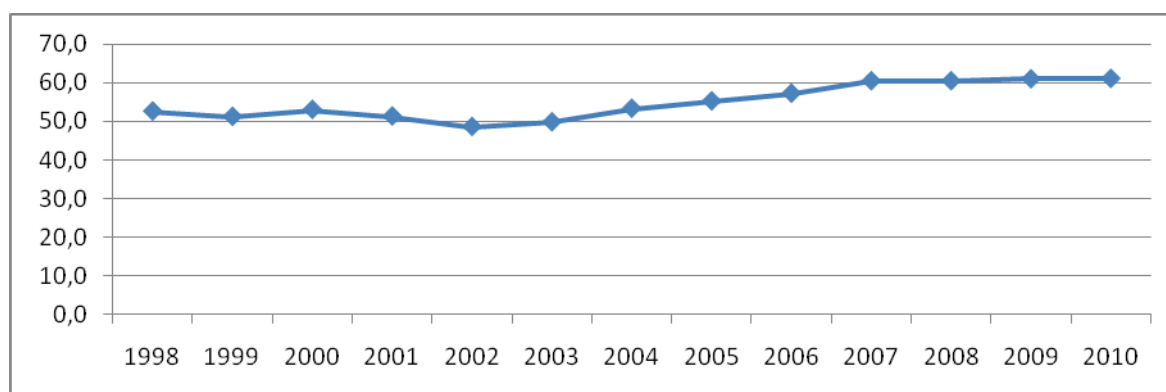


positive signals during the period from 2002 to 2008 before the world economic crisis, the industrial production during this period was half of the industrial production in 1990. While the industrial production in 1998 was half compared to the industrial production in 1990, in 2008 was lower than 40% in comparison to the industrial production in 1990, which is the year when the transformation process from planned to market system started. This can be seen from the comparison of the numbers given in the table below and the graphical presentation of this numbers.

**Table 7** Industrial production (1998-2010) as percentage from the industrial production in 1990

Year.	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ind.	52,6	51,2	53,0	51,3	48,6	49,8	53,3	55,2	57,2	60,4	60,4	60,9	61,0

Source: State statistical office-Republic of Macedonia



**Figure 6** Industrial production (1998-2010) as percentage from the industrial production in 1990

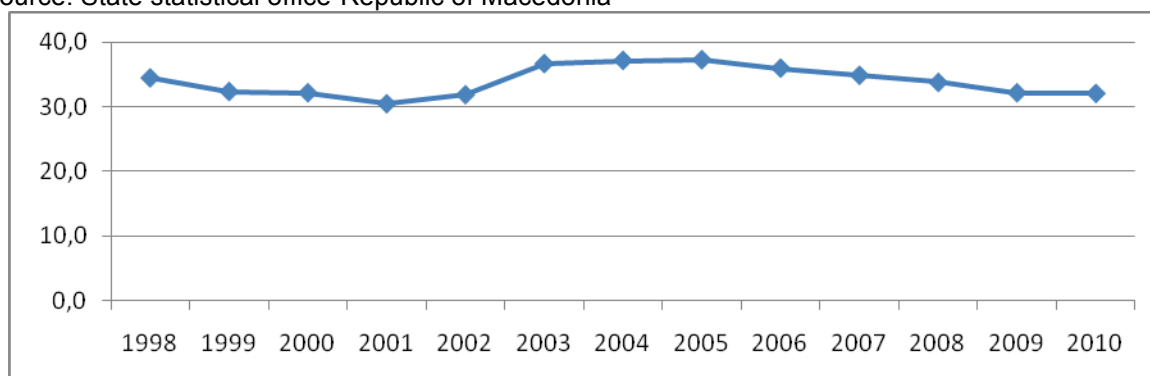
Source: State statistical office-Republic of Macedonia

When the employment is analyzed, the results are almost the same. The expected new workplaces as a result from the reformation processes did not reach the expected level, especially in production and export oriented sectors, which can be seen from the table and graph presented below.

**Table 8** Unemployment rate (1998-2010)

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
MK	34,5	32,4	32,2	30,5	31,9	36,7	37,2	37,3	36,0	34,9	33,8	32,2	32,1

Source: State statistical office-Republic of Macedonia



**Figure 7** Unemployment rate (1998-2010)

Source: State statistical office-Republic of Macedonia

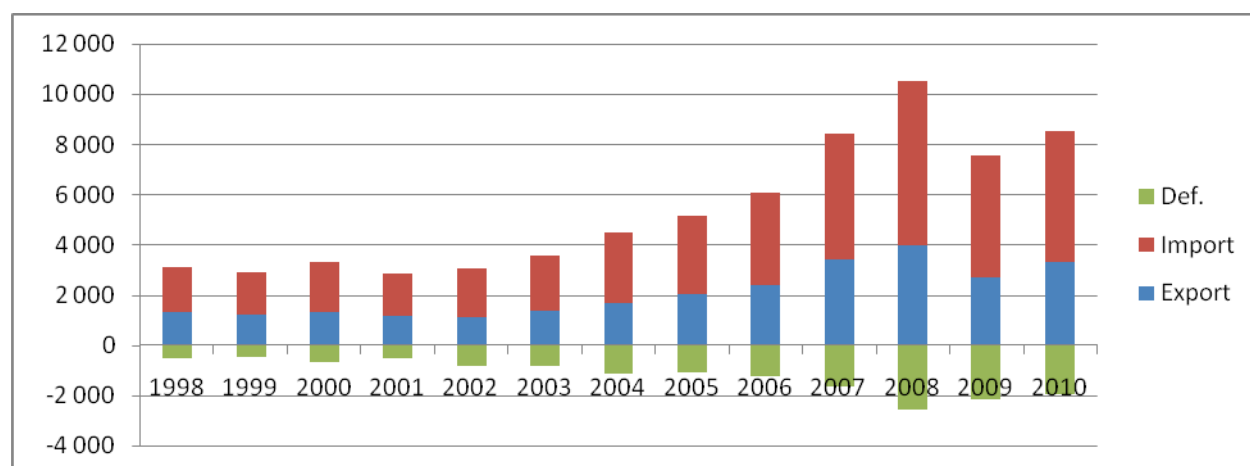
The new working places are mainly opened in the administration and in non production sectors, sectors which are not export oriented and services such as financial intermediation, real estate operations and other services. According to this, it is obvious that the development model in Macedonia during the last twenty years dominantly focused on opening banks, supermarkets, and building luxury commercial and residential buildings.

The economic structure, with overemphasized participation of the non production sector (services), without adequate participation of the production and export sectors, is one of the main factors of permanent economic problems. Insufficient recovery of the production and export sectors is the reason why the import is much higher than the export. The table below is presented the trade deficit that has continuous rise from 1998. From the table is it obvious that in the whole period the export did not manage to overcome 60% from the value of the import.

**Table 9** Trade deficit (1998-2010)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Export	1.291	1.190	1.320	1.155	1.112	1.362	1.674	2.040	2.410	3.391	3.971	2.702	3.295
Import	1.807	1.686	2.011	1.682	1.917	2.214	2.814	3.103	3.671	5.037	6.543	4.871	5.241
Def.	-516	-491	-691	-527	-806	-851	-1.139	-1.063	-1.261	-1.638	-2.574	-2.169	-1.946

Source: State statistical office-Republic of Macedonia



**Figure 8** Trade deficit (1998-2010)

Source: State statistical office-Republic of Macedonia

The deficit of trade balance during these years is covered with the surplus from other components of the current account from the balance of payments. Remittances, particularly private remittances of our citizens, and modest influx of foreign investment, have covered part of the deficit in trade balance during the recent years. But, there are fewer opportunities to cover the trade deficit, in the absence of planned foreign investment and remittances, which is becoming a significant problem in the Macedonian economy.

### 3. Conclusions

The existing vulnerabilities in the current development model generally may be grouped in these categories:

- Slow reforms in the real sector, without properly targeted incentives for development of the production and export oriented industries.
- Delay of the regulations and procedures for bankruptcy and liquidation.
- Slow performance in the field of capacity building of state institutions.
- Emphasis of the economic policy only on the exchange rate, i.e. its basic aim to provide price stability, believing that that is the most important condition for economic development.

But in such conditions, where we have the lack of measures to reduce the trade deficit, higher inflation in comparison to the Euro-zone, there are sufficient signals to abandon the policy of forced exchange rate stability which led to fundamental economic paradox, where we have a strong exchange rate for the denar in low export economy.

There is a need for changes in the business and investment climate for attracting foreign direct and domestic investments, with their focus on export-oriented sectors in the economy (especially in industry), while designing and establishing a serious mechanism to prevent corruption. This is the only realistic way of establishing a sustainable and stable development of the country and its ability to return the debts. It requires serious changes in economic policy and significant reforms in creating a favorable investment climate.

There are a couple of fiscal and monetary measures that can be implemented. In the fiscal policy there is a need for systematic rationalization of public spending, without reduction of social standards and greater tax burden on labor costs. Also, there is a need for additional activities to prevent the "black" economy. National Bank of the Republic of Macedonia needs to take consideration not only for the stability of the exchange rate for the denar, but also for the liquidity of the real sector. There is a need for production sector development and state investment in the infrastructure. Only on the basis of new economic structure and macroeconomic stability, there will be sustainable rate of economic growth and growth in living standards.

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# The impact of the information technology on the business sector development

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**With the development of information technology, the possibilities for expansion and growth of businesses are increasing. The interaction between business sector and information technology is bringing other new concepts which are affecting the future of business and information technology as two inseparable sciences. Managing business performance is a critical requirement for maximizing business profitability. In fact, in many situations, it is a critical requirement for remaining feasible in today's competitive business environment. Company managers are feeling pressure from intolerance for missed performance targets. And with performance measurement periods becoming shorter, management simply must have the capability for rapid reaction. To do this requires monitoring and tracking capabilities that can generate complete and accurate information upon which they can directly react. This information provides the required business intelligence for proactively managing business performance.**

## **Keywords**

Business intelligence, key performance indicators, balanced scorecard, non-financial data, label semantic

## **1. Introduction**

Increased stakeholder value has become the primary indicator by which businesses are measured in today's active functioning of the global economy. The capacity to enhance business performance is a critical necessity for a company. The inability of a company for better business performance is resulting in different types of negative reactions, such as instability of stock prices. Except this, the companies are in a more complex position because the business performance measurement time frames are becoming shorter. The profitability, growth and success are analyzed quarterly instead annually.

To keep pace with the changes, companies need to react quickly to incorporate varying demands and needs from the market. Elasticity and business cleverness are among the most important means to remain competitive. What is needed is a complete and comprehensive approach that facilitates companies to line up strategic and operational objectives in order to fully manage realization of their business performance measurements.

Successful businesses need information to give them a single view of their enterprise. With this type of information, they can make more effective decisions, manage business operations and minimize process interruptions, align strategic goals and priorities both vertically and horizontally throughout the business and establish a business environment that promotes continuous innovation and improvement.

All these needs for constant redefinition of business goals and strategies requires an IT system that can take up these changes and help business users optimize business processes to assure business objectives. Business performance management has the main role here by providing key performance indicators, which can be used to evaluate business performance. In fact, key performance indicator is a performance metric for a specific business activity that has an associated business goal. The goal is used to determine whether or not the business activity is performing within accepted limits. The observation and analysis of key performance indicators provide business users with the approach necessary for business performance optimization. Business performance management also becomes a great guide for IT departments who are being asked to make logical observation from simple numbers in a way that it helps them focus their resources in areas that will provide support to enable management to meet their business goals. They can now concentrate their tasks and focus on those tasks that help to meet business measurements and achieve business goals. These tasks include planning, budgeting, forecasting, modeling, monitoring, analysis, and so forth.

To enable the implementation of business performance management organizations may need to improve their business integration and business intelligence systems to provide proactive and personalized analytics and reports. Business integration and business intelligence applications and tools work together to provide the information required to expand and observe key performance indicators. If some activity is outside the limits given from the key performance indicator, a kind of signal can be generated to notify business users that corrective actions are needed. Business intelligence tools are used here to display these types of indicators and guide users in taking appropriate actions.

## **2. Business performance management and the role of business intelligence**

Business performance management has important impact on the cost reduction, income increase and strengthening the competitive advantages of the company. This process enables to develop, observe and compare basic indicators for company operation through monitoring and management of core business processes and objectives that needs to be achieved by taking the appropriate actions that will give the expected results. Business performance management is a complex business approach for managing the combination of strategic and operational objectives with current business activities. This can be implemented with the usage of the business intelligence technologies. Business performance management is generating a high level of interest and activity in the business and IT community because it provides management with their best opportunity to meet their business measurements and achieve their business goals.

The creation and management of business performance is not a simple one-time process. The emergences of new technologies and changes in the company's goals that go along with contemporary economic trends have a huge impact on the management of companies. Products or services offered by the company itself suffer changes. As the changes in business environment are continuously occurring, companies need to modify business processes that affect their performance and success. To be one step before the competitors, companies must quickly detect strengths and weaknesses in their operations, which will enable them effective decision making. Business performance management allows flexibility for the companies that will adapt them to the rapid and ongoing changes. So, the needs of businesses are creating the usage of business performance management. But, the implementation of business performance is much more than installation and implementation of new technology. The company needs to examine the business environment and to identify necessary changes to existing business processes in order to be able to use solutions which business performance management can offer.

Business performance management is actually a set of integrated analytical processes which using technology is focused to the financial and operational activities in a company. Basically, the process of business performance management include financial and operational planning, monitoring and reporting, as well as models and analysis of key performance indicators. These indicators relate to certain business activities that have common target. Monitoring and analysis of key performance indicators, enables managers and creators of the future of a company insight into the needs for optimal business performance. Applications and business intelligence tools are needed to provide information used to develop and monitor key performance indicators. For example, when a particular activity or process is outside the limits of the key performance indicators, alarming managers provoke corrective actions that need to be taken by them. Business intelligence is used to obtain key performance indicators and to guide managers to take appropriate steps to solve business problems that arise in the company.

Business intelligence is used by companies for long-term strategic planning, short-term tactical analysis and manage everyday operations and activities. Business performance management uses business intelligence to access, select, combine, and analyze information and their usage in making decisions that will affect the next steps taken by the management of the company.

Business intelligence has a great impact on business planning. This particularly applies to strategic issues such as increasing revenue, reducing costs and a decision about introducing new products or services. If the main goal of companies is to increase sales, then the use of business intelligence should give guidance with information about which products are mostly sold, which locations and price, what are competitors and the possible impact of marketing on total sales. Business performance management and business intelligence are complementary in supporting the strategic planning by providing systems that compare current situation in the company with business objectives and helps managers to identify ways of improving long-term business performance.

Except the planning of long term activities for achieving the objectives of the company, the use of business intelligence can have a profound impact on daily operations and activities of the company regarding the development and execution of these short-term activities in an efficient manner. If one of the main objectives of the company is achieving bigger sales and profitability, then the way it can be realized, is reviewing the production and delivery of products in a shorter time with the lowest cost. Here tactical and operational part of the business intelligence is used to help decision making and taking the appropriate steps by the managers. The business intelligence can be used on well-known traditional way, where production and achievements of the planned production quantities and possible spending cuts in this process will be monitored. However, business intelligence can be used to monitor and control the working process to improve and manage the overall operation of the company. Some of the possible impact can be made by identifying opportunities to improve quality or reduce the variable costs associated with production. All these possibilities of business intelligence usage related to the establishment of strategies in a company, as well as taking the tactical and operational activities in accordance with business performance management, help the company to establish business plans and perform daily activities.

Managing the business performances include various types of information and data arising from the work of the company, such as information from regular business activities, analysis of past activities, business plans, forecasts, data from the external environment of the company and other. These data types are used and processed using business intelligence to create a basis that will enable business performance management. Analyzing from a financial aspect, key performance indicators and balanced scorecards are used as main financial techniques in business performance management. The various techniques of business intelligence are used in their development, such as: data mining, data warehousing, as well as on-line analytical processing.

To overcome the problems of managing business performance using only the numbers and analysis, and to use business performance management to obtain specific numerical indicators as final results, non-financial data processing should be introduced. As examples we can mention customer satisfaction, research and development in the company, the external image and ratings of the company, the impact of the environment, employee satisfaction and other. All these data can be obtained by using social networks, blogs and web pages, and different types of media (newspapers, magazines, TV shows and others).

### **3. Balanced scorecards and key performance indicators**

In the process of setting the basics of business performance management, it is necessary to precisely define the key performance indicators. Each of these key performance indicators needs to express one of the major goals of the company and its future plans, so the management of these key business indicators will result in improved business performance. These indicators actually direct and guide the decisions of the company indicating whether the work the company is operating in accordance with predefined operating plans and strategies. Different types of companies have a number of key business indicators, from simpler to more complex. Business performance management needs to extract the most important indicators that are needed to process and thus to determine the next steps and ways to meet the objectives of the company. Among the long list of possible key performance indicators can be mentioned: the number of companies that are buyers of products, the average number of customers within a specified period, the value of products by customer, not fulfilled orders, temporary delay in delivery, accurate delivery, turnover, average costs of transportation to customers, sales trends, unplanned expenses, demographic separation of purchase, payment of outstanding debts and other. In the process of selection of key performance indicators managers can use as simple indicators as production in one shift, to more complex indicators that give results related to profitability by product, location or season. The choice depends on whether it is managed with daily operations or long-term business performance.

The need for business performance management is expressed in all levels and in relation to overall functioning in a company. Managers can recognize the need for strategic management of business performance that is the need to detect the linkage of strategy and business processes and activities undertaken to fulfill that strategy, and to analyze whether and how these processes successfully implement this strategy. Executive managers need performance management which will be consistent with the business processes they manage and should be linked to overall business strategy of the company, which provides the main reason for the use of balanced scorecards. Including business intelligence here, balanced scorecards actually are analytical applications that accumulate, model and display multidimensional performance information. These include financial, non-financial performance targets, daily indicators, analysis of trends in the company and other. Traditional business intelligence tools are used for complete critical processing of collected data, analysis and presentation in order to set objectives in managing business performance.

Balanced scorecards provide a framework for organizing strategic objectives in four different fields: financial, customer, internal business processes and development. The financial section deals with development strategy, profitability, and risk viewed from the perspective of shareholders and other stakeholders directly and indirectly related to the company. In terms of customers, the strategy is to create values and differences of the company in comparison to the other companies that will be visible by customers. Strategy in terms of internal business processes is giving strategic priorities for various business processes that affect the objectives of the company. Development, as one of the four parts from balanced scorecards, is providing a climate that will support organizational change, innovation and growth of the company. These four fields provide the basis for constructing the plan that will include and implement these strategies. Here are several critical elements that will have a direct

connection to organizational strategy, such as the growth of productivity, profitability growth by increasing the part of the market where the company is represented, improve operational processes and achieving the goals, innovation in products and services, as well as the need for investment to generate sustainable development. Creating the logical architecture of the strategic framework with the help of these elements, managers have clear picture of the company's goals and how those goals will be achieved.

Non-financial indicators enable managers' better insight to the overall functioning of the company, because many non-financial indicators can often reflect intangible values in the company, which accounting rules refuse to accept for processing. In addition, non-financial indicators provide information about specific activities that should be taken to achieve certain strategic objectives. Contemporary modes of operation require from the companies to identify areas where non-financial indicators can have a major impact on the implementation of the given strategy. In addition, proper selection of non-financial indicators and their proper connection with the financial indicators provide sufficient basis for deep analysis that managers should make for better functioning of the company. But, it is important to determine which non-financial factors have the greatest effect on long-term economic performance. Choosing an appropriate model according to which the managers will determine the non-financial indicators and establishing database, which transformation into informations will give the values of the indicators, are the most important parts in setting the foundations for getting the non-financial indicators important for the companies.

#### **4. Conclusions**

The management in the company need to focus on ways of implementing business performance management in software tools, where using the balanced scorecards will overcome difficulties with the management of data in the company collected from different sources. These data should be integrated into data warehouse, where it will be saved for further processing and presented with usage of different graphical tools. Through the implementation of business performance management, multidimensional business data and specifically named information parts (perspectives, objectives, initiatives) that are used by balanced scorecards will be linked. Also, the connection between different parts will be established. Implementation applies in relation to the preparation of special reports that will provide a graphic display of important indicators. Well performed implementation will be of great importance for managing the companies and improve their business performance.

The collection of non-financial data will be made by using framework for linguistic modeling, which will use label semantic and computing with words. These techniques for collecting data will serve for a full analysis of non-financial data and extract trends and conclusions. Full evaluation of non-financial data that will be based on label semantics and computing with words will use the idea of computation based not on numerical data, but on linguistic terms and expressions. The introduction of linguistic rules in certain mathematical models will give the basis for processing and extracting conclusions, which will give further directions for short and long term strategies that will be undertaken by managers within the company. In fact, this will provide a basis for the processing of information found in databases, and ways to evaluate certain conclusions arising from analysis of these databases. This will give the opportunity to use the techniques of data fusion, which will combine data from different sources, and through the collection and fusion of these data will be derived conclusions which will be correct, relevant and usable, and more beneficial than the processed data before fusion.

Besides the use of certain techniques from scientific disciplines and developed concepts, there is a need for using structured interviews with managers of small, medium and large companies that will provide useful information regarding the needs that have their companies, the problems that arise in setting strategies and goals, possible ways of processing financial, and non-financial data that will be needed by managers to control the



working process and to determine the direction in which the company will expand in the future. Many of the problems and needs provided by managers, which theoretically can not be seen because of the need for practical application, will provide guidelines for processing additional topics.

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# Integration of Social and Business Networks

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While business network transformation is on the rise and the present success of social media has already proved to businesses its enormous potential, the software market has not yet responded with an effective solution for integrating business and social networks. The proposed solution integrates businesses and social networks in a way that the common social user gets in one place only desired personalized information from all companies, organizations, brands, etc. that he/she is interested in. The information stream is predefined by the user and can relate to the different aspects of everyday life – i.e. when the nearby supermarket has finally stocked on the preferred French cheese; when the loyalty points have reached the number for a free refill at the gas station; when is the best time to renegotiate the credit with the bank; what are the current vacancies with desired employers or the availabilities for an appointment with a doctor, etc., etc. – users can choose what kind of updates they want to follow. The system architecture addresses the following three critical aspects: real-time analysis of events and data, semantic interoperability as well as business and social networks integration. Featuring a high level architecture, the system comprises three modules – a “core” being the high-performing engine which co-relates the millions of events coming from the business and social networks as well as contextualize the data based on the semantic data mapping; a “business module” - connects a given business system to the solution as well as provides user interface to sense and respond based on the data coming from the other business and social networks participants; and a “social network module” that connects a given social network to the solution as well as provides user interface to sense and respond based on the data coming from the other business and social networks participants.

## Keywords

Business networks, Social networks, Integration of networks

## 1. Introduction

While many industries continue struggling with the recession, the software sector pulls itself out of it quite successfully. According to a survey performed by the Sand Hill Group among the top 100 leading IT companies - the software CEOs and CFOs are very optimistic about the industry as a whole and extremely bullish on the outlook for their own companies [1]. Well over three-quarters of the respondents noted that their company had already returned to pre-recession growth levels or would reach those levels in 2012. In addition, nearly two-thirds of the respondents expect their company to grow by at least 20 percent, including more than one quarter of the respondents who expect their growth rate to top 50 percent this year. The survey also indicates that software vendors have increased their use of cloud deployment options over the past year and decreased their use of on-premises options. What's more, the analysts predict that 2012 will be a breakout year for the integration of business and social networks.

On one hand, we have the business networks integration, which we have been witnessing for several years now. Caused by the need to foster business relationships as a competitive advantage, companies are transforming their business networks to ensure responsive and collaborative supply chains [2]. The business networks integration process requires transformation that runs through a company, its partner companies, and the underlying IT landscape that connects all these separate businesses [3]. And while a new IT architecture and strategy are required to orchestrate these business networks, it all begins by establishing an open, service-enabled business process platform. On the other hand, the rising power of consumers, which itself causes the very business network transformation, is also as evidenced by the mighty rise of social networks. In the past few years the social media phenomenon has changed our lives and the way we do business for good. The mere statistics of the biggest global social network speak for themselves - more than 1.5 million local businesses have active Pages on Facebook [4]. Statistics show the average user spends more than 55 minutes per day on Facebook; Facebook has 800+ million active users and average user is connected to 80 community pages, groups and events. In the end of 2011, more than 475 mobile operators globally work to deploy and promote Facebook mobile products.

The success of social networks like Facebook, Twitter and LinkedIn has already shown companies the tremendous potential for leveraging these products for a business need. For example, every month more than 500 million people use an application on Facebook or experience the Facebook platform on other web sites. However, what the software industry has not yet responded with is an effective solution to meet and merge the needs of these closely tight sectors - the business and social networks.

## **2. Motivation**

### **2.1 The Challenge**

Successful integration of social media with business networks is very hard and complex problem. In [5], Elias Terman states five top challenges of integrating social media data with business applications:

- Business network performance is not sufficient for processing overwhelming social data streams
- Social media data is very unstructured and, therefore, is difficult to be managed
- Business IT departments should be fluent in many new social media APIs and Web standards
- Social sources generate very diverse data, which requires additional cleansing, data matching, de-duplication, standardization and enrichment prior to integration
- Businesses need special filtering in order to determine which data to integrate or not, where frameworks for running applications on large clusters like Hadoop [6] may be used. From a more generalized point of view, the growth of both business and social networks sets forth various technological and scientific challenges, such as:
- The business networks are built upon heterogeneous systems, comprising different business processes, tremendous amounts of data and a variety of meta-models, all of which put to a test the very integration of every single participating network and all its members
- Social networks, on the other hand, are much more open to further development, but at the same time there's not yet much done in the direction of either integrating the different social networks, or the facilitated integration between social networks and business systems

- Yet, this facilitation turns out to be really difficult to manage due to the unstructured nature of social media data. And while businesses are used to integrating and processing relational types of data from their SQL or Oracle databases, social media lacks well-defined data models with field names and types. Thus, companies devote additional time and effort to process data from social networks prior to actually using it
- And it's really the case for many companies that the social data overwhelms the structured enterprise applications as the constant real-time stream of social media sources generates massive volumes of records. In order for these records to have real value, businesses need to determine which data to integrate and which data to ignore. However, even with appropriate filtering, social media data volumes are really very bulky
- Last but not least, for the social media common users, advertising, although not as ubiquitous and obtrusive as that of conventional media, becomes also quite overwhelming. What once started as a personal space that is meant to help you connect and share with the people in your life is now full of sponsored links, messages, feeds and even sponsored (wanna-be) friends. So, similar to companies confronted with the bulk of social media data, the very social media users also face the need to filter the content they are interested in.

Finally, having said all that, it can be concluded that there is a huge untapped potential in integrating business and social networks. And while it may seem challenging, the key is for companies to identify which data sources are most important to the business, as well as find ways to connect with social network users only within the context and with the content they are interested in.

## **2.2 Related Works**

The idea of integration of social and business networks is not new. As early as 2000 in [7] Rauch establishes that “the Chinese and Indian entrepreneurs of Silicon Valley. are creating social structures that enable even the smallest producers to locate and maintain mutually beneficial collaborations across long distances”, which is also confirmed by Saxenian in [8].

Another idea about the trade-creating effects of business and social networks argues that compared to a situation without networks, networks of firms multiply trade flows by as much as four in some specifications as described in [9].

Perhaps this huge potential is the reason why almost two-thirds of the 2,100 companies who participated in a recent survey by Harvard Business Review Analytic Services [10] confirmed that they are either currently using social media channels or have social media plans in the works.

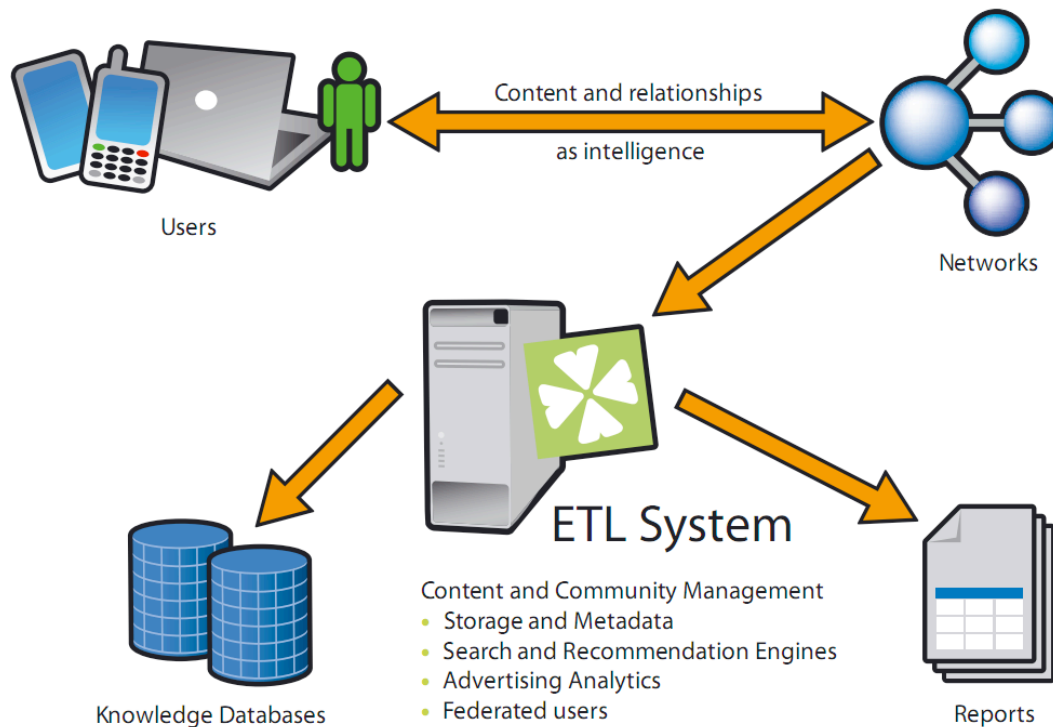
And yet, many still believe social media is an experiment, as they try to understand how to best use the different channels, gauge their effectiveness, and integrate social media into their strategy and business networks.

Only a small group — 12 percent — of the companies in the survey said they felt they were currently effective users of social media. These were the companies most likely to deploy multiple channels, use metrics, have a strategy for social media use, and integrate their social media into their overall marketing operations.

CloverETL recently proposed a social and business integration solution as depicted in Fig. 1 below [11]. ETL provides for the complex interactions between different systems as well as for the intelligence in the areas of content and relationships. With the explosive growth of both users and communities, ETL serves as a bridge among user data and a link between business databases. In addition, real time business intelligence must be continuously updated to support the ongoing electronic conversation. As data and intelligence are captured, legacy information provides business value and monetization in terms of search and advertising analytics. Further, “federated users” (meaning one registration access to many communities) represent the greatest business value to social networks because of the

exponential potential of more users using more content with more relationships. ETL can help by accepting any format, any log-in, for greater reach [11].

The process of services integration should not be abstracted from the integration of existing services' infrastructure. Such infrastructure integration encompasses two converging approaches. The first approach requires high-level services abstraction and presentation. The second approach integrates service providers' resources into clouds using a proper level of abstraction [12].



**Figure 1** Social and business integration model

Other current approaches to social and business network integration can be grouped in the following categories:

- E-commerce platforms (i.e. <http://www.shoptab.net/>) – integration between a business page in social media and a corporate online store by a daily automated CSV and XML data feeds to keep store's products and prices up to date
- Collective shopping (i.e. <https://www.facebook.com/grupovo>) - RSS feeds with daily deals from businesses to subscribed social media users
- Dashboard tools for businesses (i.e. <http://hootsuite.com/>) – management tools for organizations with multiple social profiles that want to aggregate all their social streams by scheduling messages and tweets for say a marketing campaign in a number of social media, as well as track brand mentions and analyze social media traffic afterwards
- Content streamers for social users (i.e. <http://favit.com/>) - centralize and unify the access to only the web content users are interested in, leaving behind all other irrelevant information
- Social media analytics (i.e. <http://klout.com/home>) - social media campaigns tracking and measurement for businesses.

The above review clearly shows that there is still no solution that truly integrates the urge of companies to communicate with their audiences within the social graph and the ever growing need of social users, already swamping in the sea of “feeds”, to receive only personalized and pre-filtered content. For sure the above platforms provide some nice tools for businesses

to be more present and visible in the social networks. Yet, structured in the traditional B2C principles of mass communication, these platforms are missing on the main concept of the social graph, i.e. in order to be “social” and not “mass” the communication must be desired and friendly. Otherwise, no matter how intricate or fancy the software tool is, the very communication becomes pure advertising or even spammy.

### **3. Value Proposition**

The proposed solution, which is the subject of the present paper integrates businesses and social networks in a way that the common social users get in one place only desired personalized information from all companies, organizations, brands, etc. that the concrete user is interested in. The information stream is predefined by the user and can relate to the different aspects of his/her everyday life – i.e. when the nearby supermarket has finally stocked on the preferred French cheese; when the loyalty points have reached the number for a free refill at the gas station; when is the best time to renegotiate the credit with the bank; what are the current vacancies with desired employers or the availabilities for an appointment with a doctor, etc., etc. – users can choose what kind of updates they want to follow.

If we are to get all that information by ourselves, it would certainly costs us several phone calls, browsing different corporate pages, checking and sending mails, etc. While with the system at hand, we can have it all in one place, within our social account without any additional spam.

At the same time for companies this system is an entirely new communication platform on which the information stream happens in real time, at a spot and with type of content predefined by the user. What's more, synchronized with the company ERP and CRM systems, the systems provides powerful marketing research tool that can track and analyze actual users' preferences, likes, as well as overall social media behavior, including overall relation and interaction within the social graph regarding a concrete brand and/or product.

#### **3.1 Features for Companies**

1. The companies select certain products and services that they would like to be included in the system and provides the necessary information (such as new products on stock, current sales, free services, etc.) that is to reach the social users through the system
2. The companies can retrieve market analytics data for the social users, who have declared interest in a certain brand/product/service through the system. This data can relate to:
  - Demographics (i.e. gender, location, age, education, occupation, etc.)
  - Behaviour related to the company (i.e. product likes, reference, comments, etc.)

#### **3.2 Features for Social Users**

1. Logging onto his/her social network account or system account, the user will be able to see personalized information from all companies registered in the system that he/she has previously designated to be interested in
2. When logging in for the first time, the user will be able to get automatic personalization options based on the available data from his profile, i.e. local businesses, brand selection based on interests, etc.)
3. Viewing of general information for each listed company (location, branches, open hours, etc.)

4. Selection of concrete services, products, types of information needed and updates to be followed
5. Registration for concrete feeds to be followed (sales seasons, outlet openings, new arrivals)

Actions available upon received feeds:

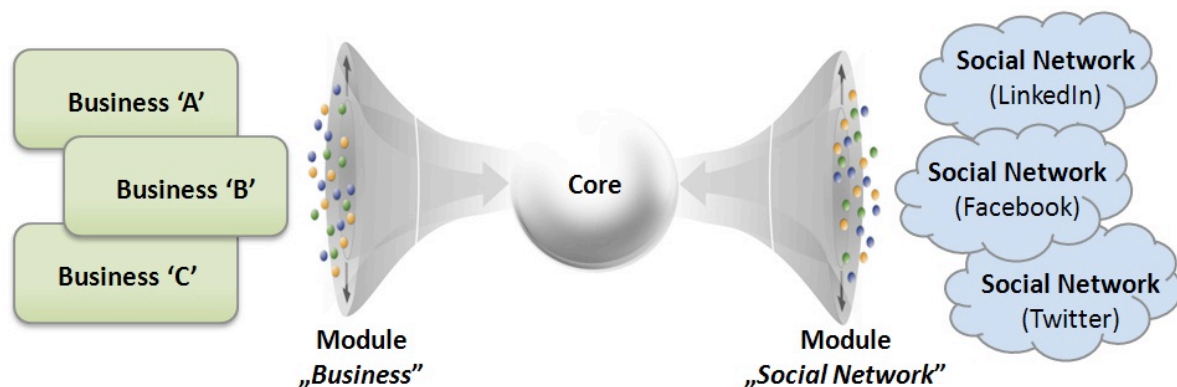
- “likes”, “dislikes”
- sharing
- commenting
- navigation to corporate/brand web site

### 3.3 Features for Social Networks

This feature follows the logic of the above features for users, with the condition that they will depend on the development options provided by the concrete network (i.e. currently Facebook allows for graphic interface applications, while Twitter supports only text messages).

## 4. High-Level Principle Architecture

### 4.1 Overall System Architecture



**Figure 2** Overall business model

To best support the use cases the system architecture addresses the following three critical aspects: real-time analysis of events and data, semantic interoperability as well as business and social networks integration. The respective high level architecture of the system is comprised by the following modules (Figure 2):

- Module “Core”: high-performing engine which co-relates the millions of events coming from the business and social networks as well as contextualize the data based on the semantic data mapping
- Module “Business”: connects a given business system to the solution as well as provides user interface to sense and respond based on the data coming from the other business and social networks participants
- Module “Social Network”: connects a given social network to the solution as well as provides user interface to sense and respond based on the data coming from the other business and social networks participants

## **4.2 Core Module**

This is the very heart of the system, getting simultaneous information about all events happening on the business and social sides. The “Core” module analyzes, combines, aggregates and distributes all results and necessary information to the companies and users respectively.

The core provides open interface for communication with business and social systems. In addition to this, it will provide the following functionalities

- Sub-module for analysis and profiling of users on the basis of demographic, geographic, psychographic and sociographic data
- Semantic synchronization of the systems’ user profiles and their client profiles within the business systems

## **4.3 Social Network Module**

The social network performs the integration between the social users and the system through a graphic interface specific for the concrete social media. This module also adapts the technical interface for the reception and distribution of social network events to the technical interface provided by the core.

Due to the different programming modules of the different social media, there will be a separate module for each one of them.

## **4.4 Business Module**

The business module performs the integration between the business and the system through a graphic interface. This module also adapts the technical interface for the reception and distribution of business network events to the technical interface provided by the core.

Additionally, there is planned a functionality to integrate the business module with one of the market leading systems SAP CRM.

## **4.5 Non-Functional Characteristics of the System**

The non-functional characteristics refer to the way the system is supposed to function, in contrast to the functional ones elaborated above, which describe what and by what means the system is supposed to complete.

Some of the key non functional characteristics of the system include:

- *Quality/Reliability*: to be ensured by the constant automatic tests performance supposed to evidence whether it works correctly
- *Accessibility/Availability*: ensured by the usage of servers working in a cloud
- *Scalability*: to be guaranteed again by cloud servers, which will allow system functions with the same high quality, during both high and low usage. The cloud used will have server data centres in different parts of the world, which will additionally ensure same high reliability for the clients in different locations
- *Response time*: again secured by the cloud usage
- *Security and protection*: secured by the cloud servers

## **5. Discussion**

As a proof of the fact that there is an actual market demand for such an integration solution as the one proposed above, both on the side of social and business users, comes the



discussion [13] that social networks as a phenomenon illustrate not only a whole new social communication, cultural norm shift and a new shape of self-identity within the globalisation paradigm, but most importantly the interrelationship between business networking. Therefore, particularly in the retail sector such integration is of utmost urgency. This new social model has led to market segmentation and a changed consumer market forcing retailers to adopt a multi-retailer strategy geared towards an increasingly autonomous and savvy customer [14].

And when the decision for such an integration is in place, be it for a retailer or in another type of industry, there are already several options available, as elaborated in [15], e.g. adding collaborative technologies into their overall business intelligence (BI) platforms like Lyzasoft<sup>20</sup>, or looking at more interactive solutions that integrate social networking functionality like Dundas Data Visualization<sup>21</sup> that allows comments to be made within dashboards with the goal of sharing information, discussing ideas, and identifying potential issues. Yet, the competitive edge of the solution concept submitted with this paper is that it provides all of those features and functionalities in one place for a whole range of industries, making it really easy for any type of business to adopt only one tool for all social media with only one integration.

Finally, taking into consideration the business as well as marketing intelligence options of the current solution proposal, as well as the competitive edge, it can provide to all industries using it, as Karan Chadha puts it in [16] taking BI to those involved in minute-to-minute decision making is going to become a necessity sooner than later.

## 6. Conclusions

And if, as put in the beginning, the major current challenges before companies willing to integrate social media data with business applications are the overwhelming bulky and real-time data streams of the social media, combined with its extremely unstructured nature, requiring additional time and effort to filter and sort what's important and what's not, the proposed solution fully meets those challenges. Featuring a high level architecture, the system effectively addresses these critical aspects by offering real-time analysis of events and data, semantic interoperability as well as actual integration between concrete social media platforms and leading ERP systems. What's more, due to its innovative non-functional characteristics, the solution provides a wide array of features for common social media users that will enable them not only to enjoy better their overall social media experience, but most importantly facilitate them in the organization of their daily tasks and chores, as well as those of their whole household. As well, synchronized with the company ERP and CRM systems, such systems will serve as a powerful marketing research tool that can track and analyze actual users' preferences, likes, as well as overall social media behaviour, including overall relation and interaction within the social graph regarding a concrete brand and/or product.

Being extremely bulky, unstructured and lacking well-defined models, the diverse social media data challenges the heterogeneous business systems typically used to integrating and processing relational types of data from their relational databases. Thus it becomes key for companies to identify which data sources are most important to the business, as well as find ways to connect with social network users only within the context and with the content they are interested in.

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<sup>20</sup> <http://www.lyzasoft.com/>

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# Improving Business Quality of Serbian Companies: The Role of Knowledge

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Productivity of knowledge and its continuous improvement directly influences improving business productivity of modern organizations. Knowledge is becoming a product and corporative intellectual ownership is even today more valuable than physical resources. Application of modern methods and techniques of management gives companies more chances to considerably strengthen competitive capacity on the global market. Companies should leave traditional concept, characterized by linear way of thinking, and turn to proactive way of thinking which implies understanding and creating changes. Serbian economy has experienced problems with productivity for a long time. It was the result of inappropriate way of business performance which was not based on market principles. Certain products had unjustifiably high prices which were not competitive on the world market. Technological equipment also represents a significant element of productivity rising. The average machine age in Serbia is 30 years. According to the research results related to the time before the world economic crisis, Serbian businessmen stated that the main obstacle in developing competitiveness was the lack of knowledge, and the most important element for developing competitive ability was permanent knowledge improvement of both executives and employees. If Serbian companies want to achieve competitive advantage on the global market, they should change the way of thinking and adopt modern world achievements in the field of organization management. In this paper the authors are analysing the role of knowledge in relation to improving business quality of domestic companies. Statistic indices and results of the current researches support the trends in this field; appropriate directions are given as well.

## **Keywords**

Competitiveness, Knowledge, Productivity, Quality

## **1. Introduction**

Global business performance assumes strategic role of knowledge and management based on permanent knowledge improvement. The basic social group are knowledge users who are able to give knowledge a function of business activity. Ohmae [1, p. 19] thinks that global

economy is based on the world in which the absence of boundaries is not a dream or a possibility, but a reality. Global economy has its own dynamics and logics because it is not a theory any more but a reality, in fact. The stress is on knowledge because success and a very survival depend on the ability to accept new attitudes and relations with the world.

Global competitiveness is moving from the price level and technical innovations towards knowledge management and innovations in the field of management and marketing. [2] The current moment of global economy can be marked by slow but sure rise of enterprises from newly industrialized countries, such as China, India, Brazil, South Africa, Turkey, etc. Enterprises from these countries are becoming global competitors. Their competitive ability is based on lower business costs, first of all because of lower labour costs, but also for their readiness to accept foreign investments and the most modern methods and management techniques. The main stimulus for these economies is increased domestic consumption as well as a numerous youth population. Young population represents an advantage not only concerning education but because of everything else – as the income rises people become more educated and they change their preferences. According to Reinert [3, p. 200], entrepreneurship, new technologies and a strong state are the key preconditions for new, sustainable development.

## **2. The Role of Knowledge in Competitiveness**

Modern times, as a development phase of human society, may be described as information society. The main features of this society are creation and distribution of information, and organization management is becoming information management. Starting from the presumption that information represents sublimated knowledge on the move, in other words, concise picture of organizing space in time, the basic pillar of the new society is knowledge.

According to Drucker [4], what we call information revolution is, in fact, knowledge revolution. Routine in the process wasn't made possible by machines but by software – software represents reorganization of traditional work. The key is not in electronics but in cognitive process. It means that the key for maintaining leadership position in economy and technology will be social position of experts and social acceptance of their values.

There have been considerable changes on organization level. Tissen, Andriessen and Depres [5, p. 158] think that the new logics of an organization is in the following:

- Dynamic, ready to study,
- Rich in information,
- Global,
- Small and big,
- Oriented towards products/customers,
- Oriented towards skills,
- Team-work,
- Oriented towards inclusion,
- Lateral, connected,
- Oriented towards buyers.

Knowledge is becoming a product and corporative intellectual ownership is even today more valuable than physical resources. Modern organization must create knowledge but it also must increase the value, too. Richard Branson [6, p. 195], a famous British entrepreneur and an innovator, considers human capital more expensive than all other factors in any company that works.

Challenges are today far greater than 20 years ago for the following reasons:

- New companies are mostly based on services,
- New companies are mostly from the field of knowledge economy,

- The change of techno-economic paradigm causes considerable changes,
- The number of allowed mistakes is far smaller than before,
- The new paradigm is, in great extent, in the phase of pre-standardization, which makes impossible to choose the winners. [3]

Modern business requests re-structuring of business functions. Companies should leave traditional concept, characterized by linear way of thinking, and turn to proactive way of thinking which implies understanding and creating changes. Business functions with strategic sign are especially emphasized in companies that work in modern business conditions. These functions are marketing, quality, research and development. Growth and development, shortly, company's success is determined by close interdependence among the three mentioned functions and their synergistic effect.

Marketing, as a business function, should create marketing program according to defined needs and customers' requests with the aim to fulfil customers' requirements, to make profit and satisfy all other interest groups within a society. Marketing management becomes knowledge management – it makes possibilities for increasing knowledge productivity of other business functions. Marketing represents the key instrument which makes knowledge more productive.

The result of research – developing function is development of new technical-technological solutions. Since innovation represents output of research-developing function, the most accepted definition of innovative process would be "innovations = invention + exploitation". It means that each successful innovation must coordinate technological as well as the whole marketing function. Marketing is essential for total process of technological innovation.

Quality is, in modern economy, observed from management aspect – quality management should enable quality improvement of the whole company. Together with product diversity and marketing communication quality represents the key element for creating a successful trade mark with a stable market position. Quality management concept is predominantly marketing concept which is based on improving all business activities, from market research, product and production development, logistics, marketing communication and evaluation of business effects.

According to Reinert [3], one of the most important things is to understand that innovations and new knowledge are essential driving force in the history of economic development. Innovations and productivity are the main forces in the struggle for competitiveness and improvement of knowledge productivity represents an imperative for achieving long-lasting competitive ability. The advantage of global economy should be accompanied by complete commitment to innovations – companies must turn to innovations as never before. [1, p. 247]

### **3. Productivity and Knowledge Productivity in Serbian Companies**

Improving knowledge productivity is certainly one of the crucial problems in most transitional countries and in Serbia, as well. Considering university education, Serbia is not only at the bottom in Europe but in the region, too. [7] In Slovenia, which is far from Serbia considering educational reforms, there are over 22% of high educated people, in Croatia at least 15% have university diplomas, in Macedonia 7.3% and the data in Bosnia and Herzegovina are not precise but they are also at the bottom of the list. According to the list of OECD for 2007, which didn't include Serbia, there was no worse country than Serbia. The worst country on the list was Turkey with 10.8% and the situation was the best in Scandinavian and Benelux countries with the average from 30 to 36.4 %. In EU, 85% of high educated people under 40 years of age are employed and this rate goes up to 91% in Romania, Slovenia, Lithuania, Netherlands, Norway. Besides, the unemployment rate is, as a rule, considerably lower in the group of high educated people than in other groups.

Since education and productivity are interconnected Serbian companies have low productivity rate. Productivity problem has not appeared in Serbian economy in transitional

period but it existed even before. Masaaki Imai [8, p. 203] emphasized "Quality is managers' responsibility. Poor quality is the result of poor management".

Serbian economy has experienced problems with productivity for a long time. It was the result of inappropriate way of business performance which was not based on market principles. Certain products had unjustifiably high prices which were not competitive on the world market. Therefore, Serbian companies reduced export prices in order to be competitive on the world market and our customers had to pay difference in unproductiveness through high prices. Old technology, poor quality, unattractive packaging and high prices are the main reasons for uncompetitive appearance of Serbian products on international market.

The analysis of Centre for research in the economy [9] show that in state companies, in administration, the effective work time is three hours and 45 minutes per day and 25 min. more in factories. In the same time, in private companies the effective work time is seven hours and 18 min., which is four hours longer. Productivity is 42% of the European average. The reasons are: insufficiently good work organization, technological backwardness and lack of knowledge, and the consequences are in-competitiveness, decline in consumption and unemployment.

Technological equipment also represents a significant element of productivity rising. The average machine age in Serbia is 30 years. Comparing to the situation in the region, this is the delay of about 12 years. Serbian economy is, technologically, 29.5 years behind European Union, which was confirmed on the representative sample of 154 small, medium and big companies within six economical branches with similar production programs. [10] The comparison was carried out in textile, food-processing, pharmaceutical, machinery, chemical and building materials industries. Austria was taken as a criterion because of its similar natural, social and demografical characteristics in relation to Serbia. The greatest backwardness was noticed in textile companies (35 years), then in machine industry (34.5 years). Pharmaceutical companies were best ranked with 21 years' delay. Considering the regions, the equipment, tools and other production means are most backwarded in south Serbia (41 years) and the best situation is in Backa (18.5 years' delay). In Belgrade the delay is 20.5 years.

The most productive companies are those with the most qualitative equipment and machines. Among them are pharmaceutical companies, some companies from the field of food processing and companies with foreign capital, which is totally 8.5 to 9% of the whole Serbian industry. The companies with best productivity – on the level of the European – are Henkel Merima and Tarket Sintelon. Metal industry is in the worst situation with 35 year- old-machines, in average, and reject of 36%, which is more than double, comparing to the average in EU countries. Even Croatia and Romania with reject of 19 and 24% are much better than Serbia.

Serbian bad competitive position, showed in Table 1, is a direct consequence of the problems mentioned above.

**Table 1** Ranking West Balkan countries according to competitiveness in 2011. [11, p. 15]

<b>Country</b>	<b>Place</b>
Slovenia	57
Montenegro	60
Croatia	76
Albania	78
Macedonia	79
Serbia	95
Bosnia and Herzegovina	100

## 4. Directions of Improving Serbian Companies' Business Quality

If our economy continues to recover slowly, which is probable in these conditions (prolonged effects of the world economic crisis), the employed in non-productive sector and services will suffer most. According to Bojadić [9], it is necessary to change the economy structure in order to increase investments and productivity, but it will cause still slower employment growth. Besides, it is also necessary to change qualification structure of the population because it is not possible to be competitive in Europe and the rest of the world with unqualified work.

The results of a research by Sajtfert et al [12], dealing with the analysis of Serbian companies' competitiveness (May-June 2007, Republic of Serbia market), points at the following:

- As the main obstacles in developing competitiveness of Serbian companies the polled executives mentioned: lack of knowledge – 24.8%, old equipment and technology – 24.1%, inappropriate use of modern management methods and techniques – 16.54%, insufficiently zestful business ambiance 8.27%, lack of financial capital – 8.27%. internationalization of Serbian companies – 2.34%;
- As necessary elements for development of competitive abilities of Serbian companies the polled executives noticed: permanent knowledge improvement of top management and employees – 20.74%, business quality standardization – 20%, development of entrepreneurship culture in business ambiance – 17%, investments in national brands – 14.8%, development of corporative entrepreneurship concept – 8.88%.

Namely, according to the research results related to the time before the world economic crisis, Serbian businessmen stated that the main obstacle in developing competitiveness was the lack of knowledge, and the most important element for developing competitive ability was permanent knowledge improvement of both executives and employees. It is obvious that Serbian executives were completely aware of the fact that the basic assumption for business quality improvement represented improvement of knowledge productivity.

The research results by Đorđević et al [13] on the attitudes of young people in relation to their inclusion in entrepreneurship process present the opinions of future experts and executives. The research was carried out in the end of 2010 (November – December), on Serbian territory (12 towns and municipalities – Beograd, Novi Sad, Zrenjanin, Kraljevo, Čačak, Kikinda, Vršac, Bačka Palanka, Alibunar, Jagodina, Nova Varoš, Novi Pazar). It included 580 students oriented towards management. When asked to evaluate competitive ability of domestic companies, 47.93% of them thought that they partially satisfied the requirements imposed by international market, 43.28% thought that domestic companies did not satisfy these requirements while only 5.69% of the interviewed considered domestic companies to satisfy the conditions necessary for achieving competitiveness on the international market. The most significant factors which are missing in developing competitiveness of domestic companies are the following: new technologies (12.94%), employees' motivation (11.41%), education (9.93%) and financial support (9.21%). Considering the level of innovativeness within domestic companies, the majority of them (60.17%) thought that domestic companies partially fulfill this factor, 30.52% of the interviewed thought that our companies were not innovative while only 6.55% of them considered our companies innovative.

According to the interviewees, the following elements are necessary for developing competitive ability of domestic companies: standardization of business quality (17.22%), implementation of modern management methods and techniques (17.08%), investments in development of national brands (17.08%) and buying modern technologies (13.02%).

The world economic crisis and its long-lasting effects stress the fact concerning the importance of permanent knowledge improvement – only the best can win, no matter where they come from. These are mostly companies that have optimized the price and quality

relations on the grounds of costs reduction and permanent productivity growth along with application of standardized concept of quality management and innovative approach. Companies from China and India are such examples.

According to Imai [8], one of the greatest practitioners from the field of quality and productivity improvement, every delay in applying the newest technologies can be as expensive as delay in applying the newest management techniques. According to de Bono [14], the founder of creative thinking, if perceptions are wrong, then the answers will be pure nonsense no matter in what extent the logic is good. According to Bešić & Đorđević [15], a special attention must be paid to implementing new management approaches, both in relation to conceptual and organizational sense.

According to Norwegian economist Erik Reinert [3], when companies' paradigm is changed the companies themselves are changed and restructured – the same happens with the executives as well. It is not possible to achieve and maintain a significant position without prosperous and successful management. In competitions it is always skill and not capital that wins in long terms.

Taking all this into account, Serbian companies have to base their business on applying management techniques that support competitiveness, flexibility and innovations as well as on improving knowledge of the employed, especially executives.

## 5. Conclusion

Competitive advantage cannot be realized in the old way – not like 10 years ago or even before the 2008 crisis. The world economic crisis will definitely change business conditions in the time that comes. It is particularly related to managing resources and market competition. Innovations, flexibility and productivity are guidelines of the future development in the field of competitiveness and organizational management. The very essence of the struggle for competitiveness lies in accepting changes. Chinese and Indian companies do not lay off workers, they employ them. Their productivity is on high level and competitive ability obvious. Knowledge is the main driving force of permanent productivity growth in the companies from these countries. Companies from transitional countries are faced with numerous problems – among them the most important are those related to improving knowledge and organization.

Economic growth and development of the Republic of Serbia requires the development of such an economy which is competitive and based on knowledge, new technologies and innovations. In order to achieve this objective it is expected from entrepreneurship to give a significant contribution to social and economic development. Besides, it is of special importance the readiness of SME sector to enter and win EU market together with applying necessary standards and reducing differences concerning the level of development.

Serbian companies have to accept foreign experiences especially those of global leaders and, in the same time, to pay attention to experiences from newly industrialized countries. Hence, Serbian companies have to create their own development strategy, especially in accordance to European and global integration flows and application of modern management methods and techniques, such as integrated management systems, relationship marketing and corporate social responsibility represents the basic assumption of successful market development.

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# **The Significance of Contractual Relationship with Distributors for Promoting Organic Agriculture Development in Serbia**

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Customer perceived value is the difference between the prospective customers' evaluation of all the benefits and all the costs of an offering and the perceived alternatives. Here, the perceived benefit is considered to be what a customer sees and feels with a purchase of product or service, whereas the perceived cost represents the total cost, but not only financial, in a relation to the purchase of a product or a service. Being more efficient than competitors in delivering value to customers on targeted markets is the key for making a competitive advantage and reaching the main objectives of the company. In that sense, the role of place (distribution) as an instrument of marketing mix is important. At the same time, certain distribution issues are related to the legal norms, particularly commercial law norms, where the distribution as a concept is realized in the framework of distribution contracts. In relation to this, especially when the study of distribution contracts is concerned, the authors of this paper have been trying to realize if the contractual relationship between a producer and a distributor in agriculture is important, and if so, how important it is. Because of the growing importance of organic farming and making great efforts to promote this aspect of agricultural production, subsidize it, and encourage it in many other ways by legal authorities in many countries, as well as because of the growing interest of consumers in this agricultural aspect, which all have resulted in the exceptional growth of market globally, this paper deals with the issue in organic farming. The issue of organic products' distribution for the producers and convenience in reaching these products for consumers is very actual. In the Republic of Serbia, organic farming is still in its initial stages. Although it is usually the export orientation of domestic agriculture that is emphasized, not rarely producers state that it is the distribution of organic agricultural products to Serbian consumers that is important for the existence of their production. Based on direct interviews with producers of organic agricultural products and secondary data sources, this paper explores through which distribution channels organic agricultural products are delivered to domestic consumers. Furthermore, the paper analyzes the legal arguments relating to a contractual relationship with the distributors, from the moment of signing the contract to its realization, as well as potential difficulties. Finally, the paper also deals with the question if the greater engagement of distributors in Serbia as intermediaries in the sale, thus making the sale of these products better organized, would increase the organic production.

## Keywords

Agriculture, Competition, Contract, Distribution, Organic Production

## 1. Introduction

Over the last ten years organic farming has experienced major technological transformations in order to adapt to the requirements of quality standards and to win a battle against "conventional" competition. This competition and the lack of information about the benefits bio production discourages farmers in Serbia to use their experience to innovate towards sustainable development. In order to have more decision-makers within small and medium-sized farms willing to deal with organic production, it is necessary to pay attention to certain aspects of planning, organization, management and marketing of products through various distribution channels.

Distribution is, as a form of the placement of goods, especially suitable for the placement of durable goods, but it is not rare that this kind of economic activity is primarily presented in the placement of other types of goods. In this paper we try to apply the rules on the distribution of agricultural products, particularly those of organic origin. Distribution channels are an important factor for increasing organic production. It is possible to have farmers selling their products independently, but given the lack of business experience in market conditions, they need help in marketing the product. The role of distributors in this case is of great importance. Often, there are more distributors involved in the process of selling goods and thus a special type of distribution network is formed, by which a product passes from producer to consumer.

## 2. Legal effect of the Distribution Contract

Distributors are intermediaries between producers and end consumers. The justification for the use of intermediaries can be seen in the fact that they perform the required functions at a lower cost than producers would be able to do. This is particularly the case when a product must be distributed to geographically dispersed numbers of customers. Distributors should not only meet customer needs but also to enable the producer to gain a competitive advantage. However, direct sales to consumers have their own advantage, which lies in the fact that the producer has full control of sales, which is not the case when the sale is conducted through an intermediary. From the point of consumer, sales through distributors are more advantageous because there are guaranteed delivery, greater choice of the same or similar goods of the same or similar quality and at competitive prices. Distributors address the needs of consumers much better than the producer does.

The distribution contract is a legal instrument defining the rights and obligations of distributors and suppliers/producers. This is the vertical co-operation agreement, under which the distributor agrees to purchase contracted durable goods from the producer or any other agent (supplier) and to carry out the distribution and resale of the goods, whereby the distributor is integrated into the commercial and organizational network of the producer. The distribution contract may be simpler when a producer/supplier sells goods directly to retailers, or may be more complex when a supplier sells goods to wholesalers who then sell goods to retailers, and eventually they sell goods to end consumers. The supplier does not necessarily have to be the producer of the goods at the same time. This is a permanent business and legal relationship between producers and distributors, which results in an unlimited number of future individual contracts for sales.

For the existence of a distribution contract it is not necessary to conclude the contract in writing. The distribution agreement is therefore an informal agreement. However, it is an *ad probationem* form due to the fact that although legal theory does not require a written form as a condition of validity of the contract, signing a contract in writing would be desirable because

the distribution is the contractual relationship that is usually permanent, and the parties have complex rights and obligations.

Both producers and distributors have numerous obligations. The most important obligations of producers include accepting orders from distributors and supplying them with the goods related to the subject of the contract, then supplying distributors with the necessary documentation, not discriminating their distributors by abusing their market position, protecting distributors from unfair competition, guaranteeing that the goods related to the contract do not have any material and legal irregularities, making sure that the goods will have a certain shelf life after leaving the premises of producers, etc.

The most common obligations of the distributors are as follows: to carry out the promotion of goods related to the terms of distribution contract, to participate in promotional and advertising activities and their cost, to provide adequate space at trade fairs, to buy the minimum quantity of goods as stipulated in the contract, to refrain from selling competitors' goods in accordance with the principle of loyalty to the producer, to keep in stock a certain quantity of goods, to order the goods in accordance with the contracted schedule, to provide after-sales service to consumers and the like. The distributor has the right to freely organize the manner of placement of goods and to set the resale price.

The distributor bears the contractual responsibility towards its direct customers and will be liable to compensate the damage to the buyer if the damage was the result of irregularities of the goods. The distribution contract does not normally create any rights of third parties towards the supplier. However, in practice, such liability can be achieved by either taking personal guarantees by the supplier to third parties or by applying rules for compensation due to non-contractual liability.

### **3. Distribution Contract as an Instrument of Distortion of Competition**

The distributor must adhere to the principle of competition when performing its professional duties. The distributor's business operations should have the features of fair market behaviour. However, in terms of competition rules, the conclusion and implementation of certain types of distribution contracts may result in undermining the competition. The distribution contract is a contract on vertical cooperation, which means that the parties are not direct competitors. It has long been believed that only horizontal contracts may influence the restrictions of competition in the market, but today there is a firm attitude that even these contracts, when the parties are positioned in the different level of production, may harm competition. In the EU, these contracts have been legally sanctioned since the case of *Gonsten & Grunding v. Commission*<sup>22</sup> in 1966.

Restrictions on competition by vertical agreements are viewed through their effects on inter-brand and intra-brand competition. Vertical restrictions on competition that affect intra-brand competition exist when a producer imposes restrictions on the manner in which its distributor promotes its products. Conversely, vertical restrictions that affect inter-brand competition exist when a producer requires from distributors not to keep or sell the goods of rival producers. [1] Vertical restraints may be in the form of export restrictions, indirect export bans, price fixing, etc.

The Law on Competition is one of the most developed segments of community law. The basic principles of competition rights of the EU are included in the Treaty establishing the

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<sup>22</sup> *Consten and Grunding v. Commission*, C-54, 56/64.

European Community (hereinafter: the EC Treaty)<sup>23</sup>, whereas the central pillars of the right of competition are Articles 81 and 82 of the EC Treaty.<sup>24</sup>

Articles of the EC Treaty relating to agriculture (Articles 32-38) are observed in a different way. The rules for market business operations in general cannot often be applied for agriculture. However, certain rules for competition from the EC Treaty may be applied in agriculture. For example, according to Article 36 of the EC Treaty “the rules on competition shall apply to production of and trade in agricultural products only to the extent determined by the Council”. Article 1 of Council Regulation No. 26/62 provides that Articles 81 and 82 shall apply to the production of or trade in the products listed in Annex I to the Treaty, except in the two cases that are given in Article 2, Paragraph 1 of the Regulation concerning derogating Article 81 of the EC Treaty, and these are as follows: in the case of the agreements which form an integral part of a national market organization and in the case of the agreements which are necessary for the attainment of the objectives set out in Article 33 of the EC Treaty. There are no restrictions for the application of Article 82 in agriculture. [2]

#### **4. The Significance of Distribution for Organic Production in Serbia**

The principal objective of Serbian agriculture is to increase its competitiveness. This is especially related to farms that are engaged in agriculture as a core business activity. According to the official data, Serbia is dominated by small farms. The largest number of registered farms has land of 2 to 5 hectares, the fewest number of farms has land size from 15 to 20 hectares and over 20 hectares. [3] The productivity of small farms and price competitiveness compared to commercial farms are much lower. However, the chance to improve the economic position of small farms in Serbia, which possess 3 hectares of arable land on average, may lie in organic farming. [4]

The development of organic agriculture may affect the quality of life in local communities, but also throughout the state. In the long-term, through organic farming, this might lead to the shortening the gap between rich and poor regions and achieving stability in production. Getting producers educated and informed can create awareness for consuming organic food in order to improve health. [5]

Serbia has the potential to expand the area under organic production and improve this type of production. However, obstacles to the development of this production lie in the domestic market, in scarcity of information of producers about opportunities in the European market and partners, hence poor grasping of opportunities in the European market, followed by insufficient education of farmers, especially for organic production method, and the certification system. That is why we are still a country where organic farming is not a significant part of total agricultural production.

Taking competitive advantages can be achieved by increasing efficiency over the competitors in creating and delivering better value to consumers in selected target markets. To win the battle against conventional production, organic production must demonstrate its advantages. However, the lack of significant organic production, due to the high price of the product, can be overcome only by strong market funds. Farmers, often unskilled in marketing their products, are not able to successfully promote their product and adapt to the changes that frequently hit the market, to effectively monitor the relationship of supply and demand and to cope with strong competition. The fundamental question that should be addressed by the producer after the product is finalized is how to make the product reach the consumer in. In this sense, the point is about different distribution channels.

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<sup>23</sup> The EC Treaty after the promulgation of the Treaty of Lisbon in 2009 got a new title – The Treaty on the functioning of the European Union (TFEU).

<sup>24</sup> According to the TFEU, these are Articles 101 and 102, which have the same content as Articles 81 and 82.

The placement of goods on the market by distribution channels is not the same with large enterprises, on the one hand, and with small and medium enterprises, on the other hand. These companies use different marketing strategies in marketing their goods. Large companies often create their own distribution network, while small and medium enterprises conclude different agreements on the placement of their merchandise with independent and autonomous agents - distributors. Distributing is a particularly suitable form of the placement of goods for small and medium enterprises that use the services of distributors in order to enter the market, which would otherwise remain unavailable.

Considering the fact that Serbia is dominated by small farms, the form of distribution which is important for producers of organic agricultural products in Serbia is the one performed by independent intermediaries - distributors. These may be companies or individual traders. By signing distribution contracts with independent distributors, agricultural producers acquire certain obligations, but they also have their rights. For every order made by the distributor they must respond accordingly by delivering a certain amount of goods. Then, they are responsible for any possible physical and legal irregularities of the delivered goods. They have no obligation to pay compensation to the distributor for the provision of distribution because distributors' earnings represent the difference between the buying and selling price, but also they must not interfere with distributors' decision about determining the resale price. This is the distributor's discretionary right. The distributor, however, independently determines the manner of the placement of goods. This means that the producer should arrange for delivery of a certain quantity of goods to the distributor. Upon the receipt of the delivery, the distributor is responsible for sale of the goods and must work in accordance with market principles and the principles of competition right.

## **5. Distribution Channels of Organic Products in Serbia**

There are several ways of placing organic products on the market in Serbia. As far as small farms in the Republic of Serbia are concerned, selling at markets is the most widespread. Direct cooperation with restaurants and retail outlets is also presented, but this is less common. Hypermarkets are such an interesting market because they require a higher volume of production. The environment in which farms operate provides opportunities that support the achievement of objectives (benefits) as well as aggravating circumstances that entail negative consequences (disadvantages). It is important to make a list of both advantages and disadvantages so, thanks to the benefits, we can eliminate or mitigate any shortcomings. [6]

### **6.1. Sale at the market**

Sale at the market is a good way for farms that are just starting their operations. Major efforts in planning and organization are not necessary, given the fact that in our country there are no strict requirements related to the quantity, types of vegetables and delivery time. At the market, consumers have a great selection so it does not generate dissatisfaction.

One of the most popular organic products market in Serbia is, now traditional, market My Farm in Novi Sad and Supernatural organic market in Belgrade. They are in many ways different from traditional markets, by above all their concept and management since they bring together organic farmers, producers with good agricultural practices and traditional farmers. The specific feature of these markets is that the agricultural products, obtained on the principles of organic, traditional agriculture and non-agricultural products (souvenirs, gingerbread hearts, hand-embroidered clothes, etc.) are sold exclusively to end users by direct producers.

What can be seen as a disadvantage is that even certified organic producers rarely label this information on their products. Likewise most stalls are arranged, but the products are piled

on the table without any particular order and sense. What will make consumers purchase juice of a certain producer is its name, packaging, the position on the shelf, a complimentary product, etc. Loyal consumer is obtained through the quality but every organic producer should pursue for some specific features that will distinguish them from others, especially in markets where nearly all producers offer the same products.

## **6.2. Sale on the farm**

Just as is in the case of cooperation with wholesalers at the market, direct sale on the farm is a good form of product placement for starters. Any special organization or plan is needed for this type of placement. Diversity in production is recommended, but a wide selection of vegetables is not a prerequisite of a good relationship with customers. Of course, one should bear in mind those consumers loyalty is acquired only through continuous offer. Ideally, a farm should be located on a busy road and there should be plenty of place to set a kiosk in front of the property with the easy access to it. There is also risk of inadequate time management unless there is a person dealing with the sale at the kiosk. If, however, the management of kiosk is carried out with a plan, an employee may devote to other duties. The best way to manage the optimal time is to determine the exact time of sale.

The surveyed organic producers that sell their products directly on the farm have different experiences. On one farm (near Irig) that are primarily oriented towards this type of sale, about 70% of customers are regular and about 30% are casual. The kiosk is open from early March to early October. At the beginning and end of season, sale is conducted from Thursday to Sunday, and during high season it is conducted every day. They mainly sell various fruit, and if they lack certain fruit they buy it from fruit producers in the immediate vicinity. Products that are not sold are frozen and then processed and sold in the winter period. On another farm, located on a busy road (near Kraljevo), the producer has limited opening hours of kiosks and only works at weekends - in May and June because they produce strawberries. They have regular clients, but they are not numerous. Point of sale is not on the road but on the farm which allows them to take care of the production process at the same time. This sale accounts for 5 to 10% of their total placement of strawberry market on the market.

## **6.3 Sale at retail outlets**

The placement of products in shops often provides guaranteed income in advance, or as agreed with retailers. As a result, it is possible to make a good financial and labour plan. Given that the payment of goods is done before delivery, it is much easier to make some short-term investments. However, there are cases where the goods are paid only upon receipt and that only a small quantity is ordered and delivered within 24 hours. According to the experience of the surveyed producers, sometimes transportation costs are higher than profits, but they feel that they should send them for the sake of long-term cooperation. Constant contact with customers can influence the creation of solid relationships, and sometimes a partnership between farmers and retailers. Customers are often tolerant for defects occurring during transportation of certain types of vegetables, and understand that some varieties develop better or worse, depending on the season. The surveyed farmers generally do not sell in retail outlets because they are mostly organic producers and their products have higher prices than conventional. The exception is when they have excess product, and only one of them has a long-term cooperation with retailers and this cooperation includes only carrots. The shop *My Farm* is an example of retailing that, among other things, sells organic products. It allows producers from the same name market to sell their products after market day (Thursday) and then the shop will usually sell them at the same price as at the market.

Vegetables must be produced at the right time and there must be a large variety of them out of season. The problem also lies in administration that occurs in this kind of business, which is much more complex than when the vegetables are sold at markets or on the farm. It is also necessary to find retailers, negotiate terms of cooperation with them, and arrange transportation with proper timing, which is not an easy task. In addition one should know what to produce, i.e. what vegetables are most in demand in the market. Regarding this the shop *My Farm* may be cited as a good example, where in daily communication with customers it is possible to see the market demand and suggest producers in which directions the demand is moving. Producers working with retailers share all the products in three categories: the first - potatoes, carrots, cabbage and onions; the second - lettuce, zucchini and tomatoes; and the third less demanded vegetables, such as peppers, broccoli and cauliflower. The advantage of this placement is, therefore, that this business method allows assessing the needs of consumers and predicting the output for each season.

#### **6.4. Sale at restaurant and hotels**

Sale at restaurants and hotels is often complementary to the above-mentioned types of business. One of the producers specializes in the production of herbs that sells exclusively to luxurious hotels and restaurants in Belgrade. [7] Hotels and restaurants often embrace novelties from the market. Production is carried out throughout the year to ensure the quality and quantity required by customers, and herbs are sold fresh and packed in plastic boxes. [8]

#### **6.5. Sale at hypermarkets**

Wholesale within hypermarkets enables producers to specialize for certain types of vegetables, which gives them the possibility to carry out major investments in production plant and to become more effective. Only one surveyed producer cooperates with *Univerexport* hypermarket in Novi Sad, and this sale accounts for as much as 50% of its sale. If such a store is opened in Belgrade (which has been announced), it will launch over 60% of its products through this channel.

On the other hand, the production of a small number of varieties of vegetables is too risky, especially in organic production, where the control of insects and diseases is more difficult. This method requires the placement and uniformity of fruit, but also better packaging. When it comes to prices, they are much lower when the vegetables are sold to the grocers than when sold at the market. There is a risk that the cooperation will be cancelled because grocers will buy at the producer who offers a better price, and payment is always done later and only after about three contingents of vegetables (which means in six months).

### **7. Conclusion**

Organic production in Serbia is still developing, and demand for these products is growing every day, especially in larger cities. Many people think that organic farming means a return to the past and application of obsolete methods of farming, which is not true. It requires, by contrast, exceptional management skills, accurate knowledge and application of new methods of production that are in harmony with more and more complex environment. When a farmer decides to start organic production, its main concern is to replace chemical additives with natural ones but it should not be the only task. The transition from conventional to organic production requires several years of practice, monitoring and technical support. The farm from the time of making such decisions must be viewed as a system, because every action and every decision cause effects on the entire property. In the case of any problem, the whole system should be analyzed by segments.



The introduction of distributors as intermediaries in the marketing of organic products can be a way of solving problems of selling these products. If sale is organized more efficiently, there will certainly be an increase in production. One form of motivation is financial, but legal security should not be neglected. The convenience of consumers to obtain organic products raises the issue of distribution, and the convenience of producers to sell products surely opens the issue of safety and good performance. When concluding the distribution contract, producers should count on lower costs, the flexibility of distributors and adaptability to changes, the high level of integration in sales and marketing and promotion system.

There are not two identical farms, so there is not the uniform procedure for their business operations. No books, procedures or guidelines are fully adapted to each organization, but they only bring new ideas and possible directions for development. To succeed it is necessary to observe, listen, try out, be active, present and persistent. It is often argued that one of the biggest obstacles to increase the land under organic products is poor knowledge of producers. Our conclusion would be that relevant institutions in Serbia need to pay as much attention as providing financial support, which is growing from year to year.

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# Female Entrepreneurship – the Diasporic Experiences of Black African Women Entrepreneurs in Britain

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Extant literature and empirical evidence suggests that women have different entrepreneurial experiences to those of men and this has been attributed to differences in educational experiences, labor market experiences, family circumstances, post- education training, culture, and access to resources. Some studies have suggested that women from ethnic minority background particularly migrant women are most affected by these and other factors resulting in them having different entrepreneurial experiences which determines the trajectory of their entrepreneurial ambitions and success of their businesses. Most studies on female ethnic entrepreneurship have focused on certain groups such as Asian and Chinese women and little is known about black African women migrants operating their businesses in the diaspora. This limitation has resulted in little being known about their experiences and how these experiences affect how they start and manage their businesses. This study addresses this gap in academic fields of entrepreneurship through an investigation of the experiences and activities of the 1<sup>st</sup> generation black African women entrepreneurs in Britain. Britain plays host to the majority of black African migrants from sub-Sahara Africa. The discussion that ensues is based on review of literature and a study recently carried out in the city of Birmingham, in the UK. Using semi-structured interviews with 32 women entrepreneurs, the paper contains some preliminary findings and emerging themes. Preliminary findings suggests that the women are 'pulled' and not 'pushed' into starting their own business with some starting their own businesses as a life style choice or hobby. Most have been entrepreneurs back in their home countries. Unlike other ethnic minority women, 1<sup>st</sup> generation black African migrant women are not socially embedded due to lack of exposure to a network of family and friends which affects their accumulation of other resources.

## Keywords

Black African women, entrepreneurial experiences, ethnic minority, first generation migrants, women entrepreneurship

## 1. Introduction

A considerable number of studies in ethnic minority entrepreneurship in Europe have focused on some ethnic groups like the Chinese [1, 2], Asian [3, 4], Vietnamese [5, 6], the Surinamese in Amsterdam, [7] and African Caribbean [8]. Due to lack of studies focusing specifically on black African migrant women entrepreneurs, conclusions about their entrepreneurial experiences have been drawn from discourses on female entrepreneurship experiences in general and particularly the experiences of other ethnic minority women. This over-generalization has been noted by [9] who asserted that this has resulted in a view of the ethnic minority population as a monolithic group. Nwankwo further suggests that due to racial

and cultural similarities between black African and black Caribbean communities, studies of the black Caribbean communities are often generalized to apply to black African communities. The question that arises however is whether the experiences of other ethnic minority women who have been studied before and the empirical evidence available to date adequately reflect the experiences of black African women. Other studies do not take into consideration the generational gap between recent migrants and those who are born of migrant parents. Preliminary findings consider two aspects of those experiences namely the reasons why these women start their own businesses and what entrepreneurial resources are at their disposal.

## **2. Migration History**

The study of the entrepreneurial experiences of the 1st generation migrant black African women will not be complete without considering their migration history. Understanding their history of migration helps to set the context in which those experiences can be understood. The migration history of Black African people into the United Kingdom (UK) is quite different from that of other migrants. Black African migrants who first came in small numbers the 50s and 60s came mainly for education purposes unlike other migrants for example the South Asians and Afro- Caribbean who came for employment purposes. Post- independence Africa has maintained close ties economically, politically, linguistically and culturally with their former colonial powers and this relationship still remains and as for former British colonies this relationship has been maintained through their membership of the Commonwealth. This relationship created privileges for travel, study, work and business [10]. It is out of these special relationships with the former colonizer that many of the migrants found the UK a favoured destination. Daley [11] notes that, "... the first arrivals fared better, often being granted full refugee status, and were better equipped educationally and economically" (p1705). The majority of the early African migrants were male which [12] posited was due to the gendered nature of the early education system introduced by the Europeans in Africa which resulted in the greater numbers of the student population being male. Women immigrated in larger numbers at the turn of the century to join their husbands or partners with fewer of them coming independently for study and training purposes in the fields like nursing and more recent migration trends has been almost similar numbers of men and women migrating. Since the turn of the century, there has been a huge increase in asylum claimants from certain African countries notably Zimbabwe, Somalia and the Democratic Republic of Congo (DRC). The first official recognition of black Africans in the UK as a major ethnic group was in the 1991 population census and in the 2001 census; they comprised 10.5 per cent of the total ethnic minority population [13].

## **3. Factors Influencing Decision to Business**

Entrepreneurship studies on ethnic minority groups have often considered the motivation or reasons why they start their own businesses. Factors such as; culture or family tradition [14], previous career/employment [15], institutional support [16], level of qualification [17], and role models or peer influence [16]: have been found to have an impact on the decision to start their own businesses. Blocked upward [18] has also featured prominently with [19] suggesting that this aspect is particularly pertinent to women of ethnic minority background due to their perception of double disadvantage in the form of race and gender. Personal motivation at initial start-up also received greater attention in literature [20], with [21] asserting that the overriding factors was for the women to be able to make a living while taking care of their families.

Orham [22], categorized the motivational factors into 'push' and 'pull' factors by suggesting that starting a business is 'driven by two opposite factors of choice and necessity according

to the relative importance of the “push” and “pull” factors’ (p233). Bourdieu [23] have however argued against the push/pull factors as the sole determinants of decisions to go into self-employment by arguing that people do not operate like robots that have to be pushed and pulled but rather use their agency abilities to mitigate against external structures. Earlier, [24] had developed a model that categories factors that influence an individual’s entrepreneurial decisions into; antecedent influences, incubator organizations, and environmental factors. Antecedent influences considers the background such as the educational background, marital status, previous employment experience, family circumstances and genetic factors of the individual entrepreneur and how this affects his/her motivation, perceptions and skills. Environment factors are external to the individual and these could be the level of support given to new entrepreneurs, the norms and culture of the society that they are socialized into, the availability of finance and role models. Incubator Organization is the type of organization the individual worked for immediately before they started their own business. That includes the skills and knowledge they acquired from their last employment and whether the experience from that job ‘pushed’ or ‘pulled’ the individual to start their own business.

#### **4. Entrepreneurial Capital (Resources)**

Motivation alone is not sufficient for an entrepreneur to start their own business. She needs the resources to translate the motivation into action. The concept of entrepreneurial capital [25] was a way of explaining the importance of both financial and non-capital capital to the entrepreneur. The amount and type of entrepreneurial capital (financial, human social and cultural) available to an individual can have a significant impact on the individual’s experience of business ownership.

Some studies [26] found that women did not use bank finance as much as men do and attributed this to the criteria used by the banks. Other studies [27] also found no evidence of discrimination by banks as the criteria they used to decide on an application is the same for both male and female applicants though [28] conceded that decisions about who to lend money are made by individuals who may have their own prejudices. Some significant amount of work has been carried out regarding financing of business owned by ethnic minority groups in general and women in particular. Africans and Caribbean have been found to rely on personal savings more than other ethnic groups because due in part to their weak social networks and negative stereotyping by financial institutions [17].

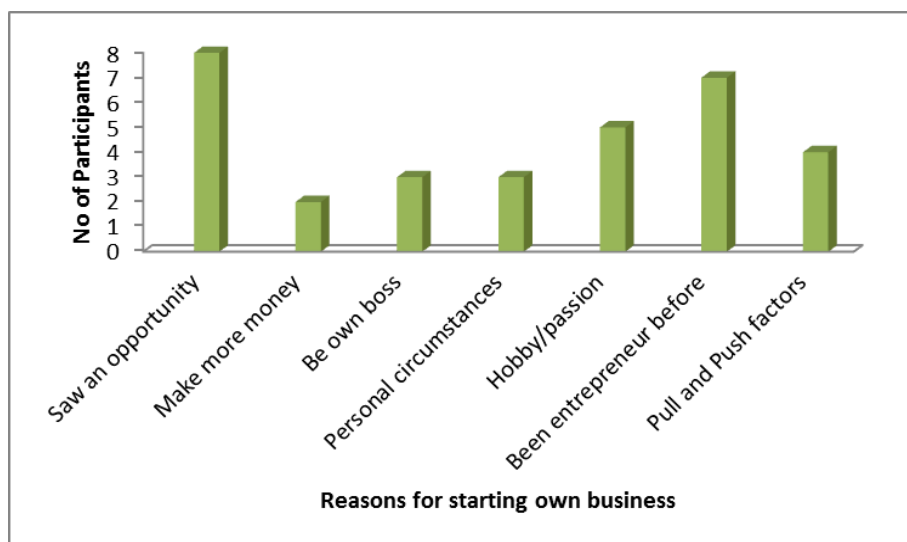
Formal education [29] is an important component of human capital as it enables entrepreneurs to accumulate knowledge and it equips them with the necessary skills they need to start their own businesses. They add that the accumulation of knowledge alone is not sufficient enough for business creation, but that the individual should have a sense of self-efficacy and the perception one has of their abilities and the amount of skills they think they have. Human capital is not only derived from formal education but may include training and work experience [30].

Social capital another element of entrepreneurial capital benefits the migrant entrepreneur in that close kinship and family members are able to provide financial help and labour [31], and they rely more on close social networks when seeking assistance to set up business than they do with mainstream support agencies [32]. This form of capital helps individuals to get connected to individuals or businesses that may provide vital support to the business in the form of information, advice and support. Boden [33] argues that women start their businesses with less social capital because they have had fewer years of work experience and they lack managerial experience due to lack of exposure in the labour market. However, [34] argued that strong ties do not always help entrepreneurs raise the desired start-up capital though conceding that cohesion through strong ties can provide entrepreneurs with resources in the early stages of their business start-up as this is the time they are most unlikely to have resources of their own.

## 5. Empirical Findings

Preliminary findings on why black African women start their own businesses suggest that rather than being pushed into starting their own businesses, they are motivated by a variety of factors as shown on figure 1.2

**Figure 1** Motivation for starting own business

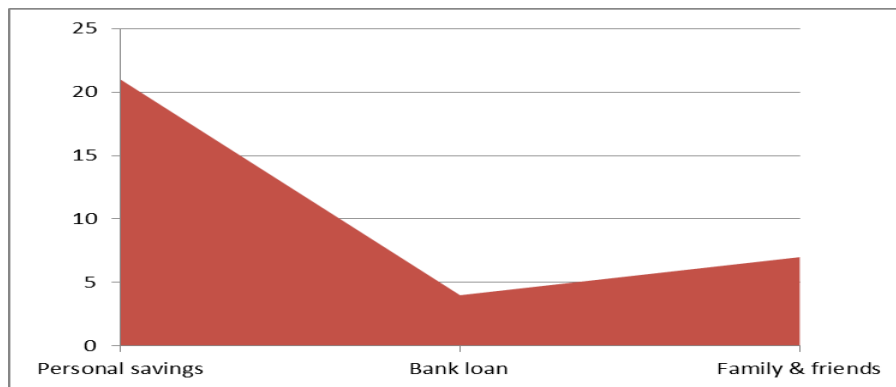


Of the 32 women interviewed, only three say they were pushed by circumstances such as their immigration status which did not allow them to work and the only viable alternative for them was to become self-employed and operate in the shadows. The other four mention both push and pull factors. They were initially pushed by circumstances for instance when they were waiting for the outcomes of their application to change their immigration status. During the waiting period which in some cases took years, they had to find something to do. However, when their immigration status changed and they could look for work, they decided to maintain their businesses because of the opportunities they later discovered and so at that time they were motivated by pull factors. If we are to consider what motivated them initially, we would conclude that they were pushed, but when to consider why they are in business, we would conclude that they are pulled. That suggests that motivation has a time span. The remaining women say they were pulled from the onset by different reasons the main one being seeing an opportunity. However, those who had been entrepreneurs before they came into the UK say they were neither pushed nor pulled but running their own business is something they have always done. A closer look at what then triggered them to start their own businesses when they moved into the country, they mention opportunity. Out of the twenty-five women who say they were pulled, two were motivated by money while another three were motivated by wanting to be their own boss/flexibility. Five other women started their businesses out of passion or as a hobby. In all, 78% of the women are pulled into self-employment.

### 5.1 Entrepreneurial capital

Entrepreneurial capital takes different forms including finance which affects the type and size of a business. Figure 2 shows a breakdown of the different sources of finance used by the women. Many of the businesses were self-financed with some women stating that because of their poor background and not having their families around meant they have to raise money on their own.

**Figure 2** Sources of finance



Of the 32 participants only 4 of them used bank loans in the form of credit cards and overdraft to start or finance their businesses. These were obtained under the pretexts that they either wanted to go on holiday or to renovate their homes. They said they used these methods because the banks were not willing to give them loans to start their businesses because they did not meet the criteria.

Five others obtained money from their spouses with only two getting help from friends. The rest of the women (21) used their personal savings to start their businesses with some continuing to take part-time employment to raise additional finance. Two women who used bank finance to refinance their businesses used debt factoring – a system of selling book debts at a discount. Due to lack of finance, most of the women said they started businesses which did not require a large amount of capital.

An interesting observation is the correlation between the types of businesses the women started and their level of education (table 1) with women at the lower end of the educational ladder concentrated in businesses such as hair dressing and retail while women at the upper end of the ladder like those with post graduate qualifications such as Master's degree concentrated in the provision of services like Law, Accountancy and Education and Training with a few of them operating restaurants. However, those with first degrees or equivalent appear to cut across all types of businesses in a more proportional manner. The type of degrees held by some of them suggests that it would have been harder for them to secure formal employment. Generally, even though the women lack other forms of capital (financial and social capital), they appear to mitigate against these deficiencies by capitalising on their human capital strengths, juggle around their finances and supply good and services that are not dependant on co-ethnic patronage.

**Table 1** Relationship between level of education and type of business

Level of Education	Total	Hair & Beauty	Food/ Catering	Retail	Services & other
Below Secondary level	2	1	0	1	0
Secondary level	12	5	0	6	1
Degree level	12	3	2	3	4
Post Graduate level	6	0	2	0	4

## 6. Implications

Without sufficient support at local and national level, black African women may find it difficult to develop businesses that go beyond subsistence level. The support could come in the form of practical help which take into consideration the circumstances of these women. There is need to encourage institutional support by encouraging banks to devise other ways of

evaluating credit worthiness of women who may not have built sufficient credit history as most of these women despite having been in the country for up to 10 years, their immigration status meant that they could not possibly have built a credit history. Support could also come in the form of help with child care since most of these women do not have family around. This could be through subsidised childcare or encouragement for schools to run breakfast and after school clubs for free or at a small fee. This will free single mothers to go into business without the worry about childcare affordability and also for them to start businesses that are not centred on childcare issues.

## Limitation and Observations

There is a notable lack of data or research on the experiences of 1st generation migrants from other ethnic minority groups would mean that there is no comparable data. As [35] also noted, a problem encountered when carrying out a research of this nature is the lack of disaggregated data on women entrepreneurship especially on Black and Minority Ethnic Groups and particularly on Black African businesses. The main sources of information are the Labour Force Survey, VAT registration data, population census and information from business support organizations and lenders. Apart from the lack of data, there is also lack of literature on black African women and as a result inference has had to be made based on studies of women from other ethnic backgrounds. This may pose a potential weakness to the study from a theoretical point of view.

## Conclusions and Recommendations

Since a full and more detailed analysis of the data gathered during the study had not yet been done at the time of writing this paper, it is anticipated that some changes and adjustments to the findings may be necessary. However given the pattern of responses from participants, any such changes are unlikely to be significant. The fact that most of the women report that they were pulled into starting their businesses by a number of factors it may be necessary to ascertain whether the initial motivation they had when they started their businesses can be sustained over time and whether it translates into growth and sustainability of their businesses by monitoring the survival rates of the businesses. In this paper I have sought to stimulate dialogue, discussion and further research by presenting preliminary empirical findings from the study.

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# The Concept of Using Standard Topic Map in Business Intelligence System

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In existing Executive Information Systems and Business Intelligence (BI) exploration of data from databases and data warehouse is already a standard. At present there is a need for solutions that allow obtaining information from different, scattered sources, to integrate, analyze and present them in various layouts, and also to discover new knowledge. More and more attention is paid to the use of semantic technologies such as topic maps (TM) as a solution which can be used to search and acquire unique information. Topic map standard [ISO/IEC 13250:2000] enables the representation of complex structures of knowledge bases, and the delivery of useful model of a knowledge representation, where the multiple contextual indexing can be used. TM is a relatively new form of the presentation of knowledge, which puts emphasis on data semantics and ease of finding, desired information. These characteristics of TM resulted in conducting a research on using topic maps for presenting knowledge of economic indicators and semantic associations existing between them. In literature the development of BI systems towards using semantic search is described. These systems are called BI 2.0. In this article the idea of using standard topic map in Business Intelligence is discussed. Topic map can be one of various tools for information visualization in BI, which – as visual interactive interface – allows to display the whole semantic network (topics and associations) efficiently, as it is essential to select the relevant information. The article is structured as follows. A brief description of BI and topic map is given. In the next section the reasons of using of TM in the BI system is presented. Then there is the description of review of three applications of TM for presenting knowledge of economic indicators. In the last section, the summary of this work is given and future research projects are indicated. This article is a continuation of the research on the possibility of adaptation and verification of the standard of topic map as a method of presenting semantic associations between different economical ratios.

## **Keywords**

Business Intelligence, Business Intelligence 2.0, Topic map, Visualization of semantic network

## **1. Introduction**

The essence of examining and assessing the functioning of an enterprise consists in appropriate calculating and using economic indicators coming from various financial reports. To interpret correctly values of economic indicators many measures and ratios should be examined that either directly or indirectly influence the final result. However, business data contains a lot of hidden relationships and dependencies that make their usage difficult. In addition, the requirements of economic market and increasing volume of data force

organizations to find efficient ways of obtaining valuable information and knowledge to improve the efficiency of their business processes.

Business Intelligence (BI) system is used for the analysis of all basic areas of an enterprise's activity, such as, e.g., finance, production, logistic, marketing, sales, customers. These applications provide many reports containing much information in each statement. Retrieving information needed at the moment from these reports is eased by the use of appropriate forms of its presentation, and of friendly and easy user interface. Nowadays decision-makers want not only to look at static reports or even ad hoc reports, but also to define goals and key performance indicators in an interactive way and to drill through information to identify chances of advancement and threats of breakdown connected with the leading activity. The usefulness of BI system is not decided by the amount of information to receive, but the amount and type of information which is required at the right moment (see e.g. [7, pp. 9]). These are basic reasons of development of applying a new technology (e.g. semantic search) in BI system. In literature the development of BI systems towards BI 2.0 (using semantic search) is described (see [14]; [17]; [18]).

The main contribution of this work is the demonstration of the reasons for using application of topic map for presenting the knowledge of economic indicators and semantic associations existing between them in the BI system. This can provide a motivation for the creation of new ontologies for economic indicators and building application of topic map which is an important step toward using the semantic search in BI. The article is structured as follows. In the next section the state-of-the-art of BI and BI 2.0 system and standard topic map (TM) and semantic search is described. Section 3 illustrates the reasons of using of TM in the BI system. In section 4, the research of applications of TM for presenting knowledge of economic indicators is presented. Finally, in the last section, the conclusions of this work are given and future research projects are indicated.

## **2. Related work**

### **2.1 Concepts of BI**

In both literature and economic practice a variety of interpretations of the term business intelligence can be found. A wide review of the definitions of business intelligence is presented in paper [7]. Whilst analyzing the BI definitions, four basic approaches to the concept can be noticed, where it is interpreted as (see also [8, pp. 41-42]):

- 1) a management concept which goal is to assure that the managers obtain information of appropriate quality and in due time,
- 2) an information technology solution which means dedicated applications allowing an advanced analysis of data (queries, reports, analysis),
- 3) a system architecture comprising, first of all, data warehouses, query and report tools, online analytical processing, statistical analysis and data mining,
- 4) a system solution resulting from the close co-operation of information technology and business where BI is not only a tool for the data analysis, but also the preparation and conduction of this analysis.

Generally we can say that BI is defined as an integrated set of tools to support the transformation of data into information in order to support decision-making (see also [18]). BI differs from the decision support system and executive information system in their wider thematic range, multivariate analysis, semi-structured data originating from different sources and multidimensional data presentation (see [15, p. 137]). From a technical point of view, the architecture of BI can include: data warehouse, data marts, the basic analytical tools (traditional query and report tools, On-Line Analytical Processing tools, data visualization tools), advanced analytical tools (statistical tools, data mining) and business applications

(tools which provide analysis around a specific business function or a specific vertical that support making various decisions on production, sales, competition monitoring, finance, etc.), corporate portals.

In literature a new generation of BI systems named BI 2.0 is described (see [14]; [17]; [18]). This system may have the following features: proactive alerts and notifications, event driven (real time) instant access to information, advanced and predictive analytics, mobile and ubiquitous access, improved visualization, semantic search information (see also [14]). BI system had acquired new capabilities through the use of such technologies as: Web 2.0 and 3.0, Service Oriented Architecture (SOA) and Software as a Service (SaaS). This system is directed on semantic analysis of data, using data and information from multiple sources (including external). One of the main artifacts to create a semantic network is the ontology, because the architecture of BI 2.0 has new components, such as ontologies, service ontologies and application domain ontology (see [14]). The ontologies are used to create the necessary knowledge models for defining functionalities in analytical tools.

## **2.2 Standard Topic Map and semantic search**

Topic map standard [ISO/IEC 13250:2003] enables the representation of complex structures of knowledge bases [2], and the delivery of a useful model of knowledge representation (see [12, p. 174]), where multiple contextual indexing can be used. TM is a relatively new form of the presentation of knowledge, which put emphasis on data semantics and ease of finding desired information (see also [1]; [16, p. 30]). Usually a TM is a semantic graph which contains definitions of a set of topics and a set of associations between topics called an ontology of a domain (see [11, p. 87]). The structure of a topic map contains three elements: topics, associations (that is relations existing between topics) and occurrences (that is indexed sources related to given topic).

TM is facilitating access to information and allowing ordering huge amounts of information resources within the framework of their semantic index. The basic ways to search for information in the application of TM are been:

- typing the name of the topic (search box),
- selecting topics from a hierarchy (tree view),
- selecting topics or associations of the semantic network using focus and context techniques (visualization of semantic network).

TM allows displaying the whole semantic network (topics and associations) efficiently, as it is essential to select the relevant and acquire unique information [22]. Semantic search is more efficient than that based on the basic hierarchic structure (see [9]; [23, p. 1899]). Furthermore, searching information basing on semantic connections in TM has a positive influence on discovering essential information (see [21, p. 301]). In semantic search in TM visualization play important role. Thanks to the visualization users can more swiftly notice and understand various structural and semantic relations.

## **3. The reasons of using of TM in the BI system**

The main goal of any business intelligence system is to access the right data at the right time to allow proactive decision-making (see among others [7]; [18]; [20]). The users of BI systems expect the access to more information, the interface easy to understand and use and the information presentation, which should be intuitive, interactive and provide context and embedded knowledge [13]. Specific attention in BI systems is given to the user interface which should let the user among others: filter, sort and analyze data, formulate ad hoc or predefined reports, generate alternative scenarios, produce drillable charts and graphs. The use of graphic interfaces is a primary characteristic of the new generation of BI applications (see [7]). However, existing BI solutions are designed primarily for people who

can understand the data models and who have time to build analyses from them and provide information for others (see [17]). To become pervasive, BI has to provide simple, personal analytical tools, using the built ontology, which supports the exploration of data sources, searching the right information based on a semantic relation, not requiring knowledge of data structures and accessing data anywhere (see among others [14]; [17]; [18]).

By applying semantic technology to the analytical tools we can try to solve the following problems (see also [11], [18]):

- Lack of support for definition of business rules in order to get proactive information and advice in the decision-making;
- Lack of a semantic layer describing relationships between the concepts and indicators;
- Lack of support to present information according to the different kinds of users that can be found in an organization;
- Lack of relatively easy modification of existing data source and data warehouse structure (usually structure changes demands work of analysts, system administrators and programmers).

For end users, the presentation layer is the most critical aspect of a BI system, since it broadly shapes their core understanding of the data displayed on their screen [20], because the system that enables information retrieval should be intuitive to use or easy to interpret by its users. A good interface contains good representation (helps users identify interesting sources) and efficient navigation (allows users to access information quickly) [10]. The basic assumption of navigation is that users should be able to view focus and context areas at the same time to present an overview of the whole knowledge structure [19].

TM can be one of the tools for visual exploration of the information in BI, which – as visual interactive interface – allows to display the whole semantic network efficiently, as it is essential to select the relevant information. Moreover TM allows the presentation of the ontology of a domain. We use ontologies to create the necessary knowledge models for defining functionalities in analytical tools. Additionally, the creating topic map application is separated from an enterprise information system which processes data on all aspects of operational business activities (see among others [11]). There is no need to modify subsystems or to duplicate contents and logic of subsystems when building semantic layers.

#### **4. Review of applications of TM for presenting knowledge of economic indicators**

Our research concerns the use of topic maps for presenting knowledge of economic indicators and searching information basing on visualization of semantic network. We have built three applications of TM in order to analyze economic indicators. These three research projects are briefly characterized.

The first case study concerns the profit sharing analysis. In the paper [11] a concept of using a topic map as a useful tool for the analysis of the profit sharing indicators is described. The presented topic map has been developed in the authoring environment TM4L (Topic Maps for e-Learning). In the example company employees realize internal and external projects. They are paid extra bonus in the form of royalties for completed external projects. This bonus means a variable, supplementary addition to the salaries of managerial staff, dependent on the financial results of the firm. In this company, 26 royalties indicators have been identified. Between these indicators there are different links and connections. In the company, royalties are divided between three groups of employees: managers, programmers, and analysts. Every appointment connects with three measures related to each group of employees. Adding the next appointment causes the appearance of the next three indicators. All factors needed to make them are calculated at the business unit level. The financial data about

internal and external projects can be found in the information system of the company. From this system the data is extracted, transferred and loaded into a data warehouse each month after the closing of a given period. It allows monthly analysis of a given employee, business unit and type of project (described in [11]). The application of topic maps for the profit sharing analysis shows the possibility to provide an organizational layer on top of one or more databases. The merging rules of topic map can be used to combine topic information received from multiple separate sources into a single operational topic map. The principal benefit of using a topic map is the flexibility that allows interpretation of the composite economic ratios. In the topic map visualizing the relationships explicitly makes interpretation of indicators easier.

The second case study of using topic map as a useful tool to organize the information in order to preserve the knowledge of economical ratios and semantic associations existing between them is concerned with the return on investment (ROI) indicator. In the papers (described in [4]; [5]; [6]) an approach to the analysis of the ROI indicator in the Du Pont model based on topic maps is described. A number of examples of visual analysis and interpretation of economical ratios are illustrated and discussed. The presented topic map has been developed in TM4L.

The ROI indicator allows to assess an enterprise's activity. During the analysis of the ROI indicator by decision-makers, the information resulting from the relations between economic ratios is essential. In our research, on account of various approaches to the pyramidal analysis of ROI, both in literature and in practice, we created a model of the conceptualization ontology for a topic map that is flexible enough to be easily adapted to a specificity of company, by carrying out further decomposition of indicators. Created application of a topic map for the ROI indicator contains 30 topics, 6 classes of taxonomic of topics and 13 semantic relationships. The application of a topic map created for the analysis of the ROI indicator according to the Du Pont model allows i.e. a dynamic and interactive visualization of semantic connections between the indicators. Thanks to that decision-makers can use a user-friendly solution facilitating obtaining information from the databases existing in the enterprise. Furthermore, decision-makers by using the 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 which can be for them a new, unique knowledge.

The third case study concerns using topic map as an early warning system for production enterprises (described in [3]). Proper and fast identification of chances and risks for an establishment is necessary for the optimization of current and strategic decisions which are taken at various levels of the management. Research involving creating models of forecasting bankruptcy of a company is carried out all the time. It is used for the building of an early warning system which is based on the models of Z-score for predicting bankruptcy. The model of Z-score is a linear combination of few common business ratios, weighted by coefficients. In the research we have decided to build an early warning system for production enterprises, which includes: four Z-score models with highest discriminatory abilities for production enterprises and four one-dimensional indicators signaling the risk of bankruptcy for production enterprises. It was assumed that the decomposition of indicators for the established system comes to the level of ratios, for which source data can be taken from basic financial statements (that is from the profit and loss account or balance sheet).

We have created an application of a topic map in the authoring environment Ontopia (open source tool to create topic map). This application contains 142 topics, 23 classes of taxonomic of topics and 20 semantic relationships. This case study 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 which facilitate access to a wide range of relevant data resources and give possibility to search data sources on account of the context.

In these applications, the search for information is based on the visualization of the semantic network links existing between identified indicators. These solutions can easily integrate with a BI system. TM can provide both additional analytical application in the BI system and user interface allowing for interactive visual information retrieval.

## **5. Conclusions and future work**

In this article, we introduce the results of our initial research to verify the usability of applying visualization of semantic network in searching information in TM application. Topic map can be one of various tools in BI, which allows to display the whole semantic network (topics and associations) efficiently, as it is essential to select the relevant information. We focused on searching needed information related to analysis of economic ratios. The results are promising. The application of a topic map allows to organize large amounts of information sources according to created semantic index of built ontology of economic ratios and supports the extraction of information from all relevant subsystems. Creating topic maps which include relations between different data impacts on calculating indicators allows understanding the way of calculating the final indicator. Managers do not need to spend much time on explaining main concepts and interpreting indicator values coming from various databases. Described case studies show that topic maps can:

- Be easily used for the representation of economic knowledge about economic and financial measures,
- Express the organizational structure,
- Be adapted to new applications and managers' needs,
- Be supportive to the managerial staff by facilitating access to a wide range of relevant data resources,
- Assure the semantic information search and interpretation for non-technically-minded users,
- Visualize different connections between indicators giving chance of discovering new relations between economic ratios constituting still unknown knowledge in this area,
- Improve the process of data analysis and reporting by facilitation of obtaining data from different databases in an enterprise,
- Be easy extension of the ontology by people not being IT specialists, e.g. by experts of economic analysis (using tools for creating of a topic map application).

The results of the research on using TM in the economic indicators analysis, despite their initial and fragmentary character, can be considered as quite significant. Properly adopted visualization improves the reception of necessary information, which consequently enables to make the right decision in shorter time. The implementation of BI systems with the right visualization solutions of semantic network in an enterprise gives many benefits for this company. Decision-makers can easily find and understand needed information. It is assumed that BI using standard TM and semantic searching will be created and developed. That will be caused by the following factors: easier understanding of contents by their users, common logical platform for different languages and applications, relatively easy adaptation of content and additional possibilities of searching and filtering information.

The research will be continued in order to verify the usability of visualization of semantic network in performing tasks connected with searching information on economic ratios. These studies enable to identify potential difficulties in searching information based on topic maps standard. The future research will be focused on the research of scalability of using topic maps to complex structures of economic ratios, and efficient visualization of concepts and associations existing in business information systems.

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# Small and Medium Enterprises and Economic Development – Case of Bosnia and Herzegovina

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Bosnia and Herzegovina is in the process of transition towards market economy, which means comprehensive reforms in all segments of society. Unemployment is one of the most serious problems in economy of Bosnia and Herzegovina. This article reflects and compares development of entrepreneurship and SMEs sector in B&H and Western Balkans countries. The author, in this paper, accent attained level of development, measures and activities of stimulation this sector. Special accent is on barriers of production SMEs in B&H. The author are came to conclusion that B&H lag in sector SMEs, in respect to the other countries in region, in which this sector obtained dynamic development and majority share (quota) in employment, export and GDP. However, in whole region still remain need (necessity) for resolving the barriers in domestic market, and parallel therewith, starts intensive activities for attack in unique European market. The most significant external obstacles in B&H are: Bureaucracy, The time it takes to implement legal judgements, The issuing of building permits, Corruption, Lack of financial stimulation, The time lapse between a trial date being set and judgement being passed, Lack of government measures to stimulate employment, Quality of road networks, Registration of real estate, and Quality and costs of telecommunications. Author suggest that business decision-makers and government administrators at all levels intervene as a matter of urgency to eliminate these obstacles, or at least reduce them radically in order to create a stimulating business environment in B&H, as has already been done in other countries in the region.

## **Keywords**

SMEs, Unemployment, Entrepreneurship, Economic Development, BiH

## **1. Introduction**

With the collapse communism in Eastern Europe and the former USSR, attentions has focused on whether such nation can successfully transform into entrepreneurial economies (whether high or low level). Bosnia and Herzegovina is one of the post-communist countries where the transition from a planned economy to a market-based economy has been more complex than in other countries in SEE. The current structure of B&H was created at the Dayton Peace Accord in 1995. The Bosnian economy has made huge progress from a totally devastated post-war economy to a functioning economy. In the period 2000-2005, the average estimated growth rate of real GDP was 5%, and 8.8% - 0.5% in the period 2006-2010. B&H has also been successful in bringing down inflation (the annual rate was 3.6% in 2005), in improving fiscal accounts and in reducing debt [1].

For BiH, primary research has been enforced in order to determine barriers of Small and Medium Enterprises (SMEs) in BiH. BiH ranks 110 out of 183 in the World Bank's 2011 ease of doing business survey. It is ranked 160<sup>th</sup> for starting a business and 139<sup>th</sup> in dealing with

construction permits. [2] BiH is ranked 110 out of 179 in the Heritage Foundation's Economic Freedom Index, 82 out of 122 in the Milken Institute Capital Access Index. It is known that entrepreneurs often appear as a generator of new products and new jobs. Specifically, opening businesses and employing people, entrepreneurs influence the reduction of unemployment and assist in the economic restructuring in the state. It is therefore very important to research what and how they affect the number of employees in companies in BiH. The authors point out that SMEs are in almost all fields, structurally integrated in the economic area are not covered by large enterprises and carry out tasks that are not interested, or which are not profitable for large companies. It increases the rate and extent of use of new resources, an economy with a high degree of flexibility and adaptability to new market and other conditions. In BiH there are 45,305 SMEs (legal entities) and 83,850 crafts. In the Manufacturing sector in 2010 were registered only 9,264 legal entities and 10,405 crafts, in services 20,113 legal entities and 36,636 crafts. In conclusion, the main goal of this research is to research and determine the elements of institutional support to SMEs sector in Bosnia and Herzegovina and their effects on employment and the creation of new jobs. In that context, in this research the author focuses on frequent problems of Bosnian entrepreneurs and they try to provide the answers for the questions about economic development and development of entrepreneurship and SMEs, and the influence of SMEs on increase of employment in Bosnia and Herzegovina[3].

## 2. Small and Medium Enterprises and Entrepreneurship in BiH

The structure of SMEs in Bosnia and Herzegovina is estimated on the basis of available data. According to current EU definition of SMEs, the majority of companies in BiH are SMEs.

**Table 1** Structure of SMEs and crafts in Bosnia and Herzegovina

B&H	Total number of legal entities in B&H				%	Total number of crafts in B&H	%
	micro	small	medium	Total			
FB&H	23 830	5 081	883	29 794	65,76	51 674	61,62
RS	10 444	2 408	581	13 433	29,65	29 426	35,09
Distrikt Brčko	1 660	410	12	2 082	41,60	2 750	3,28
Ukupno:	35 934	7 899	1 476	45 305	100,00	83 850	100,00

The data shows that the largest number of companies in BiH falls into the category of micro enterprises (with the number of employees less than 10), which is 93.6% of all SMEs. These companies are weak and require assistance at all levels. The independent shops and SME employs more than 1 / 3 of the total number of employees in BiH, and some estimates say that the companies up to 100 employees are about 2 / 3 of total employees. Regarding the ownership structure of SMEs about 90% is in the private sector. However, there is unbalanced structure in terms of representation services, because the predominant share of trade and catering sectors, and too few SMEs are engaged in the production. Too large number of micro enterprises (up to 10 employees) in total number of SMEs.

Index of development of SMEs (Index of SME development) in BiH is the lowest in the region and is 118.2 as compared with the FYR Macedonia, 306.1, or 1820.9 Croatian Slovenia 2534.9, which has the highest Index of all past and current transition countries (UNECE, 2006). The lowest Index of development of SMEs has Belarus 3.3. This index includes the private sector share in the overall economy (45% in Bosnia - 99% in Croatia), the share of SMEs in GDP in (36% in Bosnia - 56% in Croatia), the proportion of employees in SMEs in relation to the total number of employees (53 % - in Bosnia - 65% in Croatia) and GDP p/c (1,376 in Bosnia and Herzegovina-Croatia in 5035)[4].

In BiH, there is no middle class, which is essential for the development of SMEs and entrepreneurship. The average salary in January 2012 amounted to only 825 KM, or about 420 euros. As envisaged by the Dayton peace agreement, Bosnia is an independent sovereign state with a decentralized administrative structure, which displays the following table:

**Table 2** Administrative structure of BiH

Level of government	Jurisdiction				Total
	Country	Federation	RS	Brčko	
Central	1				1
Entity	1	1	1		2
Canton		10			10
Municipality		84	63		148
Autonomous district				1	1
Total	1	95	64	1	162

Izvor: <http://www.worldbank.org.ba>

Institutions are all those entities, without whom it would not be possible to realize restructuring activities. It shows the complexity of the business environment in which entrepreneurship has to develop. In Bosnia and Herzegovina, the country's political and legal system, one state with two entities (Federacija BH and RS), District of Brcko, 10 cantons in the Federation and municipalities, has created a very specific political and legal framework for economic development and entrepreneurship. At the state level can be singled out some of the institutions that directly affect or should affect the economic development and entrepreneurship, as follows: The Committee for Economy of the Council of Ministers of Bosnia and Herzegovina, Ministry of Foreign Trade and Economic Relations and Foreign Trade Chamber of BiH and the Agency for Foreign Investment Promotion Bosnia and Herzegovina. Entity-level government institutions in BiH dealing with the support of small and medium enterprises are the Federal Ministry of Development, Entrepreneurship and Craft, Ministry of Energy and the Development of RS, RS Development Bank, the Federal Employment Service and the Development Bank of F BiH. In the period from 2000 to 2008 in BiH positive economic trends were recorded. The economic and financial crisis has had harmful consequences for the economy in year 2009. Estimated reduction in real GDP to 3.2%. Despite the positive economic forecast for year 2010, the overall macroeconomic environment did not result in the creation of new jobs, at least when it comes to the formal economy. (Ministry of Civil Affairs, 2010, 27) External imbalance, despite the progress made in recent years, remains a serious macroeconomic challenge, especially the trade deficit which in year 2010 amounted to 5.3 billion KM. The labor market in BiH is characterized by high levels of unemployment, especially among the younger population. Despite the significant decline in unemployment rates between the 2006 and 2008, the estimated unemployment rate in 2008 amounted to 23.4%, and in 2009 was 24.1%[5].

Other labor market challenges relate to high rates of long-term unemployment and low labor mobility. Furthermore, the social partners are weak and take little part in shaping the employment program. It should be noted that particularly acute differences between the sexes still remain, which is a major challenge to be addressed by socio-economic policies.

### 3. Analysis of institutional support to the development of SMEs and Entrepreneurship

Development of the SME sector in BiH intensified after Bosnia and Herzegovina signed a declaration in Thessaloniki on 21 June, 2003., together with the Western Balkan countries (Albania, Croatia, Macedonia, Serbia and Montenegro) and took the obligation to implement the European Charter for SMEs. Thus, in accordance with the recommendations of the European Charter BiH has started activities making legislation that treats this area. Passed laws:

- Law on the Small Business Encouragement in FBiH (Official Gazette of F BiH, No. 11/07)
- Law on Registration of Business Entities in FBiH (Official Gazette of F BiH, No. 27/05)
- Crafts Act and related activities of F BiH (Official Gazette 35/09)
- Law on Encouragement of small and medium enterprises RS (Official Gazette RS 64/02)
- Law on Economic Development Incentive DB (Official Gazette 13/06)

In addition, all levels of government in BiH (F BiH, RS and DB) intensified and other activities to support development of SMEs sector. In this context it is important to note that all levels of government provide support in accordance with their own estimates and these activities are not coordinated with other levels of government. Additional activities are also undertaken in the development of infrastructure for the development of entrepreneurship in Bosnia and Herzegovina. With the help of various levels of government (the entity, local, cantonal) formed various business support agencies, business associations, and other aspects of the entrepreneurial infrastructure (F & H: 28 municipalities undertake activities on the construction zone, 4 clusters and 8 incubators, RS: 14 zones , 6 Cluster 1 technology park and incubator in 6 RS, DB 2 and zone 1), but there is the apparent lack of coordination of development environments to support business[6].

BiH's progress through the transition phase has effectively been stalled for some years, so the country lags behind all the others in south-eastern Europe. Its complicated political and constitutional structure is a major constraint on reform and good governance. Because reform is paralysed, the country also lags behind other potential and actual EU candidates in the region in the accession process [6]. A comparative analysis of the conditions for starting up enterprises in the Western Balkan countries is given in Table 3.

**Table 3** Comparative analysis of the conditions for business establishment in the Western Balkan countries

Overall business establishment process in figures								
		ALB	BiH	CRO	KOS	FRYM	MNE	SRB
No. of days to complete overall process	2007	39	54	45	23	18	24	18
	2009	8	60	40	22	9	21	23
No. of steps to complete overall process	2007	11	12	10	5	10	15	10
	2009	6	12	8	12	7	15	11
Total cost of the overall process (EUR)	2007	429	679	739	n/a	158	182	252
	2009	575	845	930	1066	99	192	97
Total cost of the overall process (% of income per capita)	2007	22.4	37	12.2	22	7.4	6.6	10.2
	2009	25.8	30.8	11.5	78	3.8	4.4	7.6
Minimum capital requirement (% of income per capita)	2007	36.7	52	20.6	Over 40	112	0	7.6
	2009	32.3	36.3	16.6	0	0	0	6.9

Source: World Bank and IFC, 2010

From this table we can conclude that BiH came out worst in terms of business establishment compared to the other countries, needing the highest number of days in 2007, and even more in 2009. The number of steps in the process remained the same, but registration costs increased. In some of the other countries the business environment was significantly improved (SME Policy Index, 2009).[7].

#### **4. Information on the number of small and medium-sized enterprises and employment in the SME sector in Bosnia and Herzegovina**

Small and medium-sized enterprises exist in almost all fields, structurally they fit in the economic area that is not covered by large companies and perform tasks that are not interesting, or are not profitable for large companies. They increase the rate and extent of use of new resources of an economy with a high degree of flexibility and adaptability to new markets and other conditions. According to available data in BiH there is 484159 employees in the small and medium enterprises of the total 683221 employees in 2009, representing 70.86%. In the Republic of Croatia (Croatian Ministry of Labour and Entrepreneurship, 2007,17) in 2007 there were 1128673 employed, which is 644514 employees more than in BiH, and concerning the fact that Bosnia and Herzegovina has roughly the same number of employees it is an important difference. In the first half of 2010. B&H achieved 5.8 billion KM of export and import was 11.1 billion KM, which is a deficit of 5.3 billion KM. According to the classification of economic activities in BiH, the largest exporters are fisheries, wood and wood products with no furniture, products of base metals, manufacturing of and supply with electrical energy. These activities have made export of 2.3 million KM or 40.36% of total export, while other industries have 60% of export. In most of these businesses operate small and medium enterprises, and there is a large contribution of small and medium enterprises in this segment of the economy[8].

#### **5. The key obstacles of faster development of SMEs in Bosnia and Herzegovina**

Although the SME sector was expected to expand and grow so that it creates enough jobs, to absorb the fired workers in the process of restructuring and privatization of large companies, and to create jobs for those that are new in the labor market, this has not happened in many transition economies, especially in South-East Europe. In our country too, the SME sector neither grew fast enough to prevent the growth of unemployment, nor it realized its potential as the initiator force. Even though a large number of new SMEs entered the market, because of market liberalization those SMEs did not grow as fast as it was expected based on the experiences of the developed market economies. A possible reason might be in the obstacles to development that we listed earlier on. Such obstacles to development stunt a quicker transfer of workforce from the old, non-productive large companies to the newly formed private sector. As a consequence, this can result in less-than-possible growth of a given economy, as well as a significantly greater unemployment that the one that is necessary.

In the end we can conclude that the most evident obstacles to the development of SMEs in BiH are the following:

- The divided economic space,
- Insufficient legislation,

- Lack of financial support,
- High tax rates and a complicated tax system
- Non-existence of a central registry of a bank account holder in banks in BiH,
- Non-existence of a financial market and non-banking credit institutions,
- Non-existence of advisory and financial support for start-ups,
- No possibility for securing the requested collaterals,
- Big technological backwardness,
- Non-sufficient presence on foreign markets,
- Non-sufficient education of the management,
- Lack of managerial skills,
- Big share of informal economy
- No networks between the existent SMEs,
- A very long period of time is required to register a firm, also a lot of documentation is required etc.

## 6. Entrepreneurship and Innovation

Chris Freeman, the doyen of innovation theorists, suggests that „not to innovate is to die “[9]. An important factor of nowadays economy is the fact that only with technological advancement could be created new employment, continuous prosperity of business, and prosperity of the community as a whole. Innovations in a rather big scale make an impact on changes in business and survival of enterprises. In information society and economy, the innovative skills and knowledge are intangible and abstract category. Innovation is an intellectual capital in enterprises. Innovativeness as one of the main skills of nowadays managers and entrepreneurs’ demands continuous research, experiments and discovering of new solutions for business challenges. Some of the main drivers of business are: need for survival and success, creativeness and initiatives, taking risk, entrepreneurs’ confidence, independence, motivation, energy and engagement.

Need for continuous innovations and measurement of successfulness of innovations has become a business imperative. One of the main indicators of successfulness of innovations is Global Innovation Index (GII) which gives an overview in terms of success of countries in stimulating innovativeness and efficiency of using effects of innovations implementations. GI consists of input and output indicators of innovation index. Input indicators are aspects that enable an economy to stimulate innovative, while output indicators give the results of innovative activities within the economy. There are five input indicators of Global Innovation Index: Institutions and Policies, Human Capacity, General and ICT Infrastructure, Markets Sophistication and Business Sophistication. Input indicators define the factors of how stimulating environment is within an economy. Also, there are three output indicators that represent results of innovativeness within economy, and they are: Knowledge Creation, Competitiveness and Wealth Creation. According to research of Global Innovation Index, measurement of GI indicators is being conducted in 132 countries worldwide. Bosnia and Herzegovina is among those 132 countries [10]. According to overall GI indicators, Bosnia and Herzegovina takes 116<sup>th</sup> place with score of 2.58. The highest score has Iceland with 4.86, while the lowest score has Syria on 132<sup>nd</sup> place with 2.13. In Table 4 it is given an overview of GI in Bosnia and Herzegovina and countries of Western Balkans.

**Table 4** GII in Bosnia and Herzegovina and countries of Western Balkans

Country	GI Score	Rank
Croatia	3,28	45
Montenegro	3,08	59
Macedonia	2,89	77
Albania	2,86	81
Serbia	2,68	101
Bosnia and Herzegovina	2,58	116

Source: Global Innovation Index 2008-09, INSEAD The Business School for the World, 2009., pag. 12

From Table 4 it is noticeable that Bosnia and Herzegovina has the lowest GII among countries of Western Balkans. The highest score has Croatia with 3.28, and takes 45<sup>th</sup> place among 132 countries, while Serbia has a score of 2.86 and takes 101<sup>st</sup> place, whole 15 places before Bosnia and Herzegovina. Mentioned facts show that all countries of Western Balkans have more stimulating environment than Bosnia and Herzegovina, as well as more efficient use of effects of innovations implementations [11].

## 6. Concluding remarks and recommendations

The conducted research has shown that small and medium enterprises in Bosnia and Herzegovina can bring great economic benefit in terms of creating greater efficiency and increased economic development and share in the GDP, about 40%, and new jobs. In year 2005 in the sector of small and medium-sized enterprises there was 435875 employees, 2006 - 436394, 2007 - 466611, 2008 - 495401 and 2009 - 484159 employees. In the Republic of Croatia the small and medium enterprises employed 1128673, which is more than BiH for 644514 employees. The research described in this paper leads us to the conclusion that it confirms the obstacles to SME development in BiH, which have previously been identified by the World Bank and the European Commission. Throughout the paper, it is evident that BiH lags behind other countries in the region in almost all aspects[12]. In addition, there are no concrete institutional or legislative reforms in place aimed at systematic solutions for creating the stimulating environment needed for the development and growth of manufacturing SMEs. The research has also confirmed that in BiH there are numerous obstacles to the development of SMEs in particular. Of these the most significant external obstacles are: Bureaucracy, The time it takes to implement legal judgements, The issuing of building permits, Corruption, Lack of financial stimulation, The time lapse between a trial date being set and judgement being passed, Lack of government measures to stimulate employment, Quality of road networks, Social and health insurance benefits, Registration of real estate, and Quality and costs of telecommunications. These are the internal obstacles, listed in the order of their importance to entrepreneurs: Legal counselling, Financial and tax advice, Human resources training and management, Education for increasing the knowledge and skills of entrepreneurs and managers, Training for using advanced information and communication technologies, Promotion of new start-up enterprises, Research sector and development within enterprises, Availability of information technology, These internal obstacles should also be considered by business decision-makers, with a view to improving the competitiveness of SMEs. We suggest that business decision-makers and government administrators at all levels intervene as a matter of urgency to eliminate these obstacles, or at least reduce them radically in order to create a stimulating business environment in BiH, as has already been done in other countries in the region. In addition to the external obstacles, our research confirms that in BiH there are numerous internal obstacles, which

have not been researched by the World Bank, OECD, European Commission or other relevant organizations.

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# The Risks Connected with Innovations on Financial Markets

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The objective of the paper is to present the increasing risks connected with the innovative securities and financial engineering. Financial institutions are constantly creating new financial instruments with purpose to find more profitable ways of investing money and to better manage and decrease risks, but proliferation of these instruments can lead to situation opposite to the preferred scenario. The case of United States sub prime mortgage crisis in 2007 that outgrow into the global financial crisis proves that uncontrolled expansion of new processes like securitization and new complex instruments like Mortgage Backed Securities, Collateralized Mortgage Obligations, Asset Backed Securities, Certificates for Amortizing Revolving Debt, Loan Backed Securities and Collateralized Debt Obligations can cause deep disturbances and recessions in more than one economy. Speculative behaviour of major financial institutions: big investment banks (Indy Mac Bank, Lehman Brothers), hedge funds (Bear Stearns), insurance companies, credit rating agencies, mortgage corporations (Government National Mortgage Association, Federal Home Loan Mortgage Corporation and Federal National Mortgage Association) had a great role in creation of initial credit crisis and spreading the financial crisis from the USA to the whole world, especially on developed economies like Great Britain, France, Italy, Spain, Japan, Dubai, Greece etc. Financial institutions always try to find the new better ways to invert their financial potential and make more return for their shareholders. In this constant quest for profit and because of harsh competitive struggle they sometimes forget the big picture of necessarily stability on the financial markets and engage in risky behaviour. The regulation institutions must prevent future crisis with close monitoring of financial institutions and all risks connected to the new proceedings and new exotic instruments together with the deregulation and creation of vast space for development and economic growth.

## Keywords

Innovations, Financial markets, Risk

## 1. Introduction

Financial markets are very turbulent and uncertain because situation on exchanges of stocks and other financial instruments changes every minute of every day. Authors in this paper present the most interesting trends on financial markets in latest few decades with special regard to Global financial crisis 2007-2011. Global financial crisis was the one of the severest crisis in world's history that caused recession in not only one country or region but in the whole world. In paper authors point out the characteristics, threats and risks of modern financial engineering and uncontrolled creation of new financial instruments based on process of securitization – Mortgage Backed Securities and Collateralized Debt Obligation

and their connection to subprime mortgage credit crisis and consequential global financial crisis. Also, expansive monetary policy of FED, low regulation and supervision of new instruments and business of financial institutions, moral hazard and negative originate-to-distribute model of loan allocation in banks, conflict of interest in rating agencies and insurance companies, speculative behaviour of all significant market participants, underestimation of risks and almost no stability reserves played big role in this financial crisis.

## **2. Trends on Financial Markets**

During 1970-ies government control of capital flows in developed countries becomes gradually suspended and deregulated. Deregulation was considered as right path for boosting economic growth and government decreased control of interest rates, financial transactions and financial institutions in order to create free self regulated market. In November 1999 Congress of United States removed Glass – Steagall Act of 1933 that introduced banking reforms designed to control speculation after Great Depression [1]. The repeal of provisions of the Glass–Steagall Act by the Gramm–Leach–Bliley Act in 1999 effectively removed the separation that previously existed between investment banks that issued securities and commercial banks that accepted deposits. The deregulation also removed conflict of interest prohibitions between investment bankers serving as officers of commercial banks.

Consequence of this Act is that commercial banks changed their business model and goals from conservative and low risk placements to highly risky behaviour characteristic to investment banks. The way that can provide high level of profit is high level of loans and high degree of investment risk. This contributed to rapidly increase of competition between companies in real and financial sector and competition between commercial banks and other financial institutions. In this conditions banking and non banking affairs become in great deal mixed and commercial banks often enter in fields that are not traditionally in their expertise and vice versa, in order to survive on the market and fulfil profit demands of their shareholders. Strong competition led to concentration in banking sector, mergers and acquisitions and forming great banking holdings and mega banks with international business orientation and objective to dominate on the global financial market [2].

Reagan's government wanted someone who believed in free market and deregulation and appointed Alan Greenspan in August 1987 as Chairman of the Federal Reserve of the United States. He was ahead of FED for ten years until retiring on January 2006. Greenspan had big role in two financial bubbles, firstly the dot-com bubble in 2000-2001 and secondly the real estate bubble in 2004-2006. Also, in April 2004, Securities Commission of United States makes decision to let investment banks to enlarge borrowed capital from 12:1 to 30:1 and more [1]. This repeal directly contributed to the severity of the financial crisis of 2007 - 2011 by allowing Wall Street investment banking firms to gamble with depositors' money that was held in the commercial banks.

FED's policy of low (almost zero) interest rates, constant encouragement of loan expansion, flexible and loose regulation contributed to creating a very flexible loan policy in banks and vast room for highly speculative behaviour. Low interest rates, policy of constantly increased lending and other incentives given to ensure high economic growth had influence on expansion of housing markets and subprime securitized mortgages in period of 2001-2006. On examples of some previous crisis and government role in fixing them, big banks and other significant participants on financial markets realized that FED is always ready to apply function of „lender of last resort,, to ensure financial stability and that their potential losses can be socialized. Having this fact on mind great investment banks and insurance companies can easily let themselves slip and stumble in quest for extra profits because they are sure

that they are „too big to fall“ and that FED is going to assure necessary liquidity and absorb possible losses [3].

Before financial crisis in 2007, it was believed that a market of such small size like subprime mortgage could not cause significant problems outside the subprime sector even if it crashes completely. However, we see effects of this severe crisis to the real economies of many countries, causing recessions, banking and financial crises and a global credit crunch. The large effect of crash in the subprime component of the mortgage market was most likely due to the complexity of the market for the securities that were created based on subprime mortgages [4].

From the early 1980's and time of high nominal interest rates, banks were forced to cut down costs of doing business so they can survive on market and compete with the great number of unregulated financial intermediaries who were superior because of their low costs. Reasons of high costs in banks are strict regulation, obligation to deposit reserves in the central bank and to respect prescribed capital adequacy. Also their relationship with clients should be on long-term base with rigid risk assessment and expensive loan monitoring. Banks found the way out in the process of securitization, a technique that can turn illiquid assets into liquid assets.

Banks give their clients mortgage loans (real estate loans, car loans, credit card loans etc.) and then they bring them together and create a pool of loans that they sell to their investment divisions or other investment banks for commission. Original loans remain the collateral and source of income. From these purchased pools of mortgage loans investment banks create new financial instrument and issue debt securities – MBS (Mortgage Backed Securities). Investment banks then sell these securities on capital market to hedge funds, pension funds, investment funds, insurance companies and other unregulated financial institutions. In this way banks were making their assets more liquid and they opened space for more loan emissions. With this activity banks changed their orientation from classical deposit-loan maturity business in which they profit on interest rate margins to destructive „originate-to-distribute“ model where sources of profits were commissions and bonuses.

Stimulated with FED's low interest rates, their policy of „lender of last resort“ and their low regulation of these new financial proceedings together with potential high profits in these businesses, banks started to issue more and more loans especially mortgage loans to borrowers who had problematical credit history. They figured that they could not lose for several reasons:

- Firstly they are „too big to fall“ and they were aware that FED is behind their back;
- They have mortgages as collateral, real estate market was in boom, prices of houses are appreciated and they in case of borrowers default can sell them on much higher prices;
- They thought that they have been disposed of risky loans in their balance sheets and that they in this way distribute risks of mortgage loans on a great number of market players [3].

Banks discovered a new way to earn big profits and they started to issue more loans, especially ones with low quality and high risks to clients who had low credit performances in prior cases and who don't have enough documentation or sufficient income level because they have a new and dangerous motivation to work only for provisions, to create and service a great quantity of loans and then to remove them from their balance sheets and distribute risk of borrowers bankruptcy to other institutions. In this mechanism banks were only interested to increase volume of approved loans without consideration of borrower's future perspective in solvency. This led to a bloom in subprime mortgage market and suddenly borrowers with no income, no job and no assets become suitable clients (NINJA loans). In the same time, banks were highly awarded if they contracted bad and expensive loans because it has influence on rise in value of securities backed on loans [3].

In these subprime mortgage loans interest rates and annuities in first period (2-3 years) were extremely low - under the market value, but latter interest rates rises and they are bigger

than market rates which together with payment of principal makes obligations on mortgages become multiplied. Poor quality borrowers undertake risks of these arrangements because of low initial obligations, high housing prices and possibility to get another debt and refinance if they don't have enough of their own income to pay annuities. Increased loan volume impacted on greater consumption power of borrowers that accelerated demand for real estates and lead to growth in housing prices that ensured that this financial bubble proliferated until the burst in August of 2007.

Securitization process is very complex, investment banks from pools of individual subprime mortgages were issuing securities that were again repackaged and from this they made several tranches: a) AAA or senior tranche (70%), junior tranche (20%) and subordinated tranche (10%). Owners of senior tranche had advantage in revenue payments compare to junior and subordinated tranche. Also, owners of subordinated tranche would first submit losses if borrowers bankrupt. This fact had impact on interest rates and because the subordinated tranches had the highest risk they were compensated with higher interest rates. But here doesn't stop the financial engineering, on grounds of the pool of junior and subordinated tranches of mortgage securities they created next layer of debt instruments called collateralized debt obligations that were also divided into senior, junior and subordinated tranche. Therefore, financial engineers created from securities that had lower quality than senior tranche of mortgage securities new instruments called CDO's that were outrageously ranked as high quality assets. In conclusion, from low quality mortgages banks created vast number of securities that had departed their owners from assets that served as collateral and each next layer derived more risk and lower quality [3].

On this way investment banks were creating very complicated financial instruments. The mortgage backed securities were again split into various new tranches, repackaged, re-split and repackaged again many times over. Each stage of the securitization process introduced more leverage for financial institutions and made valuing risk of these financial instruments more difficult. All this ultimately resulted in high risk situation with problems of liquidity of a number of large financial firms as value of the securities was heavily discounted on the market in response to the bust in the real estate market. Also, the securitized securities were frequently traded internationally, which led to spill-over effect of the U.S. subprime mortgage crisis and its consequences across the country borders.

Role of rating agencies, insurance companies and hedge funds shouldn't be excluded from analysis. This system couldn't work without approval of independent private agencies for credit rating assessment like Standard & Poor, Moody's and Fitch. Important question is why did agencies that should protect investors from potential frauds and misinformation participated in this suspicious process of transformation junk assets like low quality mortgage credits into apparently safe and performing assets like senior tranche of MBS's (Mortgage Backed Securities) or CDO's (Collateralised Debt Obligations)? Rating agencies don't depend from individual investors rather from the big investment banks because they give them employment and enormous provisions. Presented conflict of interests was discarded by regulatory bodies. What happened is that rating agencies have evaluated mortgage securities sold by investment banks as quality and risk free instrument and for that they charged generous fees. Also, this new financial instruments were pretty complicated and agencies staff didn't have enough knowledge to adequately estimate risks and therefore there are confined to use calculations for risk assessment provided by institutions that have issued this instruments. In addition, these exotic instruments were not listed on secondary financial market, so market supply and demand did not have influence on forming the real price of these instruments and prices of these instruments were formed using the complicated mathematical procedures [3].

Besides rating agencies, key institutions that participated in process of building apparently unlimited liquidity for securities with dubious quality were insurance companies. Insurance firms with minimal capital adequacy were constantly insured really low quality securities and on this way they helped in promoting high credit ratings given by recognized credit risk

agencies. Insurance companies didn't have enough knowledge to fully understand situation and they in many cases thought that they were insuring relatively safe assets with minimal risk. Rating agencies besides securities were also evaluating the health of insurance companies. If insurers provided guarantees for this nominally „quality“ securities, rating agencies would give them high grading rank and on this way next conflict of interests had been created.

All participants in this process created „charmed circle“: exotic innovations would increase supply in funds, banks were in position to originate new loans that had influenced on increase of demand for real estate's pushing housing prices up. Increasing prices justified growing amounts of loans because borrowers can refinance contracted credits and sell their houses on inflated prices when housing market is in boom. This would work without problems until the housing prices are rising and as long as interest rates were on low level. However, happened what could be expected: inflated prices of houses started to fall down, interest rates have increased because great risks and borrowers were started to bankrupt in accelerated rate.

Banks accepted originate-to-distribute model in their business and they thought their handing over risks of mortgage credits from their balance sheets and forward them to capital market. In fact happened opposite, banks only in first phase were absolved from this risky credits, because on the end of this closed circle happened that investment branches and divisions of banks were the greatest buyers of securities based on mortgage credits. Big banks were buying exotic financial instruments that were created by their departments of investment banking to show and set example to potential investors that MBS's were safe to buy. Besides that banks wanted to collect high bonuses and exploit loops in the law concerning mandatory reserves, so they were buying senior CDO's because this was asset with purpose of short-term trading and they would on this way decrease reserved amount of capital for safety measures.

Banks bought 80% of total amount of issued senior CDO tranches and treated them as off-balance sheet position to use favourable regulatory treatment which led to concentration of risks of possible sharp price fall of this structured packages. When crash did happen it turned out that banks didn't prepare themselves for this and that they didn't ensure almost any reserves for their risky investments. Although, regulators did notice this behaviour, they look through fingers and let the enormous concentration of risks in banks which deposits are guaranteed and where in the problematical situation FED provides liquidity. Banks who were involved in these activities let risk out through one door but they bring risk back in greater amount through another door [3].

The crisis in the subprime mortgage market didn't occur because housing prices in the U.S. started declining, as many thought. The crisis had been brewing for at least six years before signs of it became visible. The quality of subprime mortgages had been deteriorating every year since the 2001, but this pattern was masked by housing price appreciation. In other words, the quality of loans didn't suddenly become much worse just before the defaults occurred, the quality was already poor and worsening every year. Public could observe this inferior loan quality only when the housing market started slowing down, when bad loans couldn't hide behind appreciation of house prices and when bad loans could no longer be refinanced.

When in August 2007 become clear that a great number of low quality borrowers are going to bankrupt and that situation in recent time will not improve big banks stopped buying securities from hedge funds and investment banks. This had for result losses in several hedge funds (Bear Stearns) and investment banks (Indy Mac Bank, Lehman Brothers) while the market of exotic financial instruments have collapsed. Confronted with the significant fund outflows in loans and drastic fall in value of assets (MBS's and CDO's) capital in banks eroded in great level. This led to decrease in lending of financial institutions, companies and households and increase in interest rates. Prices of houses started to fall and bankruptcy rate of borrowers started to accelerate in great dynamic. Then crisis from subprime mortgage

market transferred into other financial markets in the U.S. and financial markets across whole world.

Finally, when panic overwhelmed all markets worldwide, clouds of illusions were broken apart. Proliferation of innovative financial instruments and virtual financial products caused deep divergence between production and consumption which resulted in fictive economic growth. With risk dispersion financial institutions could undertake and distribute more risks, but their speculative behaviour led to increased risk instead of the preferred opposite. Newly created instruments were so sophisticated that regulatory institutions and rating agencies couldn't independently evaluate risk so they become subordinated to institutions who issued these securities. This was totally unacceptable situation, regulatory institutions allowed uncontrolled expansion of loan and they had big share in this collapse.

### **3. Uncertainty and Risks Connected with Innovations on Financial Markets**

Uncertainty and risk are always current and significant topics because subjects like households, companies, banks and countries are constantly exposed to various numbers of changes, threats and risks. There are many various definitions of risk, because there are numerous causes of risks. Rejda defines risk as uncertainty of loss exposure [5]. Vaughan defines risk as possibility of loss, deviation between real and expected results or probability of all outcomes that are not expected [6]. Kočović defines risk as uncertainty regard to realization of some future event [7]. Although, there is no unified definition of risk, there are two common elements of every definition: uncertainty and loss. Also, it is important to notice difference between risk and hazard because hazard can create and increase the possibility of loss. Some risks can be decreased on the acceptable level or can be avoided.

Risks that accumulated through securitization and proliferation of innovative mortgage securities (Mortgage Backed Securities, Collateralized Debt Obligations etc.) could be predicted and subprime mortgage crisis and consequential Global financial crisis could have been avoided. Poorly apprehension of securitization process and risks that lies beneath helped causing illusion that this was a safe business deal in which everyone was a winner from banks and speculative market players to borrowers. Also, using this technique investors in fact expand influence and risk from one small element of credit market to financial markets in whole world with degradation of protection that central banks can provide.

All participants that were involved in this risky behaviour had their share of lose in their balance sheets and in market value of their shares. For examples of corporate crisis and bankruptcy we underline New Century Financial Corp – NCFC (company experienced great downfall in stock value and bankrupt in April 2007), American Home Mortgage Investment Corp (similar case in August 2007), Countrywide Financial Corp (company was first lender on mortgage market with \$1.500 billion in mortgage credits and they had fall of 84% in their stock value - from 45\$ to less than 7\$ per share), Merrill Lynch (this company experienced in May 2007 downfall of 47% in value of their stocks - from 94 to 50\$), Citigroup (their stocks felt for 60% - from 55 to 22\$), Bear Stearns (their stocks felt for 49% - from 158 to 80\$), JP Morgan Chase (this company register 26% fall of stock value), Lehman Brothers (reported loss of \$2.8 billion, their stock lost 73% of its value in the first half of 2008 and in September 2008 they declared bankruptcy) [8]. Crisis caused loss of \$500 billion in bad loans writing off and government agencies Fanny Mae and Freddie Mac recorded losses estimated to tens of billions of dollars [9]. Also, the most famous index S&P 500 have lost almost 20% from October 2007 to January 2008 in spite of significant liquidity backup of government and then some of the biggest optimist realized that way out of this crisis was not going to be quick and easy.

Banks and other financial institutions had a large share of their asset portfolio devoted to MBS and CDO. When borrowers started to default in great number it led to decreased level

of housing prices. This caused problems in banks which were left with mortgages that they couldn't sell on previous appreciated prices and they actualized great losses on this side. On the other side prices of mortgage securities started to crash and they could only be sold with big discounts. At the same time, lenders tightened credit standards and increased interest rates, which caused fire sales, further pushing down prices and diminishing loan supplies. This led to losses measured in billions of dollars and backfire effect. Badly perceived and underestimated risk, poor perception that investments in MBS's and CDO's were good decision, enormous investments in this worthless – junk securities that couldn't pay out banks debts and no safety reserves made them step into severe solvency crisis.

After large and coordinated interventions of Central banks of The USA, Europe and Great Britain in December of 2007 that prove to be insufficiently effective, it became rather clear that problem wasn't just liquidity on mortgage sector of financial market. Crisis had been diffused on whole financial sector and other sectors in U.S. economy because of many factors especially low trust factor that led to suspension of the most credit operations. Parallel to this, crisis expanded out of U.S. borders to Europe banks that actively participated on U.S. subprime mortgage market and from there to whole world.

It was really hard but possible to predict and estimate all consequences of this crisis on substance losing, trust destruction in key instruments of modern financial architecture and controlling and regulatory function on financial markets. Monetary authorities tried to extenuate and resolve crisis with monetary injections into financial institutions but it didn't work because problem wasn't liquidity but solvency. In today's securitized financial institutions solvency was question of trust and credibility that couldn't be solved with financing. Investors and clients needed to be ensured that books are cleaned from contaminated, nonperforming securities and investments. Independently of complexity of used instruments fact was that books of financial institutions contained claims behind which were not enough real value, after downfall in housing prices, to payback the created debts, so capital adequacy was falling down under the safe level to survive. Also, it was difficult to accurately figure total level of real losses in securities without leverage (MBS's, CDO's and other so called "AAA" securities) that existed in accounting books and safety deposit boxes.

Current crisis was a result of nearly perfect constellation of weaknesses that existed in institutional and regulatory frame of U.S. economy. In conditions of stable macroeconomic environment with very low interest rates, high liquidity and very low degree of volatility, American financial institutions started to undervalue risks. These factors influenced on gradual relaxation of rules and even degradation of credit and portfolio risk management system, with appearance of defect chain in definition and implementing regulatory measurements for financial sector and supervision of financial institutions. Crises prevention system and intervention system also failed. Financial institutions that initiated mortgage loans weren't strictly regulated and they haven't respected requests for full (objective) reporting and consumer-client protection [3].

Financial crisis negatively influenced on decrease of current and projected economic growth, downfall in stock markets, losses for all economic subjects, it led to recessions and high unemployment rates with worsen perspectives for successful businesses and private investments, that are one of the most important ways out of this crisis. Based on report of International Monetary Fund from April 2010 authors present table with information about change of GDP, consumer prices and account balance, as the most significant indicators of economic condition, for selected developed countries for period 2008 -2011 [10].

**Table 1** Chosen developed countries: annual change of GDP, consumer prices and account balance in percent for 2008 – 2011

	Real GDP				Consumer Prices <sup>1</sup>				Current Account Balance <sup>2</sup>			
	2008	2009	Projections		2008	2009	Projections		2008	2009	Projections	
			2010	2011			2010	2011			2010	2011
<b>Advanced Economies</b>	<b>0.5</b>	<b>-3.2</b>	<b>2.3</b>	<b>2.4</b>	<b>3.4</b>	<b>0.1</b>	<b>1.5</b>	<b>1.4</b>	<b>-1.3</b>	<b>-0.4</b>	<b>-0.4</b>	<b>-0.5</b>
United States	0.4	-2.4	3.1	2.6	3.8	-0.3	2.1	1.7	-4.9	-2.9	-3.3	-3.4
Euro Area <sup>3,4</sup>	0.6	-4.1	1.0	1.5	3.3	0.3	1.1	1.3	-1.5	-0.6	-0.3	-0.2
Japan	-1.2	-5.2	1.9	2.0	1.4	-1.4	-1.4	-0.5	3.2	2.8	2.8	2.4
United Kingdom <sup>3</sup>	0.5	-4.9	1.3	2.5	3.6	2.2	2.7	1.6	-1.5	-1.3	-1.7	-1.6
Canada	0.4	-2.6	3.1	3.2	2.4	0.3	1.8	2.0	0.5	-2.7	-2.6	-2.5
Other Advanced Economies	1.7	-1.1	3.7	3.9	4.3	1.5	2.2	2.2	3.1	5.1	4.4	4.3
<i>Memorandum</i>												
Newly Industrialized Asian Economies	1.8	-0.9	5.2	4.9	4.5	1.3	2.3	2.3	4.9	8.9	6.6	6.6

<sup>1</sup>Movements in consumer prices are shown as annual averages. December–December changes can be found in Table A6 in the Statistical Appendix.  
<sup>2</sup>Percent of GDP.  
<sup>3</sup>Based on Eurostat's harmonized index of consumer prices.  
<sup>4</sup>Current account position corrected for reporting discrepancies in intra-area transactions.

Source: International Monetary Fund, World Economic Outlook, 2010; 64.

International Monetary Fund pointed strategy how to stabilize financial markets and boost economic growth with conciliation of national and international factors. This strategy was consisted of two parts: first, relaxation of monetary policy and second, fiscal stimulus. These measurements were given with certain restrictions: 1) monetary policy should be relaxed with continual care for financial stability; 2) fiscal stimulations should be given in boundaries of available fiscal space and long term fiscal sustainability. Shortly, monetary policy was elected as first line of defence and Central banks of The USA, Great Britain and Europe ensured additional liquidity and continued to stabilize inflation expectations. Next step was preparation and implementation of adequate fiscal package directed to stimulate and increase aggregate demand, primarily with stimulation of private consumption. Household consumption and corporative investments are engines of every economy, especially The American, and purposes of these measurements were to establish confidence and that these subjects start spending and borrowing. These incentives were only temporarily to keep long term sustainable fiscal position [3].

Central banks have to continue keeping liquidity, ensuring good functioning of interbank money market. Also, central banks should be very careful in choice of institutions they support in liquidity, for how long and on what grounds they offer guaranties. Controlling function must be consistent in evaluations and asset write-offs of all financial institutions. Policy of monetary relaxation and fiscal stimulus were implemented in countries with low inflation, low public debt and solid position in foreign exchange reserves with caution that fiscal stimulus would be: temporary so it doesn't question sustainability of fiscal position on medium term and directed to layers of consumers with low income who would spend them immediately [3].

In aspect of financial markets, most important question was turning back the confidence. Financial institutions reported their investments in subprime mortgages securities that are in their balance sheets and ones that were recorded as off-balance sheet positions. Crucial importance for big financial players who had great debt write-offs were drawing fresh additional capital and establishing necessary level of capital adequacy and liquidity reserves so they could convince future investors about their solid financial position.



This Global financial crisis unveiled flaws of regulatory frame, risk management system and use of non transparent and complex instruments (MBS, CDO etc.). It is necessarily to keep in mind enormous losses that mortgage corporations and investment banks undertake because of undervaluation of risks connected with excessive crediting and innovative financial instruments, as well as the inadequate, practically non existing security reserves. Suggestions to policymakers is to learn on their mistakes and to increase capacity of regulatory institutions so they can react on time in ambient of suddenly changes and indentify risks correlated with exaggerated crediting and complicated financial innovations. But tight regulation should be balanced so it provides the legislation framework that encourages new investments. Also, in order to avoid recognized risks of financial innovations, to prevent future crisis and to ensure stability of global financial market, it is necessarily to implement lending reform, rating agencies and insurer's reform, securitization reform, re-strengthened supervision of all financial institutions and financial instruments. The government should ensure the stability of the financial system by recapitalizing those banks that have a realistic possibility of survival and merging or closing those that do not.

In try to resolve regulation issues and respond to financial crisis Basel Committee on Banking Supervision in International banking regulations - Basel III introduced new capital requirements for banks. The Dodd–Frank Wall Street Reform and Consumer Protection Act were signed into law in the United States by President Obama on July 21, 2010. It establishes new rules for how banks and insurers can invest capital, how hedge funds are regulated and how financial services firms report information [11]. The Act is a product of the financial regulatory reform agenda of the United States Congress and the Obama administration. Some journalists argues that the Dodd–Frank Act is not strong enough, arguing that it fails to protect consumers adequately, and, more importantly, fails to cut big and interconnected financial entities down to size. Also, World Pensions Council (WPC) have argued that the dismantlement of the Glass–Steagall Act was only the symptom of a much deeper problem: the emergence of a new economic paradigm associating the worst interpretations of Keynesian monetary stimulus with unbridled deregulation that came to define the Clinton and Bush eras since 1993 to 2009. In that perspective, they view the Dodd–Frank Act as insufficient, lacking the broad provisions necessary to restore financial orthodoxy and minimize conflicts of interests [12].

## 4. Conclusions

Effects of sub prime mortgage crisis and global financial crisis were devastating. The world's biggest economy - USA had fallen into unprecedented crisis since The Great Depression in 1929. Because of tight international relations and overboard investments financial crisis quickly expanded from The United States to whole world. Housing prices gone bust, mortgages became difficult to cash together with the mortgage backed securities that altogether led to great loses in financial institutions, stock market crashes, high unemployment rates, increasing prices of future credits, strict credit standards, decreased credit supply and closing credit markets, destruction of investors' expectations and trust, liquidity and solvency problems, bankruptcy of many householders, private investors, mortgage credit agencies, banks, hedge and investment funds. Global financial crisis reviled flaws of regulatory and risk management system, as well as the dangers of uncontrolled expansion of loans and non-transparent and complex financial innovations.

Governments and Central banks of all developed countries at first tried to contain further spreading and collapse and then to give long term resolutions accompanied with structural reforms. Policymakers participated in re-establishing of confidence in the short term with measures like guarantees for buying large stakes in the financial sector, which was problematical because of moral hazard and deviated behaviour in financial institutions. Measurements were strategically planed and global consensus was made between the most developed countries in two segments: 1) relaxed monetary policy and 2) fiscal stimulus

policy. Besides these short term measures some changes were made in regulation and supervision mechanisms like Dodd–Frank Act and Basel III, but there are more steps to be taken so we can ultimately decrease risk of enormous losses and future crises. Basic suggestion to the policymakers is to increase authority and capacity of regulatory institutions so they can react on time in uncertain environment of constant changes and identify risks connected with the over excessive crediting and complicated innovations. Strict regulation should be also balanced with the goal of economic growth and increase of investments. But regulation enforcement shouldn't be alone, it is necessary to conduct more structure reforms especially in rating agencies, insurers, banks and other financial institutions to ensure future stability of financial markets.

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# Repositioning through resilience in times of crisis: the case of entrepreneurial academic institutes

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History has demonstrated through time a series of crisis situations which either had a regional or global impact. Furthermore, lessons from nature have demonstrated that animals and plants experience incremental or radical changes in their lifecycles, sometimes as an unavoidable part of their natural wellbeing. In the same manner, mankind confronted difficulties and managed to cope with harsh conditions that were proved to be aggressive for its continuity on the planet. Most of the times such crises originated from the simultaneous presence of opposing parts that wished to dominate, impose their own will or simply fight for survival.

Current global economic and financial crisis proved that periods of development and prosperity may easily, be followed by recession and poverty. The quick and sudden penetration of negative consequences to social welfare is characteristic of globalisation. Nevertheless, this paper does not involve the sources of crises or their causes but merely focuses on the crisis management as a current issue and how this could be exploited in a successful manner. This study is followed by a detailed literature review and literature taxonomy is used for classifying and analysing aspects on three main topics: (a) resilience, (b) crisis management and (c) entrepreneurial oriented academic institutes. Also additional literature on knowledge bases and social media is included.

This paper undertakes the concern of how an academic institute could affect its region in a period of crisis and what initiatives have to be taken. Could it become a resilient-pole leading the region to sustainability through change and risk? Could it activate the regional powers, integrate and unleash the stakeholders' learning capacity?

Crises will occur either directed or resulting from faulty decisions. The issue stems from the concern, what the healthy organisations should do in a sick and disastrous environment. Yet it is essential both for the people and organisations to reposition themselves in terms of regional development and acquire a dominant role. Regional development implies social change and transformation and for a region to cope with that, three axes to adopt and build on are suggested; entrepreneurial oriented academic institutes, resilience based practices and post crisis management. The common component of these is: learning.

In periods of flux, entrepreneurial academic institutes could be the actors undertaking the responsibility to converge the available regional powers, towards an area-based regeneration initiative, inspired by the principle that joined-up problems need joined-up solutions. Besides, they could be involved in industrial and regional policies in order to cultivate all forms of creativity and knowledge. The aim should be to reposition themselves in leading the region to unknown paths based on resilience by coordinating a robust set of modern tools such as crowd sourcing, living labs, mass collaboration and social networking; these will prioritise the value of human capital and are expected to alter, in result, the regional knowledge infrastructure.

The entrepreneurial academic institutes have the strategy and the skills to operate in unstable environments with high risk. Therefore, this experience would be proved a

valuable resource for diverting to regional sustainability. A resilient region is less sensitive and vulnerable to shocks while resilience can function mainly as an evolutionary concept rather than a protective mechanism. Making decisions that collide with past strategies is rather difficult, especially when these were proved to be successful. The ones, who will deal with it effectively, are expected to be the leaders in the years to come. Repositioning is a continuous adjustment strategy towards the notion of global governance-closely linked to resilience. Late discussions relate resilience to “panarchy”; the model of “network culture” in the global society, based on (a) ecology and complex systems, (b) technology, and (c) politics. In crises, stable axes like education, through academic institutes, may serve as a compass to the future of uncertainty. At least, whilst everything changes there is a survival kit that remains untouched. At this stage the issue of education governance is a significant contributory factor and may or may not be the pole that is capable of coordinating interdependent activities and realise change in the region.

This paper is an approach on the idea of repositioning a region in the global community through the use of modern social communication technology tools coordinated and administered by entrepreneurial academic institutes. It will be a next challenge to specify a concrete implementation plan which will reflect the original idea.

## Keywords

resilience, crisis management, regional development, entrepreneurial academic institutes, education governance.

## 1. Introduction

In their paper “Why Europe will suffer more”, *Gros and Alcidi (2009)* they forecasted that the cost of current crisis could be larger in Europe than in the USA revealing fundamental asymmetries that exist within Europe in terms of the structure of the member markets. Therefore, recovery is expected to be slower. In the same year, the World Development Report (*World Bank, 2009*) raised the issue of reshaping economic geography. It identified the significance of the clusters, a small set of cities and towns which could be the propeller for economic growth. Clusters direct to regional agglomeration economies that are reshaping urbanization itself- a strategy that creates leading and lagging regions which inevitably correlate through extroversion, proximity, diversity and knowledge spillovers.

Restructuring urbanization is the outcome of the new economic geography commonly called “geo-economy”. In such interchangeable environments, repositioning may be a challenge for regional players who wish to survive and lead.

Education remains one of the major axes for the society, sometimes with negative effects. As *Rasche and Escudero (2009)* claimed, in recent years schools have educated many people who contributed to the current crisis-fact that cannot be neglected and has an essence of truth. Thus, education, has been positioned as part of the problem rather than as the solution. It was also revealed that psychology and the issues of perception and noesis are usually behind fake hope and “too big to fail” attitudes. Leveraging and investments derive from man operations while, resilience from social science, environmental studies and nature itself.

Overall, the paper aims to question how an academic institute can reposition itself in a region and contribute to the area-based repositioning, by adopting regional resilience mindset and combining modern social practices with the help of technology.

In section 2, there is a brief description of the question under analysis-which subject would be considered mostly as a proposal to change in a new situation.

Section 3, includes a synthesis and analysis of different literature, retrieved from relevant fields linked to the problem statement; followed by the methodology of literature taxonomy. A technique that contributes to an effective comparison and integration of different views as well as to the guidance of this paper's thinking process.

Section 4, where the solution is presented, takes into account a number of principles, late theories and modern technological tools. It is a simple suggestion on how different regional powers could cooperate by exploiting modern practices, abandoning past successful recipes and adopting a more realistic view.

Conclusions present some final recommendations related to the abilities that an entrepreneurial academic institute can demonstrate and how it can reposition itself while alterations occur as a leader.

## **2. Problem statement (the concept)**

What happens in a constantly changing environment, which suddenly experiences a period of crisis, threatening the living entities? The weaker an organisation is the more vulnerable it becomes-especially in such occasions when their only options are to sustain or die. But what is the expected impact on healthy and strong organisations. Their successful and rational strategy of acting entrepreneurially to embrace uncertainty so far was dealt with risk and return. Following the same path though, in an uneven surrounding, may "bounce back the ball".

What are the initiatives that a region should take in periods of flux; which are the regional powers that could undertake the responsibility to lead in sustainability supporting all those organisations in crisis; and finally how technologies could be recruited in helping to overcome?

Thus, approaching the issue from a regional perspective, it is intended to research the initiative that could guarantee sustainability in a region.

## **3. Literature Review**

According to *Christopherson et al (2010)*, crises and disasters quiver thinking and probe given assumptions and measures of success and failure. *Kesetovic and Nadic (2010)* have incorporated in their research a comparative review of crises' characteristics through time (*Appendix I*). They acknowledged the balance between prevention and elasticity, as the challenge for future crises management. Crisis being a dangerous state for an organism, deducts from it sufficient mechanisms to cope with. Thus, recovery can occur through restructuring or external intervention. Managers are customarily expected to solve crises problems without the adequate information which eventually do not provide the overall picture.

At this stage, sustainability becomes the first target for the organisation, and the region. This is beyond growth and profit or even competitiveness yet more close to collaboration and consensus. It targets more to integration and agglomeration of powers implying also an alternative path for a region, and this is learning how to survive in complex conditions.

Here is an intriguing question concerning economic geography, raised by *Hassink (2010)*; why some regional economies renew themselves whereas others linger on decline? In response, *Simmie and Martin (2010)* claim that adaptation and change are the key processes in the development of regional economies. Additionally, adaptation and adaptability impose the coordination of multiple players in the region (*Pike et al, 2010*). Paul Krugman's assertion is also noteworthy; regions initially develop, grow and prosper owing to particular path-dependent processes (*Bristow, 2010*). Path-dependence is a notion associated with not only humans but also organisations along with regions, originating from

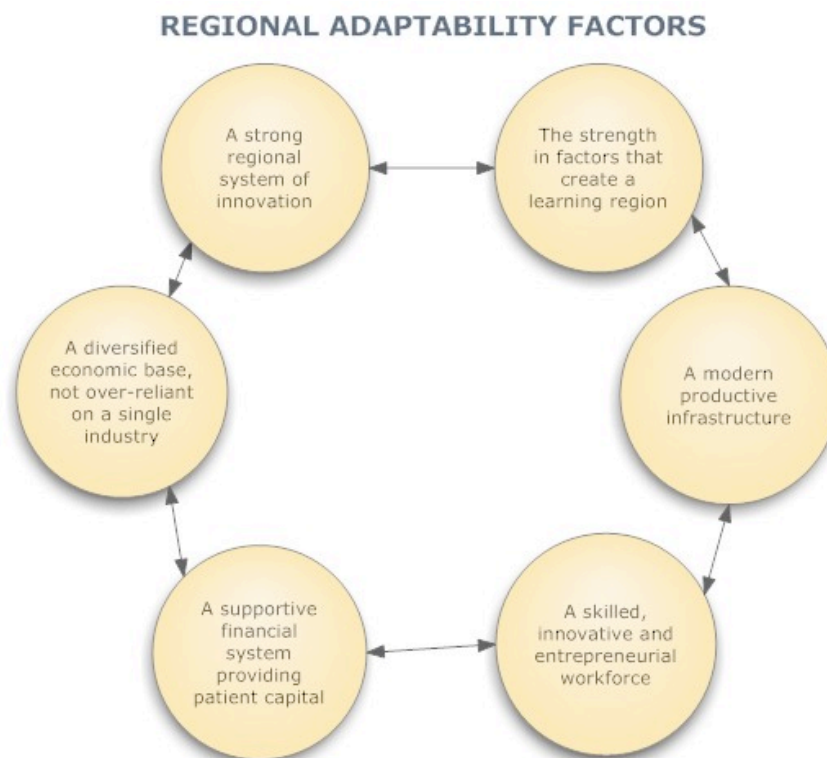
their decisions' total throughout time. *Hassink (2010)* highlights that a path-dependent process grows out of a system's history as well.

Regional economic development relates to various concepts that except path-dependence include lock-ins, path creation, cluster life cycles, co-evolution, sunk costs and the learning region (*Hassink, 2010*). For instance, lock-ins is regarded as functional, political or cognitive obstacles that undermine a region.

*Christopherson et al (2010)*, in their analysis argue that the success of a region can be largely measured by past and current economic growth, plus amending measurements, adaptation, convergence and equilibrium. Therefore, growth, profits and competitiveness are not a panacea for a region to sustain, as it is reconsidered. Region could be seen as a manifestation of human actions and social relations- an approach that introduces the idea of transition through time, space and process.

*Rodgers et al (2010)* claim that this is when a region should consider its strengths and build on them its economic development strategies. Likewise, *Durkin (2010)* concludes that it is important for the region to be able to identify its own assets.

But what are the factors that enable a region to adjust and adapt over time? *Christopherson et al (2010)* present a multi-pillar framework consisting of such factors. (*Figure 1*).



**Figure 1** The regional adaptability factors

In addition, *Hassink (2010)* declares that regional adaptability involves history and economic geography, recognising the importance of place-specific elements plus the processes to explain broader spatial patterns of technology evolution. Economic geography handles the economic landscape and its transformation over time and *Durkin (2010)*, pinpoints its vital role in economic geography since each region appears to have its own specialties within the globalised system. Moreover, *Pike et al (2010)* declare that economic geography emphasizes the integral role of socio-spatial relations among the social agents of capital, labour, the state, civil society and power, and politics. Such agents shape and being shaped

by pathways of change. He links the regional economic geography to path-dependence in the same way that *Hassink (2010)* does. Besides, he signifies diversity and variety existing in a region, claiming that these characteristics unfold the trajectories of change.

At this point, *Pike et al (2010)* corresponds to *Christopherson et al (2010)* in terms of identifying specialisation and diversification as a regional advantage which prevents it from over-dependence upon narrow economic base. Diversity proclaims resilience as a crucial strategy focusing on the need for diverse economies that will be less vulnerable in crises and external shocks. Resilience has originally emerged from building upon concepts of ecology, psychology and disaster studies (*Hassink, 2010*). Diversity is the common link of adaptability and resilience. *Clark et al (2010)* claim that natural system models are frameworks for understanding economic growth and distribution. In contrast, *Simmie and Martin (2010)* assert that regional economies may be analogous to ecosystems in certain respects but quite different in other. Nonetheless, there are interesting links between resilience in natural and human environments (*Hassink, 2010*).

There is much to learn from ecology and nature. Life cycles and attributes apply in human systems, imitating historical and geographical past experiences and like *Hudson (2010)* verifies resilience denotes the capacity of ecosystems, individuals, organisations or materials to cope with disruption and stress and retain or regain functional capacity and form.

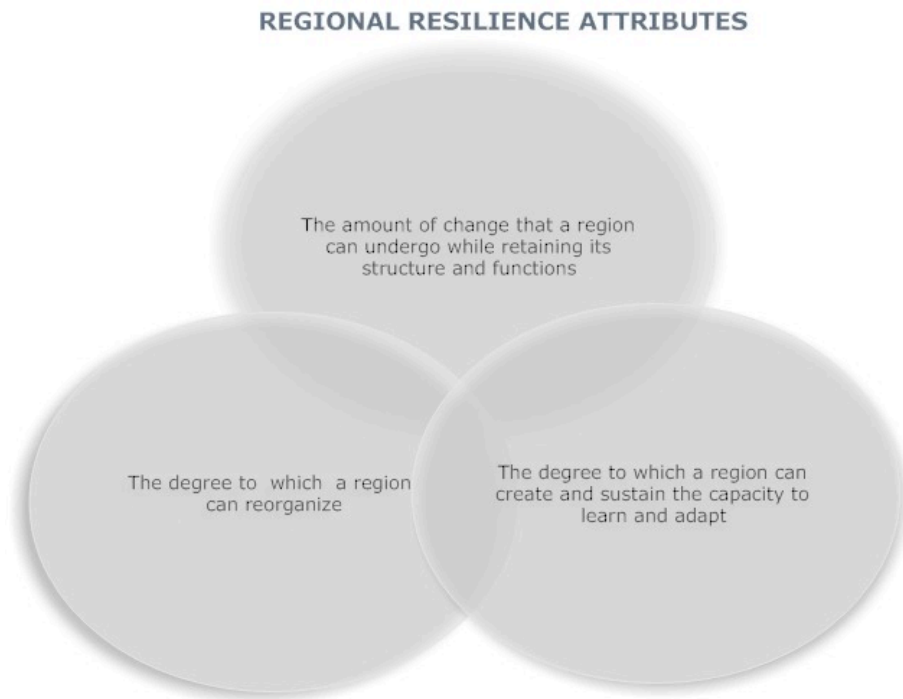
Resilience is not yet accepted as a distinguished notion due to its malleability. It means different things in different cases. Above all it relates to exogenous economic shocks and reflects the region's capacity to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function structure and feedbacks (*Bristow, 2010*). Definitions about resilience are still blurred and contradictory. *Hassink (2010)*, for example, opposing to *Bristow*, insists on the change of structures in a region. He claims that resilience entails decisive action from a region to change its structures and is mostly this, the purpose, rather than adaptation or renewal- prioritising clearly adaptation rather than resilience. Nevertheless, resilience appears to be a much stronger concept for a region, since it has to manage unpredictable change. Hence, a region should prepare to alter its fundamental structures if continuously changing environmental conditions impose this.

*Christopherson et al (2010)* present an appealing approach to the properties of regional resilience, describing it as a socio-ecological system (*Figure 2*).

This figure focuses on three regional characteristics as these were identified: the amount of change, the reorganisation and the learning. Learning is the key factor.

Another approach by *Hassink (2010)* introduces the notion of equilibrium in shock effects and post crisis situations. Here *Hassink (2010)* contradicts *Christopherson et al (2010)* who work on regional adaptability and resilience. The former accepts the regional economic adaptability as the dominant concept and suggests that resilience should be analysed further. However, the ladders adopt the idea of resilience as a process that encompasses rebound, adaptation and recovery. Evidently, the second is a conclusion of a broader view positioned away from the lens of regional growth, competitiveness and similar modern practices. Furthermore, *Rodgers (2011)* identifies that people, organisations, regions, and countries are all subject to a diverse and evolving environment and resilience is essential to a positive response to external shocks.

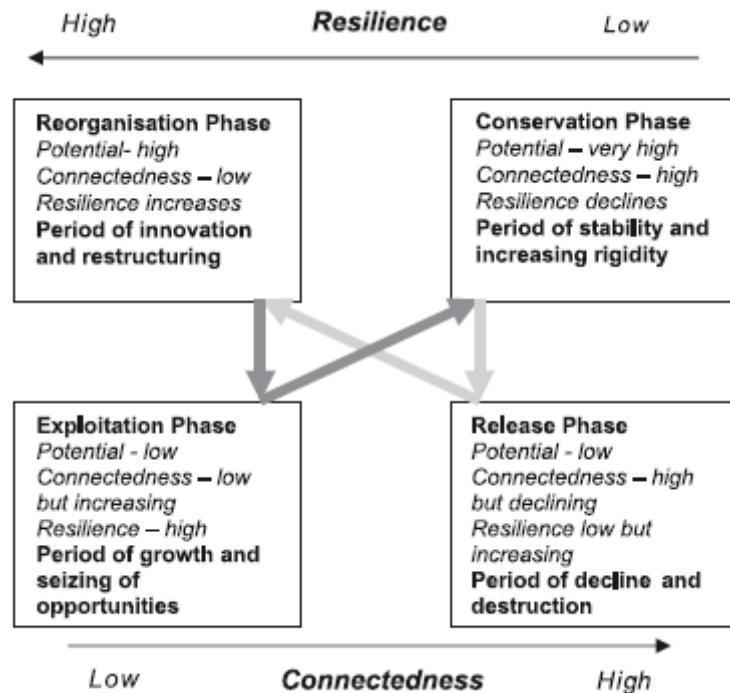
*Clark (2010)* agrees with *Hassink* in that for a region, returning to equilibrium after the shock is anything but natural. Moreover, *Hassink* presents a four-dimension model of resilience which focuses in different types of equilibrium; (a) the back to normal equilibrium, (b) the flip from certain equilibrium to another, (c) the path dependent equilibrium, and (d) the long-term equilibrium. He identifies that resilience was raised as a concept since clusters were proved inadequate to secure sustainability in a region. Although, he is sceptical about resilience admitting that it is relative to the region's learning process.



**Figure 2** The regional resilience attributes

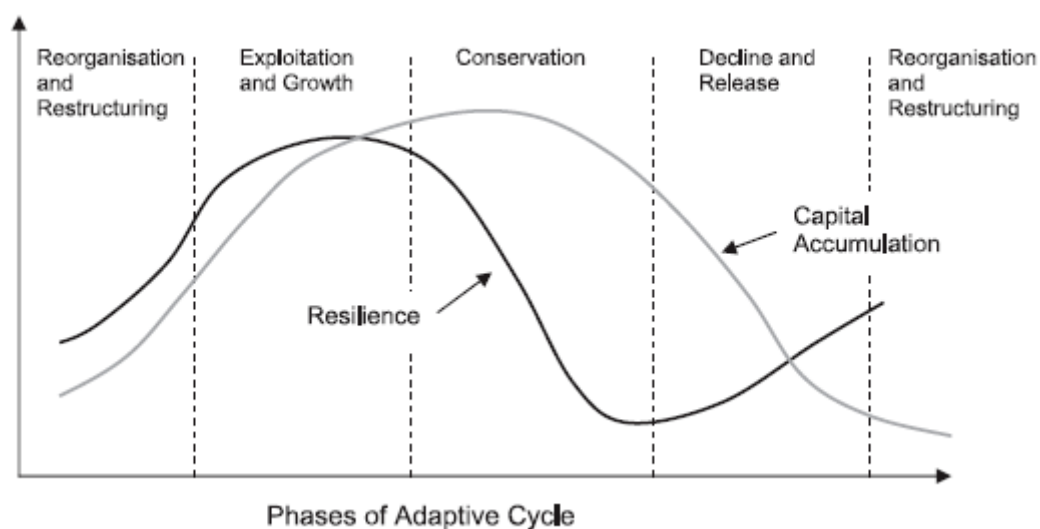
Regarding Hassink's conclusions, on the other hand *Simmie and Martin (2010)* claim that organisations consisting of regional economies are continually changing and adapting to their economic environments. Such changes are driven by the acquisition of new knowledge which makes them unstable. They conclude that there is no space for equilibrators approaches. Simmie and Martin first borrowed the panarchy model from ecological science and adjusted it to regional economic resilience. By combining characteristics they built the following four-phase adaptive cycle model of regional resilience. (*Figure 3*).





**Figure 3** The four-phase adaptive cycle model of regional economic resilience  
 (Source: Simmie, J. And Martin, R. (2010) The economic resilience of regions:  
 towards an evolutionary approach. *Cambridge Journal of Regions, Economy and Society*,  
 3, p. 33)

Below there is a model that represents the system's life cycle. While concentrating on the degree of resilience that the organisation shows in terms of the phase it experiences one can observe the representation of the two dimensions of resilience and connectedness through the phases that a regional economy experiences. Introspective to each phase, there is a varying level of connectedness which is defined by the level of interdependencies among regional members such as local networks of trust, knowledge spillovers, business associations etc. In times of crises where decline and destruction is the norm, connectedness becomes considerably high.



**Figure 4** Resilience as a process: variations in resilience across the adaptive cycle  
 (Source: Simmie, J. And Martin, R. (2010) The economic resilience of regions:

The resilience of a regional economy depends both in the longer or shorter term on processes (*Simmie and Martin, 2010*). The capital accumulation varies through phases as resilience, as seen above (*Figure 4*), and is the total strengths and skills of the region's workforce as well as their capacity to upgrade. Another approach of the four-phase cycle of the system adaptation and change is given by *Pendall et al (2010)* in *Appendix II*.

According to various researchers both adaptability and resilience incorporate the essence of learning. A learning region is actually a resilient region which learns at first how to exploit time, space and process for its own sustainability.

Learning is the key factor in periods of crisis. As *Rosenthal and Kouzmin (1997)* state, crisis is a serious threat to the basic structure or the fundamental values and norms of a social system, which under pressure and highly uncertain circumstances require critical decisions. At this point, we identify common characteristics with resilience recalling what earlier was presented by researchers that dealt with this. Furthermore, *Elliott (2009)* highlighted that the process of knowledge transfer and assimilation, is a key component for the learning framework in an organisation. *Appendix III* contains the mapping of this process. Although local forces or other barriers block learning, learning from crisis directs to knowledge acquisition that depends on regional players, and how they will handle and acclimatize it-which ultimately may be translated into new norms and practices or plain history.

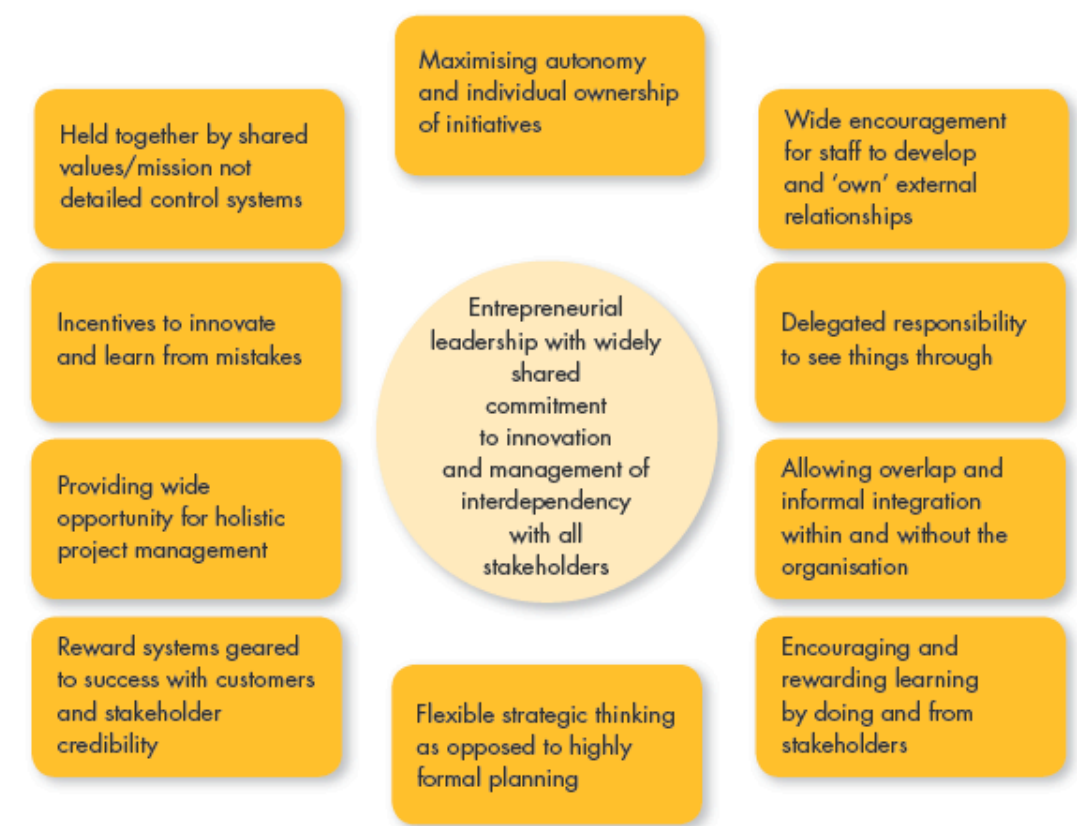
In addition, *Elliott (2009)* characterises integration indispensable to effective learning otherwise its lack would be a barrier. Thus, it is extremely important to define the roles of stakeholders in a region and their interplay. *Veil (2011)* complements that although learning can be beneficial, analysing the crisis after its aftermath, it may lead to hindsight bias. Wrong assumptions will lead you to erroneous learning. The author also recognises three barriers in learning from crisis; (a) the classification with experience where regional players cannot understand the different patterns and signals of crisis, (b) the mindlessness, meaning when players act from a single perspective, (c) the reliance on success, or fake hope, which is based on past successes.

Experience is useful and is considered capital in an organisation. It is actually a component of the social capital. Nevertheless, in a rapidly changing environment, using primarily experience is not always the appropriate technique, as this might retrieve stereotypes that are no longer valid. Moreover, using direct experience in crises situations is rather unrealistic since crises are non-events which do not occur in regular patterns. According to *Rosenthal and Kouzmin (1997)*, crises do not lend themselves to the usual examination of regularities of behaviour and management. Mankind tends to perceive and learn through adopted and accepted frameworks that are mostly experience-based. We perceive what can be understood according to our codification. Managing the unexpected incorporates the practice of thinking beyond limits which provides seeing what others see but do not understand. As *Baran and Adelman (2010)* points out, experience is crucial in developing high-potential employees into effective executives. The administration of crises does not depend exclusively on skilful and experienced managers-the need for learning could be involved. *Baran and Adelman (2010)* propose firstly the vicarious learning, or learning from others who have already experienced crises, secondly simulations, meaning equipping managers with well practiced patterns of problem-solving behaviour, and interpersonal communication training, focusing on being receptive in all viewpoints and acting quickly.

Failing to learn, organisations and regions will continue to incubate vulnerable pathways, which enable potential for disasters. Crisis management refers to the self-incubating crises caused by people's faulty assumptions and wrong interpretations (*Elliott and Smith, 2006*). Many researchers (*Elliott et al, 1997; Milasinovic et al, 2010; Elliott and Smith, 2006*) also agree that the promotion of wider learning on crises situations should be embedded in a new adapted culture especially when we are referring to a region.

Regions encompass the regional stakeholders who are the living capital that enables or blocks the region's resilience. Academic institutes are considered as regional players since these may harness learning. They may as well operate as an integrator of the regional different powers trying to merge their dynamic and outward the derivative. *Rodgers (2011)* claims that Universities should ensure that they provide regional economic benefits from the knowledge they produce.

In a sense, learning process, if administered successfully, could be transformed to wisdom. Wisdom could provide the basis for resilience. This may be cultivated by an active, risk-taking, innovation-oriented and entrepreneurial focused academic institute. Not all institutes are capable to undertake such responsibilities. Normally the issue raised is how an academic institute could be reality-based. *Penaluna and Penaluna (2008)* state that the interaction of an academic institute with the creative industry infiltrates business insight in the institute. An entrepreneurial institute is accustomed to perceiving signals through market lens. There are paradigms and models raised on this tendency; *Gibb et al (2009)* in their paper on meeting the entrepreneurial development needs of higher education institutions, presented the characteristics that the university should demonstrate as an entrepreneurial organisation (*Figure 5*).



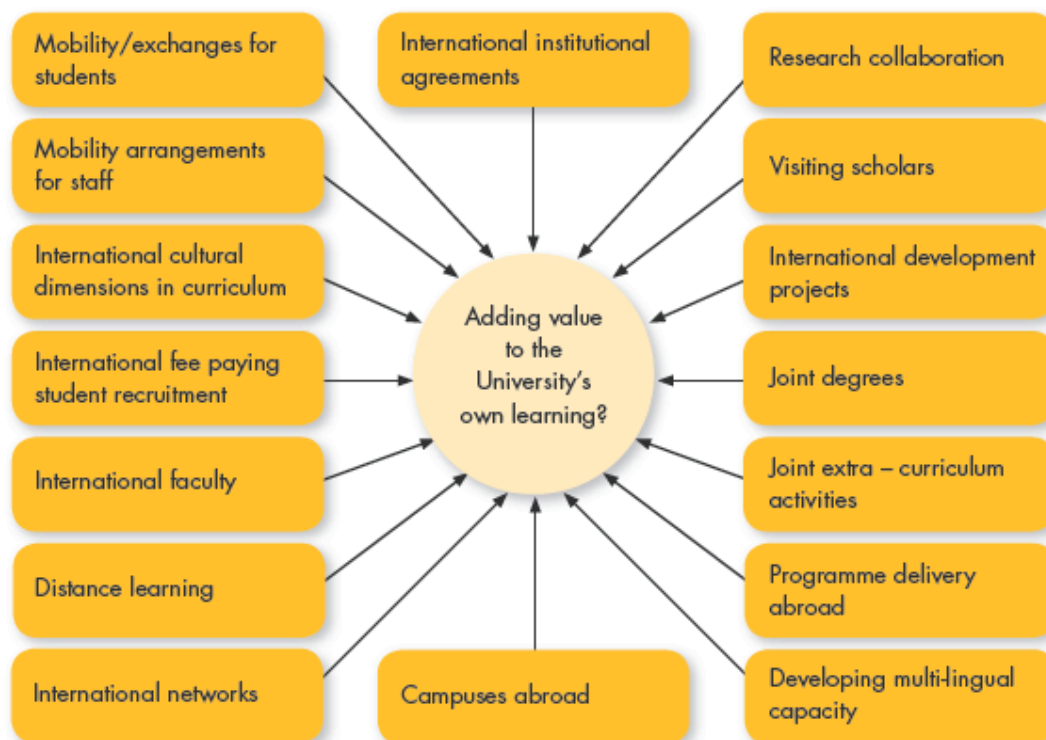
**Figure 5** The University as an entrepreneurial organisation (characteristics)  
 (Source: Gibb, A. et al (2009) Leading the entrepreneurial university:  
 Meeting the entrepreneurial development needs of higher education institutions.  
*The National Council for Graduate Entrepreneurship*, October 2009, p. 17)

The entrepreneurial institute operates beyond business, bureaucracy and planning processes. It is not strict "marketisation" but it aims to bring the professional "managerialism" into the academic environment. Beliefs like brand equity and customer loyalty are equally

important to its contribution that resides in the interaction with stakeholders and the extroversion to the region.

Another example, introduced by *Rache and Escudero (2009)*, presents the model of Principles for Responsible Management Education (PRME), an innovative initiative for leading the change by academic institutes. Management education promotes corporate responsibility within the institute and in extent in the region that this operates. It functions as a pole which administers achievements and failures to lead change and confront challenges.

An institute with international standing and global knowledge configuration aggregates the characteristics that are necessary to pilot change. In *Figure 6*, *Gibb et al (2009)* present a model institute which among others introduces the component of learning as a core process.

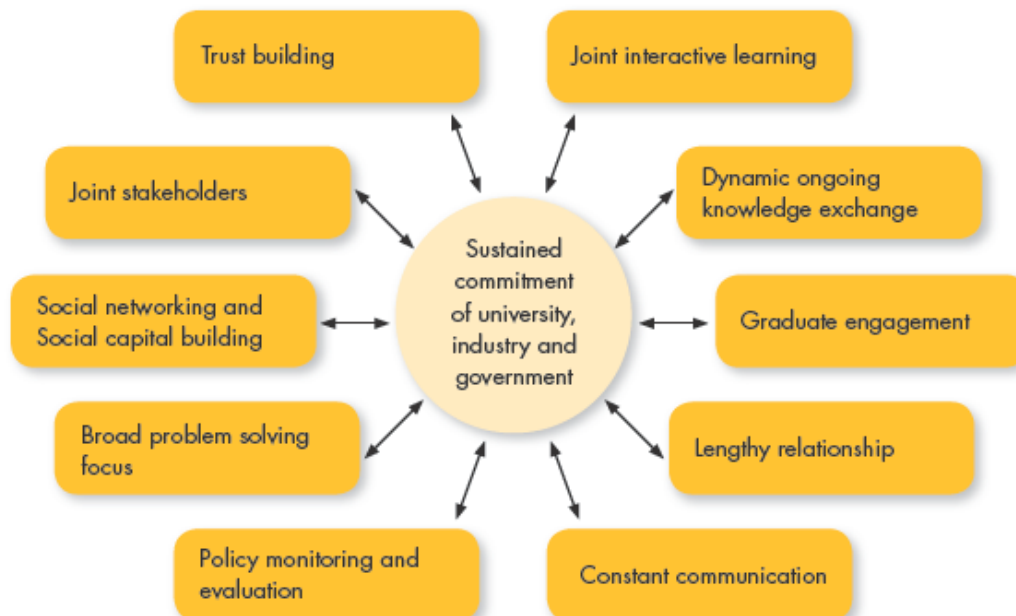


**Figure 6** Activities and Processes involved in university internationalisation  
(Source: Gibb, A. et al (2009) Leading the entrepreneurial university:  
Meeting the entrepreneurial development needs of higher education institutions.  
*The National Council for Graduate Entrepreneurship*, October 2009, p. 10)

It is a good starting point for a region to use the above model and identify the suitable institutes that could undertake the initiative to regenerate the region.

What's more, another interesting model, introduced by *Huggins et al (2008)* sets up the regional economic development through the increased interaction across government, business and higher education sectors. Known also as the “triple helix”, it focuses on the production of new forms of collaboration and partnership to drive forward regional development. State, industry and academia are regional players that interrelate through knowledge and learning but not necessarily progress under the common perspective of consensus and joint-up objectives. In a sense, this supports or not the localised network approach. Not all three players are underestimated. But the importance of a learning and entrepreneurial academic institute could constitute the break-even point for achieving change.

*Gibb et al (2009)* once more approached the “triple helix” from the academic institutes’ perspective. They emphasize that universities have the power of knowledge diffusion; therefore they can play a stronger regional socio-economic role (*Figure 7*).



**Figure 7** Higher Education, Government and Private Sector Partnership (the basis of the triple-helix model)

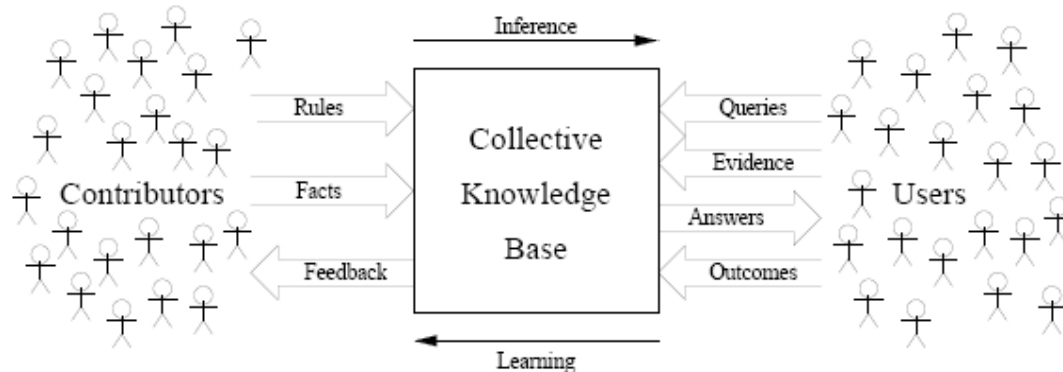
(Source: Gibb, A. et al (2009) *Leading the entrepreneurial university: Meeting the entrepreneurial development needs of higher education institutions. The National Council for Graduate Entrepreneurship*, October 2009, p. 13)

The main component though for all parts in this common effort is commitment. Similarly, *Bramwell and Wolfe (2008)* concluded that universities could generate value in the regional economy by applying techniques to attract talents, provide support to the industry and exchange knowledge.

According to *Lessard and Brassard (2010)*, governance is partly a means of conceiving the building of politics based on a network of organisations and actors who move about various political arenas, be they local, central or intermediate. Governance implies that someone plays the role of the regulator in a network of participants given the fact that it administers the most valuable resources. In a resilient region the most valuable resource is learning. Therefore, a successful regional regulator is expected to redistribute learning, integrate all groups and increase the power of resilience in the region. Legal framework may be an obstacle to this; legislation is recognized by various researchers as the leading issue in making a region capable of self-tuning its powers (*Huggins et al, 2008; Lessard and Brassard, 2010*). But if the decision’s circle incorporates more players, it validates the legitimacy of the final decision.

Modern practices of sharing knowledge and diffusion of learning include the use of knowledge bases, mass collaboration, crowd sourcing or even the living labs. *Richardson and Domingos (2003)* some years ago identified that acquiring knowledge prevented the rapid spread of various systems. Nevertheless, the internet made it possible to build knowledgeable communities and foster learning, especially under the consideration of

serious motivation. A core model of bringing together users (the public) and contributors (regional players) is presented in the next figure (*Figure 8*).



**Figure 8** Input-Output view of a collective knowledge base  
(Source: Richardson, Matthew and Domingos, Pedro (2003) Building large knowledge bases by mass collaboration. *Journal of ACM (K-CAP'03)*, p. 3)

Following this model, social networking and social media applications could be a stepping stone for reaching the desired level of intercommunication and sharing of knowledge among regional members.

Another instrument for the academic institute to diffuse learning and coordinate powers could be the living labs which can be seen as user-driven open innovation environments (*Guzman et al, 2009*). They are open innovative environments in real-life settings, where user-driven innovation is fully integrated within the co-creation process of new services, products and societal infrastructures in a regional harmonized context (the “Open Innovation Functional Region”) catalyzing the synergy of SMEs Collaborative Networks and Virtual Professional Communities in a Public, Private, People Partnership (*Appendix IV*), (*Santoro and Conte, 2009*). As *Bergvall et al (2009)* defined, a living lab is user-centric innovation milieu built on everyday practice and research.

Moreover, there are additional technological potentials to administer and collaborate such as Communities of Practice (CoPs) which have a more business-to-business approach and interaction. A contemporary way of exchanging knowledge and create instantly expert communities under a common motive and a common target.

## 4. Proposal of a solution

This paper is an endeavor to bring forth and introduce a different role for the entrepreneurial academic institute in times of crisis, taking into careful consideration various analyses and findings of researchers.

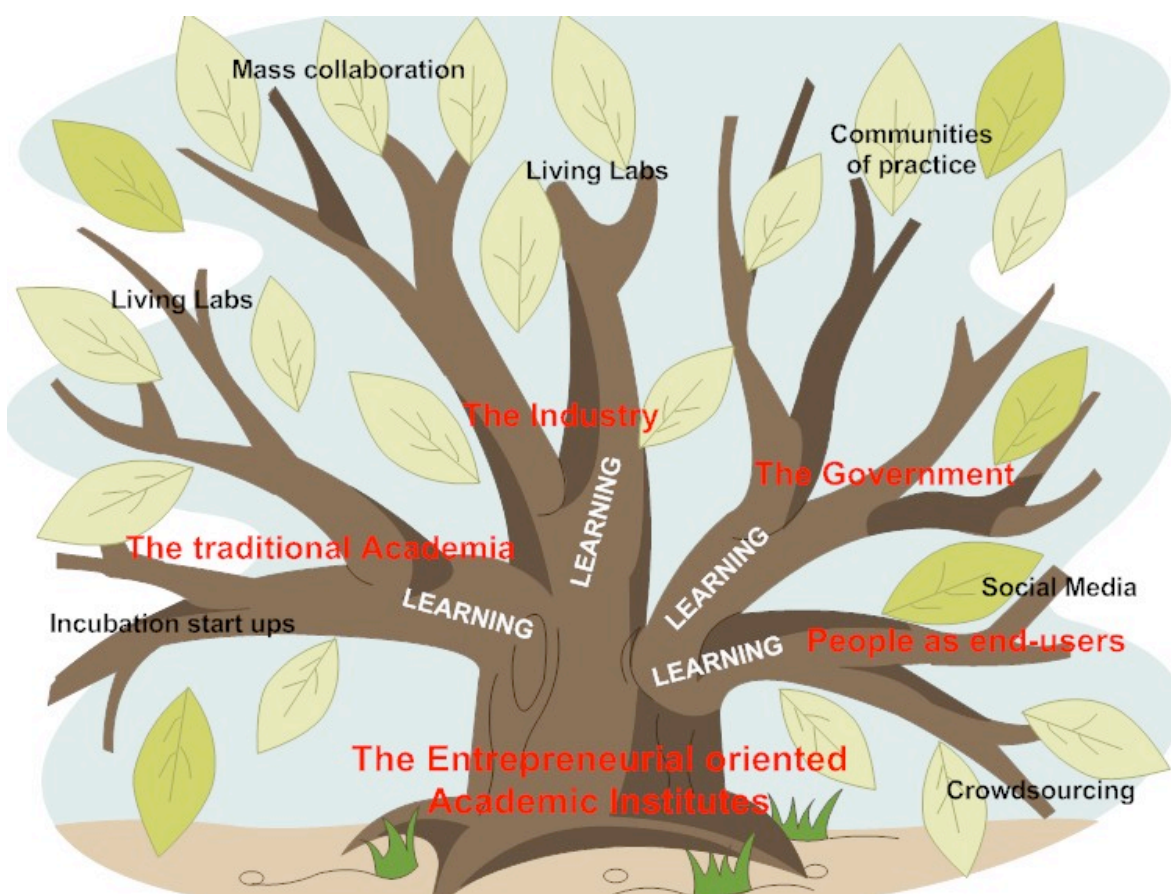
The learning commercialisation activities could be at the upfront in a region, administered by the regional academic institutes which among others could undertake the role of the integrator. Times of crisis, even if their duration is blurred and prolonged, could be seen as opportunities for repositioning and changing of roles.

As concluded in earlier sections, crises jeopardise the structures of an entity (organisation, region, a human being, etc.) and place the status quo- meaning mostly the widely approved elites in various stress tests. Although not universally agreed as a separate concept yet and commonly adopted by natural sciences, resilience seems to cover the gap between what



happens during and after a crisis situation. Crisis management deals mostly with specific processes that derive from what we could learn from such situation, how we can cope with it and possibly a fixed repertoire of predefined reactions according to what have learned so far. But in a constantly changing environment, it is almost certain that series of crises are expected to be part of the coming future. Emergent powers and hidden opportunities in various aspects are volatile and unpredicted. Therefore, it may be an option for a region to re-consider first, the creation of a flexible structured community framework (non-structured region or changing-structured region).

Repositioning lead by an academic institute means that it will establish the new resilient framework upon which regional players will interrelate aiming in transforming the region to a metropolis of learning. A learning region is a resilient region. The academic institute will secure the interconnection and handle the modern social media and networking to infuse learning and empower local players to innovate (*Figure 9*).



**Figure 9** Education Governance and Regional Resilience

The figure above portrays the regional approach of achieving resilience with the lead of academic institutes and the contribution of modern technology. Even in periods of crisis, when external shocks and threats enforce the essence of uncertainty, the region could follow rules of nature, ignore growth and competitiveness adopt social concern and remain resilient in the transition period. Actually this model could be considered as the region's knowledge infrastructure methodically incorporating policies and coordination among players.

Finally, the region could exploit a diversified repertoire of services and products, based on common learning and coordination through a network of knowledge infrastructure administered by the local academic institutes towards resilience.

## 5. Conclusions

In an era defined by an entrepreneurial knowledge-based economy, academic institutes have become central to their regions (Nelles and Vorley, 2010). An entrepreneurial academic institute demonstrates response to the market structures and the use of knowledge. Being the center for learning, it can redistribute the regional business intelligence. Resilience encompasses adaptability, change, sustainability and incorporates the flexible structures through time which guarantee the existence, the rebound and recovery. Recovery though does not necessarily mean bringing back equilibrium. At this point, we could recall what the first priority was for the designers of ARPNET, the ancestor of internet; their idea was to create a non-structured network which should be linked but independent at the same time so as to make it resilient and easy to recover no matter the level or the nature of damage.

In crises, a region could be prepared to appoint effortlessly the specific pole to undertake the repositioning and lead the region through resilience to sustainability at no growth, with no competitiveness but with cohesion and consensus among its stakeholders. This may probably be the blue ocean for a region in periods of flux, when it tries to stay resilient and working from the inside to secure its own assets, strengths and learning capital.

This paper is acquainted with the idea that entrepreneurial academic institutes could play the leading role in their regions. Since learning is the component in demand these days, non-traditional academia could take the lead and bring together different powers. The means should be modern channels of communication and knowledge sharing. Building a technology-oriented community and administering the recycling of knowledge throughout the participants, would direct to learning as the common component.

Academic institutes should realise their broader socio-economic potential.

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## Appendix I

### Characteristics of crises

#### *Characteristics of traditional crises*

- A known, isolated event, within the framework of conventional hypotheses;
- The situation is perceived as manageable (technically, economically, socially);
- Costs are relatively easy to calculate, while recovery is possible in the context of already tried systems;
- Limited duration;
- Codified intervention procedures with which specialists are well acquainted;
- Limited number of interveners, all of whom are specialists for one aspect of the problem;
- Clearly defined roles, responsibilities and hierarchy, known to the agencies of intervention.

#### *Characteristics of the modern crisis*

- Great consequences (effects), affecting a large number of people;
- Large economic price, overwhelming the capacities of classic insurance systems;
- Without precedent (new), generic and combined problems that affect vital resources;
- An avalanche-like dynamic due to multiple resonating phenomena;
- Poor response on the part of emergency systems, obsolete, inapplicable, even counterproductive procedures;
- Extreme uncertainty, which does not lessen during the entire crisis period;
- Long duration, with threats that change over time;
- Convergence, i.e. a large number of actors and organizations appear on the scene;
- Critical communication problems: with responsible organizations, the public, the media, victims;
- Significant dangers of all kinds.

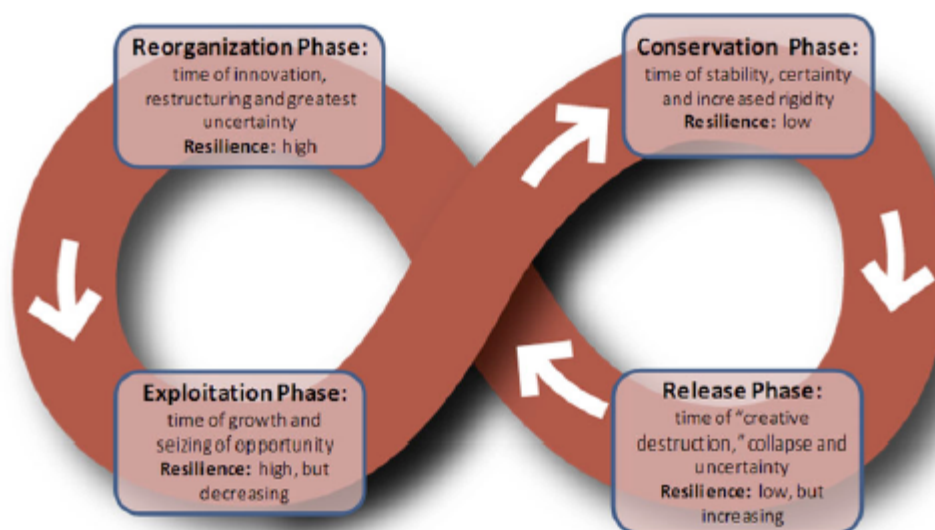
#### *Characteristic of future crises*

- Existence of a pre-crisis and a post-crisis time, with irreversible change;
- Breakdown not caused by a single specific event, with a global resonance of various forms;
- Basic procedures, as well as those that are usually not questioned, are no longer applicable: e.g. fundamental principles, identities, contexts, actors, rules of the game, defense mechanisms, knowledge – all these tools must be reconsidered and problematized;
- Breakdown brings repeated, increasingly frequent crises that suddenly crystallize, occur and disappear in a seemingly incomprehensible and random manner;
- Strongly and deeply rooted in the system's imbalance, breakdowns are even more resistant to conventional treatment;
- Since "decomposition" is the most conspicuous, the prevailing impression is that of a general process of decoupling, of disintegration that is almost impossible to stop;
- Breakdown permeates the entire field of operations. Fundamental problems react in concert, preventing all isolated treatment. There is a sense of loss.

(Source: Kesetovic, Z. and Nadic, D. (2010) The Power and Impotence of Crisis Management in facing Modern Times. *Scientific Review Paper Megatrend University*, 7(2), p. 273-290)

## Appendix II

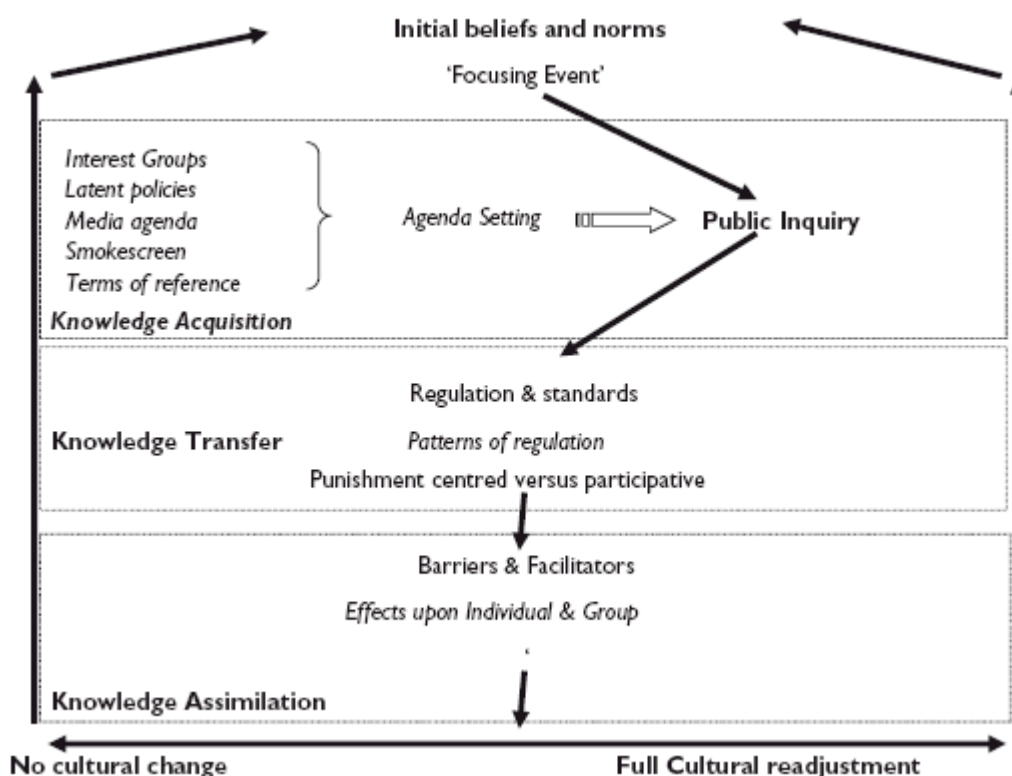
### The four-phase cycle of system adaptation and change



(Source: Pendall, Rolf et al (2010) Resilience and regions: building understanding of the metaphor. *Cambridge Journal of Regions, Economy and Society*, 3, p. 76)

## Appendix III

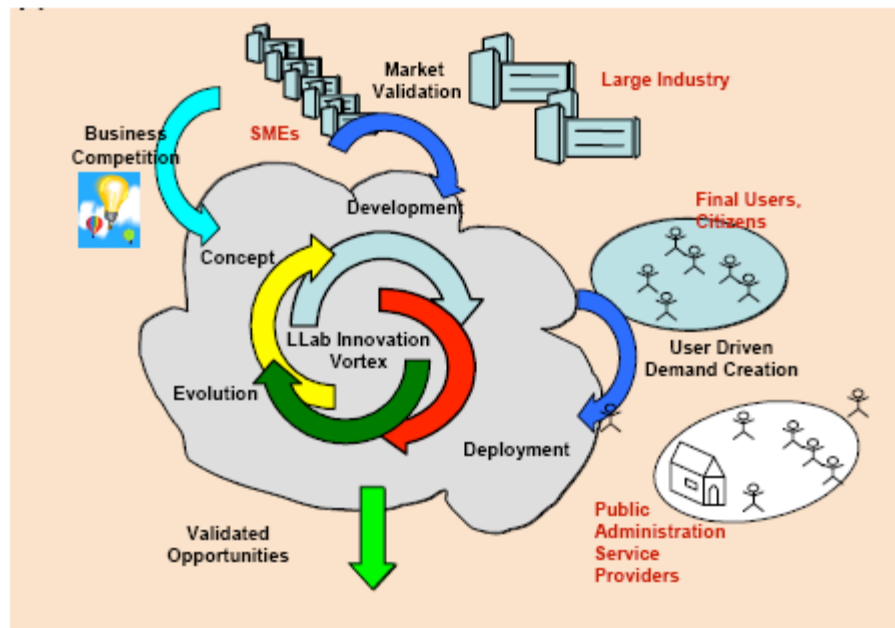
### Mapping the process of organizational learning from crisis



(Source: Elliott, D (2009) The Failure of Organizational Learning from Crisis – A Matter of Life and Death? *Journal of Contingencies and Crisis Management*, 17(3), p. 159)

## Appendix IV

### The Living Lab operation phase: Actors and Roles



(Source: Santoro, R. and Conte, M. (2009) Living Labs in Open Innovation Functional Regions. *Proceedings of the ESoCE-net, White Paper*, p. 8)

# Empirical Evidence on Innovation Output and Economic Performance in Slovenian Manufacturing

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The research investigates into the specifics of the relationship between the company's innovation outputs and its business performance in the case of Slovenia's medium-size and large manufacturing companies. More specifically, the following research question was set: how is the proportion of revenues arising from innovation related to the company's financial results? A positive correlation between the ability to successfully launch new products and the sustained economic performance has been confirmed in a number of studies, in spite of the various hampering factors which have an impact on innovation. However, pursuant to the national statistical data, only 35% of Slovenian companies prove to be active in innovation, 41% of these in the manufacturing sector – in spite of the breadth of the Eurostat definition of an “innovative company”, i.e. a company with “some” propensity to innovate. Official statistics also indicates that large enterprises tend to innovate more than small and medium-sized enterprises (SMEs). However, our research shows that as much as 56 % of the Slovenian population of large and medium companies are non-innovative (i.e. having no revenues from innovative products in the previous three years). Furthermore, smaller companies tend to be more innovative as larger ones. As regards the subset of innovative companies, they do not necessarily show a better economic performance. In the case of hi-tech manufacturing, the innovation leaders' economic performance is lower than in the case of both the innovation followers and the non-innovators. The proposed paper shows an empirical investigation of the above findings.

## **Keywords**

Innovation management, low-tech, hi-tech, Eurostat, productivity, value added

## **1. Introduction**

The present research focuses on an improvement of innovation performance in companies and addresses two problems. In developed countries, many research results showed positive influence of innovation activities on business results of Hi-Tech companies. Moreover, examples of best practice are often transferred from Hi-Tech sector into Low-Tech one. However, even though national strategies often promote the development of Hi-Tech industries, such industries only yield 3% of value added in the OECD economies. The question which is not well researched is how to manage innovation processes in companies as to the level of their technological development level. As there are considerable differences between Low-Tech and Hi-Tech companies, the innovation management models used for Hi-Tech companies are not always directly transferable to Low-Tech ones. The additional

challenge is connected to Hi-Tech companies in Slovenia (a case of country in transition), where most innovative companies fail to achieve apposite business results.

The second research challenge is related to statistical data. The Community Innovation Survey for Slovenia [1] represents the basic statistical instrument for innovation performance measurement in the EU countries. The survey data have an advantage in being obtained from a significant part of all companies (since the completing of questionnaire is compulsory). Besides, the methodology is standardized around Europe and relatively well known among respondents/companies. However, it is aimed primarily at benchmarking at a country level. Therefore, the data have only a limited applicability for the studies focused on innovation relations at a company level. Our research aims at developing a methodology which would enable the use of EU statistical data on innovation at the micro level and, based on the use of these data, to identify factors affecting the companies' innovation performance.

Two main objectives of our research are as follows: i) to develop a methodology enabling the use of EU statistical data on innovation for studies at the micro (company) level and ii) based on the use of these data, to identify the relation between innovation inputs and innovation performance as regards the companies' technological level.

## 2. Methodology

The research was performed in all Slovenian 624 medium- and large-size companies operating in the manufacturing sector. Groups of Low-Tech (actually Low and medium Low tech) and Hi-Tech (High and medium High tech) were created according to standardised Eurostat/OECD classification [2] (Table 10). Firstly, we performed a structural analysis of both groups to verify whether they should be analysed separately.

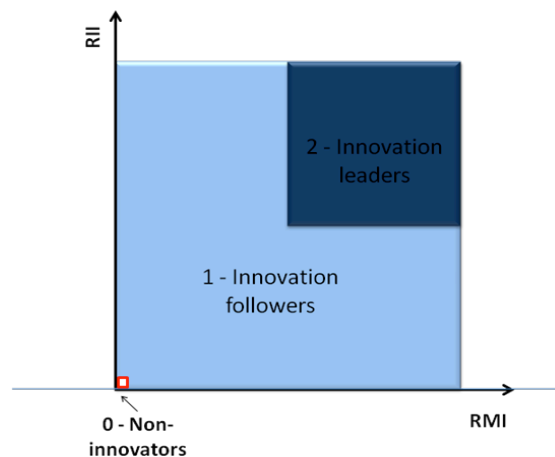
**Table 10** Structure of the sample

	<b>Total number of companies</b>	<b>Non-innovators (N)</b>	<b>Innovation followers (F)</b>	<b>Innovation leaders (L)</b>
Low and medium-low technological manufacturing (Low-Tech)	442	235	178	29
High and medium-high technological manufacturing (Hi-Tech)	182	69	95	18
<b>Total</b>	<b>624</b>	<b>304</b>	<b>273</b>	<b>47</b>

Within each of these groups, the two key variables that represent a measurable output from the innovation process were defined as: RII ("Index of revenues from innovation"), i.e. a proportion of total turnover resulting from innovations (either new to the market or new to the company only), and RMI ("Index of revenues from market innovation"), i.e. a ratio of turnover from innovations new to the market to total innovation turnover. The values of the output indices served as criteria for grouping the companies. Accordingly, three groups were formed: Non-innovators (N), Innovation Followers (F) and Innovation Leaders (L) as shown in Table 10, i.e. companies having a high (above median) proportion of turnover from innovations and a high (above median) proportion of turnover from "radical" innovation in total innovation turnover (high RII and high RMI) as presented in Figure 7. A methodology is described in details in [3].

In the first phase of our research, innovation groups were in pairs compared with non-parametric tests (Mann-Whitney's, Kruskal Wallis's and Pearson's chi-square test was applied as per the type of data) in order to establish in which variables the groups significantly differ. We compared: (i) relation between their innovation and business results, (ii) scope and productivity of their innovation investments, and (iii) organizational structure of innovation.

Next, non-parametric tests were complemented with Spearman in Pearson correlation analysis between RII and RMI variables and other influencing variables so as to obtain a clearer picture as regards factors influencing innovation and business results.



**Figure 7** Division into Non-innovators (N), Innovation followers (F) and Innovation leaders (L) per each of the two groups of companies

### 3. Results

So as to establish whether a pattern of analyzed companies may be addressed as a whole or to confirm that structural differences among groups of companies are so significant that they need to be analyzed separately, analysis of variance was performed. We compared both groups pursuant to 80 variables of innovation factors, innovation and business results, which were selected from a set of all available variables.

Out of 80 variables the Low-Tech and Hi-Tech groups significantly differ in 39:

- Out of 42 variables of innovation factors the groups differ in 22.
- Out of 13 variables of innovation factors the groups differ in 10.
- Out of 25 variables of innovation factors the groups differ in 7.

Based on these results, it may be concluded that separate analysis of Low-Tech and Hi-Tech companies is essential.

#### 3.1 Innovation expenditure level

Results indicate that innovation expenditure as a proportion of revenues from sales ("investments in innovation") (Table 11) significantly differ both a) between sectors of industry and b) between dissimilarly innovative companies within a particular sector of industry.

- Hi-Tech companies invest a higher proportion (3.48 %) than Low-Tech (1.94 %)
- Innovative companies in both sectoral groups invest in innovation substantially higher proportions of their assets than non-innovative companies. Innovative processing companies invest three- to fourfold more into innovation than non-innovative companies. As regards comparison of innovation followers and innovation leaders, the groups in the Low-Tech category prove to be similar, while the innovation leaders in the Hi-Tech category invest in innovation half as much as the innovation followers.

Processing companies invest 2.30 % of their revenues from sales in innovation on average. Companies in group N invest less than 1 % of their revenues from sales in innovation, while the remaining groups invest 3.7 or 4.5 %, respectively. More substantial innovation investments thus coincide with enhanced innovation results (higher values of RII and RMI).

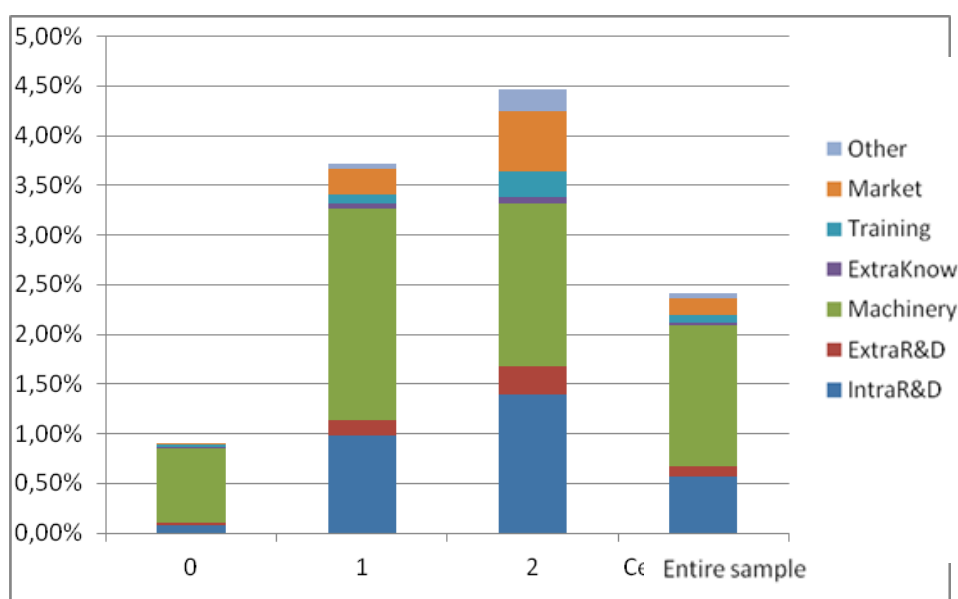


### 3.2 Innovation expenditure structure

As per scope, investments in the acquisition of machinery and equipment, necessary for creating innovations, prevail and exceed a half of all assets invested in innovation (Figure 8). The companies invest slightly less than a third of their assets into R&D (intramural and extramural), while the remaining part is predominantly invested into training and marketing of innovations.

**Table 11** Categories of expenditures

Variable	Abbreviation
Intramural R&D expenditure / Net revenues from sales 2006	IntraR&D
Extramural R&D expenditure / Net revenues from sales 2006	ExtraR&D
Expenditure in acquisition of machinery, equipment and software / Net revenues from sales 2006	Machinery
Expenditure in acquisition of other extramural knowledge / Net revenues from sales 2006	ExtraKnow
Expenditure in training / Net revenues from sales 2006	Training
Expenditure in market introduction of innovations / Net revenues from sales 2006	Market
Expenditure in other preparations/ Net revenues from sales 2006	Other



**Figure 8** Structure of investments as per innovation groups, processing sector of industry

The structure of investments differs as per groups of dissimilarly innovative companies. Considering modest investments of non-innovative companies, the comparison of investment structure between innovation followers and innovation leaders seems reasonable. If particular categories of expenditure are joined logically, it may be summarized that:

- in the Low-Tech group the innovation leaders invest more in creating intellectual property than the innovation followers (index 2.00), while the proportion of technological investments is lower (0.69) and investments in marketing of innovations higher (1.86),
- in the Hi-Tech group the innovation leaders invest more in creating intellectual property than the innovation followers (index 1.67), the proportion of technological investments is also higher (1.20) as are the investments into the marketing of innovations (2.40).

### 3.3 The efficiency of exploiting invested assets

Beside the amount of investments into innovation, the efficiency of exploiting these assets also influences on the revenues from innovation. As demonstrated, the innovation leaders invest more into innovation than the innovation followers, and at the same time transform these investments into revenues more efficiently (higher 1/CRIT). In the group of innovation followers, the company with one invested Euro into innovation creates €1.6 of revenues on average in Low-Tech or €1.9 in Hi-Tech group, while in the group of innovation leaders €14.3 of revenues in Low-Tech and €7.7 in Hi-Tech (Table 12).

**Table 12 The proportion of investment expenditure in revenues from innovations (CRIT) and the ratio between created Euros of revenues as per every invested euro (1/CRIT (average)) as per groups**

	Innovation followers (F)					Innovation leaders (L)				
	Average	Median	N	StDev	1/CRIT	Average	Median	N	StDev	1/CRIT
Low-Tech	62%	12%	175	216%	1.6	7%	4%	29	9%	14.3
Hi-Tech	53%	14%	95	111%	1.9	13%	11%	18	11%	7.7

### 3.4 Economic results of innovation

In the case of Low-Tech, the innovation leaders are economically more successful than the followers and non-innovative companies. Companies appertaining to the group of innovation leaders record the fastest growth. Net revenues of this group grow the fastest of all the groups in all analysed periods (07/06, 08/07, average growth 08/06). Furthermore, the number of employees in the period 06/08 grows in the group of innovation leaders, while decreases in the other two groups. Innovation leaders are more profitable (the highest recorded ROE, ROA), whereat ROE in the period 06/08 also grows the most rapidly. Finally, the innovation leaders record the highest growth in wages and salaries, and together with the innovation followers also a third higher gross value added per employee (2008) than the companies not active in the field of innovation.

In the case of Hi-Tech, the innovation leaders are economically less successful than the innovation followers and non-innovative companies. As to the revenues per employee the innovation leaders perform slightly better than non-innovative companies and roughly similarly than the innovation followers, whereat as the only one of the three groups they record negative average growth in revenues per employee in the period 06/08. All groups in Low-Tech record a drop in ROE in the period 06/08, whereat the innovation leaders record the most substantial drop (given that also ROE (as well as ROA) prove to be the lowest in the group of innovation leaders). Innovation leaders achieve similar gross value added per employee (2008) as the other two groups, yet the lowest growth in wages and salaries. More indicators (equity, assets, wages and salaries) indicated above average or at least an average increase in the group of innovation leaders in the period 06/07, yet this growth proves to be below average in the entire analysed period (06/08).

### 3.5 Innovation profiles of both company groups

In both groups of processing companies (Hi-Tech, Low-Tech) the value (€) of revenues created by a company with one EUR of innovation expenditure (1/CRIT) is substantially higher (more favourable) with the innovation leaders than innovation followers. In Low-Tech group the innovation leaders record eightfold higher value than the innovation followers, while in the Hi-Tech group only fourfold higher. In Hi-Tech sector the transition from the

group of followers into the group of innovation leaders thus requires more substantial investments and generates poorer results than in the Low-Tech sector. Advancement into the group of innovation leaders thus proves “easier” for the Low-Tech group than for the Hi-Tech one. Innovation leaders in the Low-Tech group record better business results than the innovation followers, which means that endeavours towards the advancement into the group of innovation leaders in the case of Low-Tech sector may generate good results (also financial) relatively faster.

### **3.6 Group of Low-Tech companies**

Revenues from innovations as to the total revenues (RII) of the reference group of innovation leaders account for 50.4 %, which is 2.6-times more than in the group of innovation followers. Revenues from innovations new to the market as to the total revenues from innovations (RMI) of the reference group account for 72.9 %, which is 2.2-times more than in the group of innovation followers.

Innovation expenditure in the reference group accounts for 7 % of revenues from innovations. A company with one euro invested on average in innovation generates EUR 13.4 of revenues. The innovation leaders are on average eightfold more efficient in exploiting their assets for innovation than the innovation followers.

Approximately a half of investments is allocated for technological equipment, a quarter for intramural R&D, 5-10 % for marketing activities and training, and the remaining of investments for less important factors.

In order to achieve positive business results innovation co-operation proves important for the companies in the Low-Tech group. The companies which record lower ratio between intramural and extramural R&D expenditure (i.e. invest more into extramural performance of R&D activities) achieve (statistically significant) higher ROE.

In this sectoral group different forms of intertwinement of innovation activities of the company with innovation activities of other companies prove to be the most important innovation factors, i.e. co-operation of the entire supply chain (suppliers, customers) in the innovation activities of the company as well as the co-operation with public R&D institutions (including universities and other higher education institutions and governmental or public research institutions). Weakness of proper development in this sector of industry dictates a search for external partners; to a great extent it is probably the case of the search for partners which operate at higher technological levels.

Development activities of suppliers or their innovations in the field of materials and machinery represent the basis for the development of their own innovations for the company in the Low-Tech sector. Of course, such innovations are generally not regarded as breakthrough innovations since new material and equipments are concurrently available to all competitors in the sector.

### **3.7 Group of Hi-Tech companies**

Revenues from innovations as to the total revenues (RII) of the reference group of innovation leaders account for 50.5 %, which is 2.4-times more than in the group of innovation followers. Revenues from innovations, new to the market, as to the total revenues from innovations (RMI) of the reference group account for 76.5 %, which is 2.7-times more than in the group of innovation followers.

Innovation expenditure in the reference group accounts for 13 % of revenues from innovations (CRIT). A company with one euro invested on average in innovation generates EUR 7.8 of revenues. The innovation leaders are on average fourfold more efficient in exploiting their assets for innovation than the innovation followers.

In the reference group of innovation leaders (2) the total investments in innovation account for 6.82 % of revenues from sales. Comparison of relative structure of expenditure indicates that the relative share of investments into machinery and equipment (as to the total innovation expenditure) decreases with an increase in innovation, while the share of investments into training and marketing of innovations increases.

The majority of investments are not directed into technology as in the Low-Tech group, yet in the creation of intellectual property (investments into intramural R&D (34.3 % of all investments), extramural R&D (6.8 % of all investments), training (6.5 % of all investments) and acquisition of other extramural knowledge (e.g. patents, licences – 1.9 % of all investments)). Furthermore, investments in marketing of innovations prove to have a substantially greater importance than in the Low-Tech group (1.15 % proportion of revenues from sales or 16.8 % of all investments).

Comparing the Low-Tech with the Hi-Tech sector, proper innovation proves considerably more important in the Hi-Tech group. In order to create revenues from innovations (RII) internal sources of information prove extremely important since they contribute to the design of new innovation projects and to the progress of the existing ones without relying on extramural partners. Thus directly related is also the importance of highly-skilled staff (employees with masters and doctoral degree). Moreover, the real-time response to the market needs is also important, in particularly in the Hi-Tech sector where it proves decisive for market success.

If the intramural knowledge in the Hi-Tech sector tends to represent a key to an increase in revenues from innovations, more proves necessary to advance to a higher level, i.e. to innovations new to the market and not only to the company). The aforementioned “more” indicates investments into extramural knowledge. Expenditure for acquiring other extramural knowledge demonstrated significant influence on dependent variable RMI, including expenditure for obtaining licence for patents and non-patented inventions, expert knowledge and experience as well as other type of knowledge from other companies or organisations.

It may be concluded that the Slovenian companies, even those appertaining to the Hi-Tech sector, primarily acquire inventions new to the market (patent, licence, know-how) and fail to develop them (independently or in co-operation with others).

## **4. Summary and Discussion**

As demonstrated, there are 56 % of non-innovative companies operating in the manufacturing sector (without any revenues from innovations in the period 2004 to 2006), out of which almost a half of them operate in the processing sector. Only 6 % of all companies appertain to the category of innovation leaders, 7.5 % of which appertain to the processing companies. Pursuant to the same research carried out by SURS/Eurostat (on the basis of methodology applied the Eurostat research shows somewhat misleading innovation of the economy) indicates that 35.1 % of Slovenian companies are active in the field of innovation. We do not have the said data on innovation active large and medium-sized companies available, yet it may be concluded that a proportion of such companies is substantially higher.

We established that innovative companies in both sectoral groups invest substantially higher amounts of assets in innovation than non-innovative companies, namely 3-4-times more than non-innovative companies.

Beside the value of investments into innovation, the efficiency of exploiting these assets also influences on the revenues from innovation. As demonstrated, innovation leaders invest considerably more into innovation than the innovation followers, and at the same time transform these investments into revenues more efficiently.

Comparing the success of processing companies in the field of innovation and business, it is obvious that innovation pays out in the Low-Tech group. The most innovative companies are

also more successful pursuant to the majority of indicators, i.e. achieve for example for one third higher value added per employee. Contrary proves evident for the Hi-Tech group; the most innovative companies record poorer business results. What might be the underlying reasons? It is possible that in order for the Hi-Tech companies to gain considerable market shares with new products, they need to invest substantially more assets (into development, market). Investments into R&D and market do not bring positive effects in the company's balance sheet, well at least not in the short-term. Poor business results of innovative companies within the Hi-Tech sectoral group may be the consequence of poor development level of the sectoral group in Slovenia. Also those most successful (the highest RII and RMI) prove to be only average in comparison with the global competitors.

The innovation does not contribute to higher value added in the sectors with higher level of technologies (Hi-Tech). In order to increase value added per employee, breakthrough innovations are essential. However, there are only a few of such innovations in the Slovenian environment. Additional reason may be that despite increased investments the companies fail to manage their innovation processes with sufficient quality in order for the increased investments to bring quality results. Assuming this, a quality jump is necessary beside investments of higher quality into innovation. In praxis, this means that innovation activities need to be appropriately aligned. This means that it does not suffice to bring models and good practice into the company from abroad, yet it is necessary to manage innovation activities with due expertise and balance, and in sustainable manner as to the sector or specifics of a company.

The mentioned represents an important conclusion connected with national policies and innovation management in Hi-Tech companies. Another conclusion is related with Low-Tech companies. As we showed at the beginning, Hi-Tech industries gain only 3% of added value in OECD economies. Therefore, the national policies should not be focused on Hi-Tech sector only. Low-Tech companies gain a significant proportion of value added and using appropriate approaches for innovative management, the economic results can be achieved much easier than in Hi-Tech; especially in a short run.

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# Customer Co-Creation and New Economic Sociology

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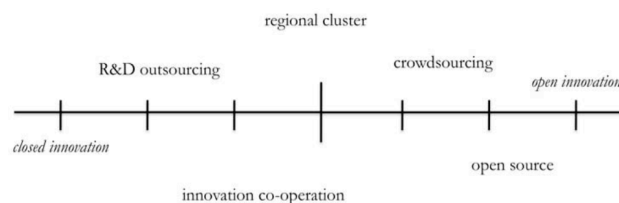
Customer co-creation entails the active involvement of customers in the innovation activities of the firm. This collaborative production is a new kind of collective action that is socially embedded in internet communities and includes self-selected individual action as part of collective self-organization. The specifics of this social embeddedness have received less attention in the debate. In this paper we argue, that the sociological perspective should be applied to economic phenomena like customer co-creation and that SME can benefit from this perspective.

## Keywords

Co-Creation, Economic Sociology, Open Innovation, Social Embeddedness, User Innovation

## 1. The Innovation Continuum and Customer Co-creation

Innovation is a key-factor of business success [33], but in “many organizations, especially those with a traditional approach, innovations are 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” [13].

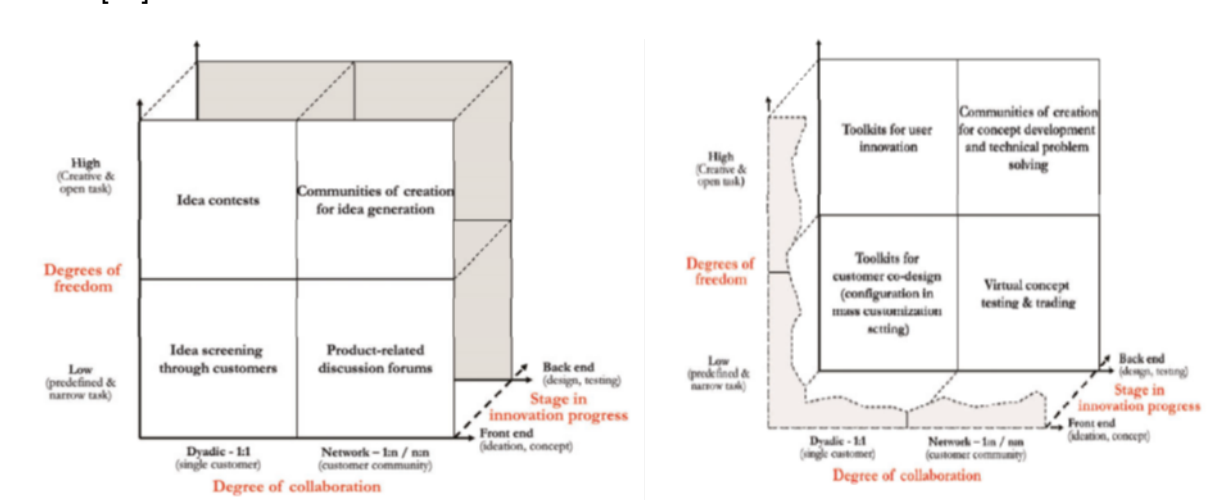


**Figure 1** The innovation continuum [31]

The innovation continuum shows that organizations have several options to open their innovation process: outsourcing R&D, co-operate with partners, building regional clusters, asking the ‘crowd’ for innovative ideas (crowd sourcing), using open source tools and finally, implement open innovation as a business model (Figure 1). Consequently, it is not the question of closed innovation or open innovation - the question is: Which aspect of the innovation continuum fits?

SME involved in highly dynamic markets are more and more technology-driven by web 2.0 technologies and use “purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation” – Open Innovation [6, 7]. Open Innovation, as a Business Model, today have a much broader application than first proposed by Chesbrough [27, 30]. It can be stated, that the emerging research field of Open Innovation is in a phase that is still very fluid, with many national/global [23] and regional [39] Open Innovation activities. On the other hand, we have User Innovation where users “expect to benefit from using a product or service, while manufacturers, by contrast, expect to benefit from selling it” [38].

In this paper we focus on Open Innovation, from the company’s point of view, with special interest on Customer co-creation. Customer co-creation entails the active involvement of customers in the innovation activities of the firm [40] where value is co-created by multiple actors [29]



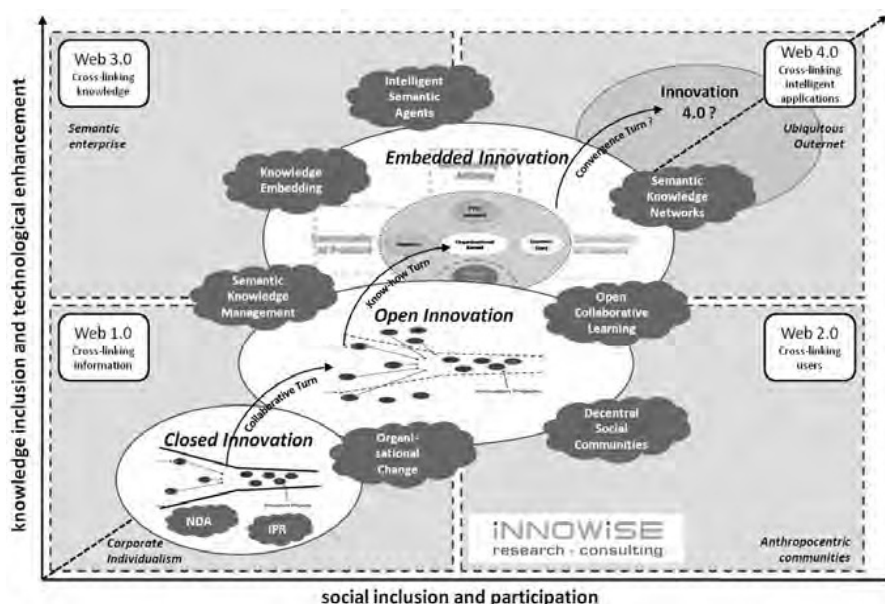
**Figure 2** Typology of customer innovation at the front end and at the back end of the innovation process [24] (42 and 46)

Customer innovation depends on the degree of freedom and the degree of collaboration at the front end and the back end of the innovations process (Figure 2). But, is it the single customer deciding only by himself really, or isn’t every customer decision embedded in a community or a social context? This collaborative production is a new kind of collective action that is socially embedded, e.g. in internet communities, and includes self-selected individual action as part of collective self-organization. Specifics of this social embeddedness have received less attention in the debate [42]. This is not surprising, because “few persons competent in sociological theory have any working knowledge of economics, and conversely few economics have much knowledge of sociology [26].

## 2. New Economic Sociology and Embedded Innovation

Old economic sociology discusses the sociological perspective applied to economic phenomena [22, 9, 34, 40] but the economy of modern societies does not simply operate according to its own inherent laws, but is embedded in a moral order, interests, and in social power [4]. The new economic sociology therefore argue, that economic behaviour is “embedded in networks of interpersonal relations” [19], so that the assumption of atomized decision-making is wrong [19]. “Sociologist focuses on the actor as socially constructed entity, as ‘actor-in-interaction’ or ‘actor-in-society’” [36]. New economic sociology is based

on two master concepts: embeddedness and social construction of reality [37]. Beckert argue that economic sociology is not limited to showing the social contextualization of economic action as such, but needs to demonstrate a systematic connection between the embeddedness of economic action and historical developments [3] - the context. When we look at context as a unique set of actors and the unique reciprocal links among them [8] it is clear, that this reflexive practice leads to a more *reflexive innovation model*, which takes into account the *theory of reflexive modernization* [17].



**Figure 3** The Emergence of Innovation 3.0 [20]

Other researchers prefer the term 'Embedded Innovation' (Innovation 3.0) (Figure 3) "as the fundamental ability of a firm to synchronize organizational structures, processes and culture with open collaborative learning processes in surrounding communities, networks and stakeholder groups so as to ensure the integration of different external and internal knowledge, i.e. competences or technological capabilities, and to exploit this knowledge to commercial ends" [20]. *Reflexive Innovation* or *Embedded Innovation* displays the dependency of innovation from social inclusion and the emergence of innovation from social interactions.

### 3. Consequences for SME

Co-Creation as an Open Innovation approach is traditionally part of innovation strategies of large companies (Table 1). Instead, the generation of innovation in the SME sector is different, because the main focus is on multiple interactions. So SME operating in an increasing dynamic and digitalized environment, with knowledge being the most indispensable and important resource for innovation, need to establish trusted relations to aligned communities, networks and stakeholders [10]



**Table 1** Fraction of companies with collaboration by size [10]

Collaboration	AT		BE		DK		NO	
	LE	SME	LE	SME	LE	SME	LE	SME
Domestic horizontal	7%	5%	14%	5%	21%	14%	16%	8%
Domestic science	41%	11%	48%	19%	44%	21%	53%	17%
Domestic vertical	20%	11%	40%	20%	45%	25%	39%	18%
International horizontal	11%	3%	23%	7%	24%	11%	19%	8%
International science	28%	6%	27%	9%	29%	11%	31%	7%
International vertical	33%	11%	59%	26%	55%	27%	45%	22%

Note: Fraction of firms with collaboration of the specific type. SME denotes small and medium sized enterprises with 250 employees or less, LE denote large enterprises with more than 250 employees.  
Source: AT based on CIS 3 (1998-2000); BE, DK, NO based on CIS 4 (2002-2004).

Consistent across countries is the fact that SMEs exhibit a lower propensity to collaborate with any type of collaboration partner [10]. The authors of a study in Austria, Belgium, Denmark and Norway found out, that a “broad based, holistic approach to open innovation may give greater returns than a deep focus on a single aspect” [10]. Innovative SME in Central Europe should therefore not only copy open innovation business models from Western European companies. They can leap-frog ahead with a more reflexive or embedded innovation model that integrates innovation and new economic sociology.

## 4. Conclusion

In this paper we argue, that innovation is a process and a continuum from closed to open innovation, where customer co-creation entails the active involvement of customers in the innovation activities of the firm. This collaborative production is a new kind of collective action that is socially embedded, but the specifics of this social embeddedness have received less attention in the debate. This is not surprising, because few persons competent in sociological theory have any working knowledge of economics, and conversely few economics have much knowledge of sociology. Open innovation from the new economic sociology point of view leads to a more reflexive or embedded innovation model, which can be used by SME to leapfrog-ahead in their business.

Formal models developed by economists for understanding the economy are inadequate for understanding the dilemmas faced by the world economy today. New models like new economic sociology are hot developing areas in this discussion but there exists too little work on the transformation from socialism to capitalism in Central Europe and in the former Soviet Union, which is to be regretted because both of these regions are practically *living laboratories for economic sociology* [36].

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# Analysis of 3D Software Visualization Metaphors for Architectural Visualization

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In this paper we analyse three different approaches to software (source code) visualization. We discuss a two three dimensional (3D) visualization metaphors – city metaphor and spatial cartographic metaphor. We studied their applicability in respect to visualization of software architectures. Appropriate versions of these approaches could be applied to different problem domains outside the software industry. Through such kind of visualization we can reason and view internal structures obtained from automated analysis of very granulated pieces of information. The particular domain knowledge have been distributed or coded into the different artefacts – in our case it is source code. Software visualization deals very close with dependency analysis for complexity of software and makes process more transparent.

## Keywords

3D visualization, software visualization, city metaphor, spatial cartographic metaphor, software architecture

## 1. Introduction

Visualisation has been used to illustrate facts about the subject which have been visualized graphically with possible purpose of helping observers to reason about the subject of visualization. It tends to be a sort of abstraction which reduces complexity of the subject. Looking at the computer display we see a two dimensional projection of a 3 dimensional movie. 3rd dimension is rendered into others two. Emulation of the 3rd dimension is an important feature of the visualization software in respect to software comprehension and understanding.

In this paper we analyse three different approaches to software visualization in respect to source code visualization. We review their applicability in respect to software architectures [24] visualization. Appropriate versions of these approaches could be applied to different problem domains outside the software industry. Through such kind of visualization we can reason and view internal structures obtained from automated analysis of very granulated pieces of information. The particular domain knowledge have been distributed or coded into the different artefacts – in our case it is source code. A good formalization for the artefact's structure is not strict requirements but have to be previously established. Based on some formal knowledge and information extraction the encoded structure of the system is displayed by 3D tools. This will make easy processes of system comprehension and understanding.

Software is a subject of visualization for a long time and it is not an easy task because of the nature of the software – extremely complex and always intangible. Integrated development environments (IDE) editors visualize source code as a two dimensional array of characters and make up the code with fonts, colours, text styles, etc. This type of visualization views the programming code for the purposes of edition, modification, easy understanding and comprehension. This is a specifically intended view of the source code which helps the programmers to be more effective in their coding activities.

Graphical visualization of software supports better and faster understanding of source code design and functionality due to human perception of information and cognitive factors improve the understandability of the visualization. Software visualization deals very close with dependency analysis for complexity of software and makes comprehension and understandability more transparent.

Software visualization has been defined as: “.. a discipline that makes use of various forms of imagery to provide insight and understanding and to reduce complexity of the existing software system under consideration.” [13].

Real software systems consist of billion lines of code and they comprise huge amount of information. Software includes different types of interconnections of the different entities from the different levels of abstraction and different viewpoints of concerns. The software engineering [25] comprises software development technologies which includes two spaces - technical and social. Technical space includes different types of hardware and software tools – compilers, editors, product and process management tools. While social space consists of variability of nets of the stakeholders, donors and users of the software product. Information systems are very complex and very balanced ecosystems [20] which makes their understanding and visualization complex and difficult task.

In this article we considering seven levels of abstractions of software which visualization tools provide in respect the program and system comprehension. We add two more abstract level to the existing taxonomy [22] – enterprise business-processes and software ecosystem level.

The distinguishing properties of the tools in this study were the extraction, analysis, and presentation techniques of the tools. This three characteristic properties help define the level of abstraction of a visualisation tool.

In our taxonomy of the tools according to their visualization capabilities we distinguished seven level of abstraction. The ascending scale starts with lowest level 0 the program code itself through level seven the view of software ecosystem [20]. Level 1 presents the lowest level of abstraction and it is the “debuggers” level. This is the automatic low level of manipulation like a code preprocessing level, template instantiation, debugging, etc. The next level 2 of abstraction illustrates method calls and returns. Level 3 starts the middle portion of the scale ascends from tools that illustrate an object or class-level representation of the system. Level 4 are reserved for tools that provide an architectural-level view of the system. Level 5 aggregates information about object population, memory usage, load distribution, or deployment. Level 6 present an enterprise and business processes level. It comprises all IT processes that support the product or product line [5].

These seven levels of abstractions visualization tools provides opportunity to reason about the software system at different level of knowledge for program comprehension and understanding. This taxonomy comprises code level, program level, architecture level, large scale level of the comprehension of the system.

For the purposes of research all our case studies we use are open source projects. The reason behind this is that their source code is free available and is under public usage licence.

In the context of the Bulgarian national science fund project DO 02-102/23.04.2009, which aims at software source code analysis and extraction of software pattern and artefacts and visualization of these elements, we have experimented with several metaphors [2] [3] to

provide some tangibility to the abstract nature of software. These are city metaphor and spatial cartographic metaphor. Tools representing both 3D visualization metaphors are free available and are a subject of research of strong research communities.

## **2. Related Works**

Robert DeLine's work on software navigation [6] [8] is based on the observation that developers are consistently lost in code [7] and that using textual landmarks only places a large burden on cognitive memory. He proposes four desiderata [6] that should be satisfied by spatial software navigation: (1) the display should show the entire program and be continuous, (2) the display should contain visual landmarks such that developers can find parts of the program perceptually rather than relying on names, (3) the display should remain visually stable during navigation (and evolution) and (4) the display should be capable of showing global program information overlays other than navigation.

Software visualization [14] can be of great use for understanding and exploring a software system in an intuitive manner. In the past decade the software visualization community has developed a rich wealth of visualization approaches [10] and provided evidence of their usefulness for expert tasks, such as reverse engineering, release management or dynamic analysis [9] [21]. Typically, these visualization approaches had been implemented in interactive tools [23]. However most of these tools are stand-alone prototypes that have never been integrated in an IDE (integrated development environment). Little is thus known about the benefits of software visualization for the "end users" in software engineering that is for everyday programmers. What is lacking is how these techniques support the day to day activities of software developers [26].

Treemaps [27] represent tree-structured information using nested rectangles. Though treemaps make continuous use of the visualization pane, the interpretation of position and distance is implementation dependent.

Polymetric views [17] visualize software systems by mapping different software metrics on the visual properties of box-and-arrow diagrams [18]. Many polymetric views are ordered by the value of a given software metric, so that relevant items appear first (whatever first means, given the layout). Such an order is more meaningful than alphabetic (or worse, hash-key ordering), but on the other hand only as stable as the used metric. The System Complexity view is by far the most popular polymetric view, and is often used as a base layout where our requirements for stability and consistence apply [12]. The visualizations are three-dimensional with position and visual distance of entities given by selected metrics. However they do not incorporate the notion of a consistent layout.

CGA Call Graph Analyser [4] is an explorative environment that visualizes a combination of function call graph and nested modules structure. The tool employs a two and half-dimensional approach.

VERSO is an explorative environment that is also based on the city metaphor [16] and it employs a treemap layout to position their elements. Within a package, elements are either ordered by their color or by first appearance in the system's history.

## **3. Software Visualization Metaphors**

Before starting analysis of the tools representing 3D software visualization metaphors we will briefly describe the used case studies.

### 3.1 Case studies

In this section we briefly introduce the three systems we used as case study. Three of them are free/open source and have a long time support from open source community.

First one ArgoUML [33] (version 0.28) is a UML modelling tool and includes support for all standard UML 1.4 diagrams. It was originally developed by a small group of people as a research project and now has many features that make it special, but it does not implement all the features that commercial CASE tools provide. It runs on any Java platform and is available in couple of languages. It is available for free and can be used in commercial settings.

JEdit [34] (version 4.3 pre-release 18) is second one of our study cases and it is a rich text editor which supports a syntax highlighting for more than 200 file types. It is free source and is implemented in Java. It combines features of the powerful commercial editors with the plug-in architecture. This allows users to extend and tune functionality with their own plugins.

Jmol [35] (version 11.8.9) is an open source Java based 3D molecular viewer for chemical structures. It allows high-performance 3D rendering with no hardware requirements.

These three tools are under GNU public licenses, so we could use them for our experiments. The largest of these three systems has almost half a million lines of code. For our experimentation work it is enough to estimate a different types of granularities – a coarse-grained level – classes are represented as monolithic blocks and all internal details are omitted, and fine-grained level – internal details are presented, such as methods that constitute the body of the class.

### 3.2 Polymetric Views

X-Ray [32] is an open source product and mainly its purpose is for source code analysis and visualization of large software intensive projects with more than hundreds of thousands lines of code. X-Ray is an Eclipse [36] plugin (it is available for installation for almost the all operating systems) and its implementation is based on GEF (Graphical Editing Framework) [37].

Using X-Ray the user can easily understand the structure and to get initial understanding of interrelationships between classes and packages of the Java project. It displays 2D interactive visualization in a tree or graph, textual information and allows user navigation. (We consider X-Ray in this article because its functionality forms the basis for the 3D tools.)

Its main functionalities are refreshing, zooming, selecting, colour choosing, nodes choosing and filtering by previously established criteria. The regular expressions could be used in order to constraint the search results. One of the most important properties is showing dependencies and interfaces links and groups.

X-Ray uses three polymetric views: *System Complexity View*, *Class Dependency View*, and *Package Dependency View*. System complexity view is very useful for viewing the gap between design and implementation of the software system. It allows the user to comprehend complexity of the system according to methods, classes, lines of code included, and class hierarchy without need to read the code. It uses positional and coloured way to display different types of metrics.

Positional metrics visualize nodes which are modelling classes as rectangles. Class hierarchy is visualized as three structure positioned vertically. Width of the rectangle views the number of methods in the class, while height of the rectangle views the number of lines of code of the class. Coloured metrics used different colour for different nodes. For example classes are coloured as dark blue, abstract classes are coloured blue and interfaces are coloured in white colour.

Others two views show dependencies between classes and packages which are connected with weighted links. If two classes or packages are strongly coupled the link between them is

much darker. This two views show unusual grouping of the dependent entities and show any types of errors in components collaboration.

### **3.3 City Metaphor for Software Visualization**

A city metaphor [30], [29] offers a clear notion of locality, supports orientation, and features a structural complexity. Software system classes are buildings in the city (city is the whole system) and packages are area or districts where buildings are placed. With the visual properties of the city artifacts a different metric values are related: for classes, the number of methods (NOM) mapped on the buildings' height and the number of attributes (NOA) on their base size, and the number of lines of code (LOC) on the colour of buildings, from the dark grey (low) to the intense blue (high). For the packages the nesting level mapped on the districts' colour saturation.

*The city metaphor considers strictly and saves containment relationships between packages and classes. But there are couple of different important relationships between software artefacts which still have to be viewed.*

CodeCity [28] is a standalone application and it is portable for all widely used operating systems. It is implemented in VisualWorks Smalltalk [38] and it is built on top of Moose [39]. It inherits Famix [40] meta-model. In this tool models are extension of Famix meta-models and are builds on top of the Moose framework. This system is responsible for abstract representation of the source code. This means that it provides an internal (possible abstract) representation and it makes visualization language independent. This tool renders the 3D interactive cities using the OpenGL [41] graphical framework.

CodeCity is mainly used for software systems developed using Java, C++, C#. Actively this tool explores city metaphor where software system is presented as an interactive three dimensional city. This tool is an object-oriented system with a dynamic user interface.

The usefulness of this approach for program comprehension tasks is described in detail in [31]. Although helpful in reverse-engineering a single version of a system, this visual representation does not help in understanding the architecture of the software. For example run-time architecture is difficult to explore and reason about some architectural capabilities is not possible. This metaphor is based on constructional visualization of the system which can be used for displaying components and connectors composition but there is no easy way to display different relationships between software entities.

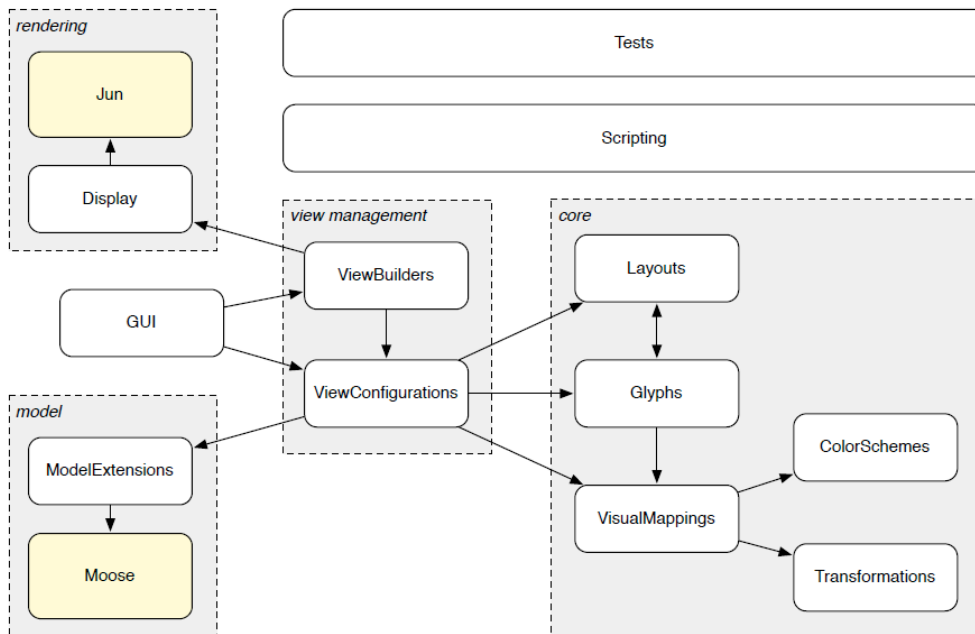
A specific character of the CodeCity is that the number of methods of particular class specifies the height of the building and the number of class attributes specifies width and length of the base. The classes with couple of methods but small amount of attributes are viewed as very high and thin buildings and these ones with a lot of attributes but small amount of methods are viewed as platforms. Embedded packages determine the density of colours in the region – deeply embedded packages are collared as dark blue while others are coloured in light blue. For purposes of minimization of the area the modified Treemap [27] algorithm is used for displacement of the rectangle buildings.

CodeCity architecture is composed from four main modules: model, core, view management and rendering.

Briefly we will describe the architectural elements of the CodeCity application showed at Fig. 1. It could be used a starting point for developing tools for visualization of different artefact and models of the software system.

The Model module purpose is to modelling the software systems we visualize with the tool. As we mentioned before they had an abstract representation – for example abstract and concrete syntax tree.





**Figure 1** CodeCity module-level architecture [28]

In case of very large software intensive system the model representation is important for the efficiency of visualization. Since our research is done for the purposes of visualization of software architecture there is need of two levels of visualization - fine and coarse grained level of visualization. Software architecture requires both level of granularity to be presented. The Core module deals with the visual representation model. Its main components are figures (Glyphs), layouts (Layouts), and the mapping mechanism (VisualMappings). It provides the means to map model properties - software metrics - onto glyph properties - size, and color, and involves the computational parts of the packages Transformations and ColorSchemes. The View management module handles the configuration (ViewConfigurations) and the construction of visualizations (ViewBuilders) which, based on the current view configuration, takes a software model, builds the visual model of the system and calls the rendering engine to generate the visualization.

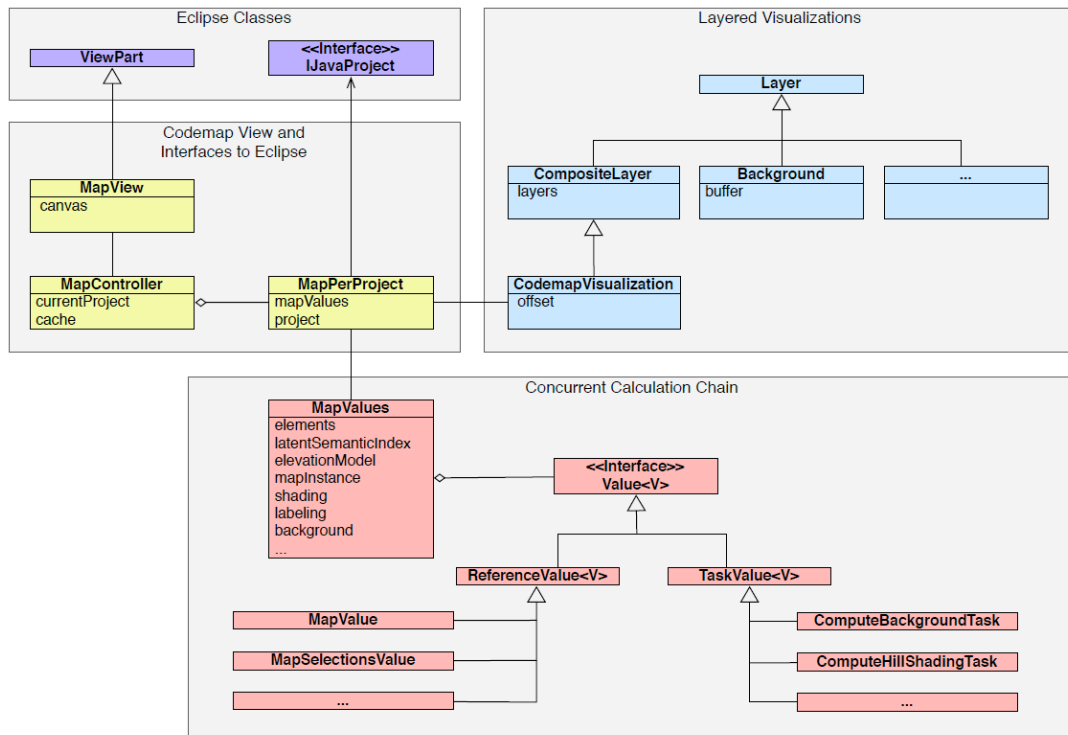
The Rendering module takes the visual model of a system and renders it on the screen. an OpenGL implementation is used for viewing. The Display package deals with visualization rendering, navigation, and interaction.

CodeCity GUI provides widgets for the modification of every view configuration parameter as well as basic scripting language to build adhoc visualization. The user can choose different "city" elements, marks some buildings, and filter them using specified criteria – name, type, category, artefacts, navigation. Part of the package elements and buildings could be viewed in different view for the purposes of detailed analysis. Buildings can be made transparent if the user does not want to consider them. A different attributes could be attached to them – for example – "age" attribute.

### **3.4 Software Cartography – Spatial Visualization**

Software visualization empowers software system understanding in an intuitive manner. Spatial representation of software is a promising approach of increasing interest. There are evidences and promising opportunity for software developers and architects to make good use of the map to inspect search results and call graphs of the system. Open question to software architects is how they find cartography metaphor useful for their architecting activities.

Software Cartography uses a spatial visualization of software systems to provide software development teams with a stable and shared mental model. Software Cartography is most useful when it supports as many development tasks with spatial location awareness as possible.



**Figure 2** Codemap UML diagram overview [11]

Codemap [11] is a tool for 3D visualization as a plug-in for Eclipse [36] and it can display only Java sources. Codemap can be used for creating visual model of already finished projects as well as projects which are under development. Integration of Codemap with Eclipse's structural navigation features, such as search for callers, implementers, and references makes it applicable tool for reverse engineering of the legacy systems. Integration of Codemap into the Eclipse IDE allows a map of the software system always to be present. This helps developers to correlate as many development tasks as possible with their spatial location.

The Codemap supports the following tasks:

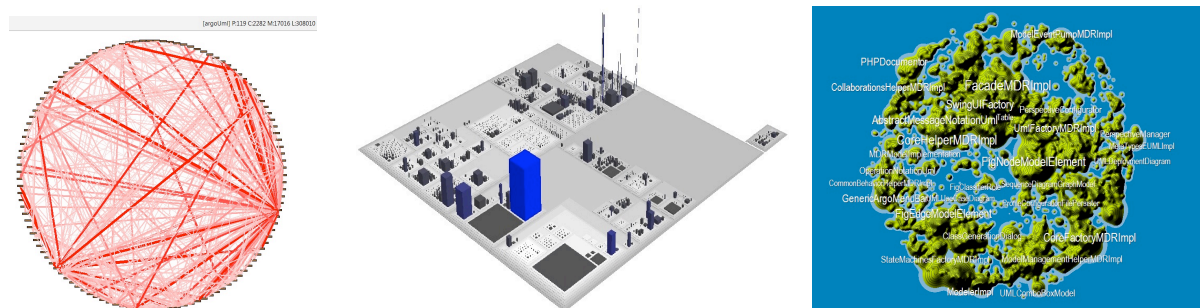
- Software system navigation for different purposes mainly for software development or software analysis. As an Eclipse plug-in it uses couple of features from the platform for browsing packages and editing source code. Through double click on the map users opens the closest file in the editor. Recently visited classes are highlighted on the map.
- Applying different software metrics to the source code. For example compare bug density with code coverage and test coverage information. Adding more metrics is available through providing additional plug-ins.
- Displaying the search, declaration, and references, compiling errors and other developers information. In respect of the open files and who is the author or corrector of the source code in files they are coloured in different colour in the map.

- Clustering of software by topic [15] based on and creating a lexicon of source code. There were shown that software lexicon is more stable than software structure [13]. Map labels are mainly class names but could be user specified words or topics.

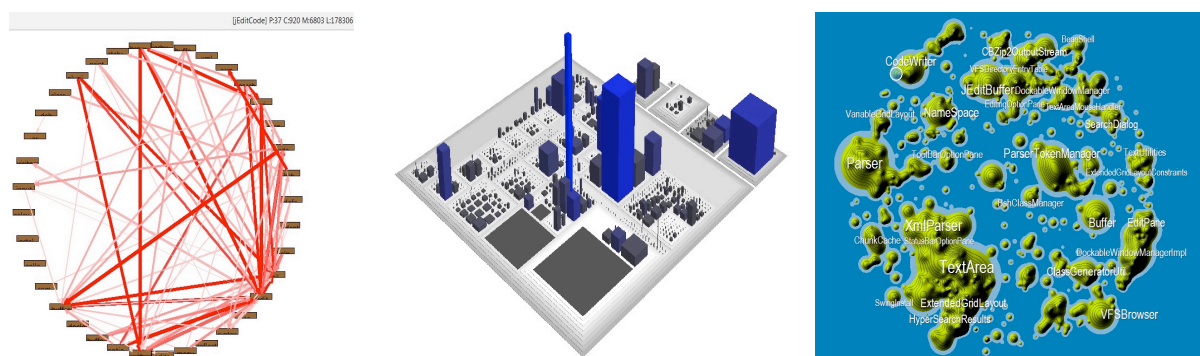
Map elements and links between them depend of the source files and their metrics. Each file is represented as an island on the map. There are possibilities for changing the view of software model according to user needs via choosing a different metrics, colours, levels and labels, etc. For particular project including or excluding specific visualization is relatively easy. In order to get more complete view of the software different views can be combined.

## 4. Use Cases Analysis

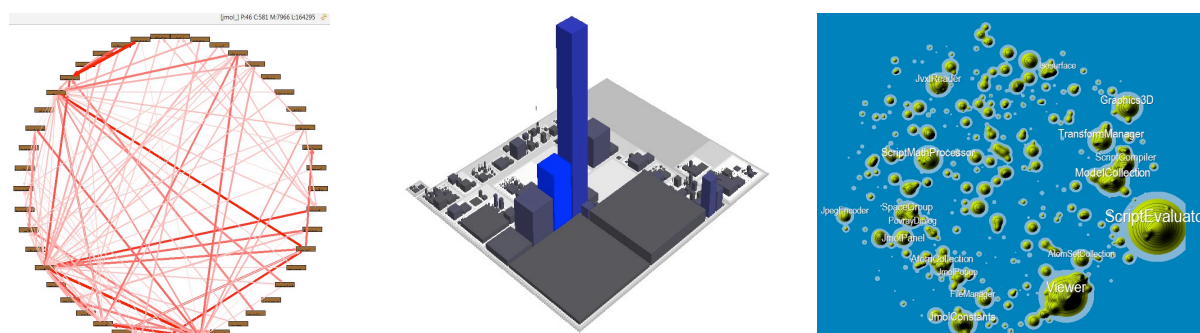
For the purposes of the analysis of these three visualization tools we will use three open source projects ArgoUML (fig. 1), jEdit (fig 2), and jMol (fig. 3). Each one of these projects has been analysed using each one of the tools. Below you could find the results of visualization.



**Figure 3** ArgoUml (0.28) visualization results



**Figure 4** JEdit (4.3.18) visualization results



**Figure 5** Jmol (11.8.9) visualization results

## 5. Conclusions

All these three tools are portable for different operating systems. One of them is stand-alone application but others are developed as plug-in for Eclipse integrated development environment.

X-Ray and CodeCity are used for the finalized source code while Codemap is able to be used for the evolving projects in the state of development. X-Ray can be useful for displaying the treemap of the source code and to display interrelationships between classes and packages. CodeCity is useful in circumstances of analysis and visualization of huge amount of source code. It also shows interrelationships between classes and packages and propose possibilities to change view. Codemap is also useful with the collection of software metrics applied for appropriate information and results of different searches over the software in the project.

The experimental analysis suggest that in order to address the full range of representative software comprehension and reverse engineering tasks, it is necessary to support abstraction, structural and behavioural information, and the integration of statically and dynamically extracted data. It is reasonable to expect that a tool implementing this approach would be useful in real world software maintenance.

The features we consider useful for architectural visualizations are

- **Language Independence**

Considered tools visualizations are built using abstract representation of the source code. This allows them to be language-independent and model representation independent.

- **Completeness**

Different relationships among software entities - inheritance, invocation, access - either explicitly as links between the artefacts or implicitly as distance between them in layouts are not well established and need to be developed.

- **Scalability**

Software intensive systems comprise billions of lines of code. As we mentioned before largest of our case studies has half a million lines of code. And because of we have no experimented with such kind of software system we just only predict a scalability of the software visualization tools based on proposed architectures.

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# Development of an Innovation Strategy for the Thessaloniki Metropolitan region

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**This paper presents the results of a regional consultation exercise, initiated by the Asviloc+ South East Europe territorial cooperation project, with the aim of defining a medium to long term strategy for developing innovation in the wider metropolitan area of Thessaloniki, Greece. The strategy was developed and presented for consultation in a series of open events in Thessaloniki, where the relevant stakeholders had the opportunity to debate and reshape it.**

## **Keywords**

Entrepreneurship, innovation policy, regional innovation strategy, regional innovation systems

## **1. Introduction**

The term "Innovation Strategy", defines the objectives, actions and implementation tools, which allow improving both the capacity and innovation performance of a region. It is a form of technological and strategic development planning, which takes into account the networks, dynamics and weaknesses of the innovation system of the corresponding region in which it applies. It is a fact that the poor performance of Greece and of its thirteen regions, in terms of their innovative capacity, necessitate the intensification of the efforts of both public and private sector so that this performance is immediately improved. Thessaloniki is the capital of the Region of Central Macedonia (RCM) and plays a dominating role in the region's economy. Any strategy for the development of the wider Thessaloniki municipality area will have to refer to the region as well. The proposal for the "Thessaloniki Innovation Strategy" for the decade 2011-2020 was developed under the project Asviloc + SEE program and entered into consultation as part of the Innovation Forum, which operates in the city, during late 2011 and early 2012.

## 2. Current situation in Thessaloniki on the basis of innovative activity

### 2.1. The performance of the Innovation System of Central Macedonia (RCM)

The Region of Central Macedonia is an example of what we may label as a "European paradox", observed at country-level European Union, as well as at a regional level: while there is a high level of research activity and knowledge production by a number of entities and initiatives, the performance of RCM in the field of innovation remains low. In RCM a relatively small proportion (12%) of firms operate in industries characterized by the OECD as medium - intensive technology. RCM and its capital Thessaloniki appears as "consumer" rather than "producer" of innovation. The Region is characterized as being of "moderate - low level" of innovation, despite the fact that within its geographical boundaries there is quite a good level of public funding for research. RCM shows a limited performance in the field of innovation, despite the existence of a high concentration of components of a successful local / regional innovation system, such as research centers, universities, business incubators, active business associations and chambers, dynamic and extroverted companies. This reality reinforces and substantiates the meaning of "paradox" already mentioned. However, while the overall innovation performance of RCM is very low at the EU level, the Region ranks among the top three regions in Greece in terms of innovative performance. Athens and Thessaloniki maintain their top positions because of the ongoing presence of industry and technology-intensive services within their geographical boundaries. Indeed, 2009 data confirm that the strengths of innovation in Central Macedonia are the human resources of higher education research and technology institutions as well as public research and development spending.

### 2.2. The ability of Thessaloniki for R&TD and innovation: the elements of the Regional Innovation System

The entities that make up the Regional Innovation System, (the local 'triple-helix' of innovation) are:

- (a) The Regional Authority of Central Macedonia and the local level authorities.
- (b) Chambers, Business and Professional Associations.
- (c) Business and technology parks, high tech incubators and the Innovation Zone.
- (d) Universities (among which the largest University in the country), Technology Educational Institutions, as well as private higher education institutes that attract foreign students.
- (e) Research Centres, among which the second largest in the country public research centre
- (g) The manufacturing and services sector.

Table 1 presents a simplified version of the SWOT analysis of the Regional Innovation System.

**Table 1** SWOT analysis for Thessaloniki and the RCM with reference to the development of innovative activities

#### **Strengths**

- A critical mass of institutions and initiatives that support innovative activities (business, educational and research institutions)
- Significant experience of developing and implementing innovation activities.
- High degree of networking of institutions

#### **Opportunities**

- New orientation of ERDF funds and new initiatives at EU level
- Creation of new mechanisms for the diffusion of new technologies and know-how from research entities into production.
- Easier acceptance of new innovative products from



- Private initiatives to create innovation clusters
- A significant degree of openness of the local production system
- Presence of industries with increased international competitiveness.
- Gradual homogenization of regional markets
- Pressure to export due to financial crisis

#### **Weaknesses**

- SMEs have limited capacity to finance innovation activities.
- Low level of private sector participation in financing innovation activities.
- Fragmentation of relevant activities and lack of coordination at local level.
- Insufficient visibility and valorisation of research results.
- Introvert orientation of innovation activities
- Divergence of the research and the industry worlds regarding their approach towards innovation.

#### **Threats**

- Bureaucratic obstacles of public initiatives designed to support innovation and entrepreneurship.
- Unclear and ever-changing institutional framework (taxation, management of research results, etc.)
- Significant reduction of financial capacity because of the economic crisis.
- Brain drain

### **3. Guiding principles for the Thessaloniki Innovation Strategy**

#### **3.1. External environment**

The environment within which Thessaloniki and RCM should develop their own strategy for innovation to be implemented in the coming years is characterized by the following external factors:

- The current economic crisis, which calls for a radical overthrow and replacement of the current public-centred consumer-based model of development, with a model based on the exploitation of comparative advantages of each region, entrepreneurial extroversion and production of products and services with high added value.
- The challenges facing the developed world as a whole and which can be summarized in three-fold: environmental degradation, financial instability, demographic decline.
- The framework set by the EU strategies which try to respond to current challenges, which centre on the Strategy for Europe 2020 and the adoption of the Innovation Union Flagship Initiative.
- The framework set by the EU structural funds for the new programming period 2014 – 2020. This may be viewed as the last major opportunity for the country, region and Thessaloniki, in order to invest in human capital, knowledge and technology.

#### **3.2. Principles for strategic innovation in Thessaloniki**

Based on the above analysis, the Thessaloniki Innovation Strategy is proposed to be based on the following principles:

- Excellence and extroversion: the pursuit of excellence and targeting exports of products and services are the cornerstones of any initiative and investment.

- Exploitation of comparative advantages (smart specialization): moving from horizontal initiatives and investments towards initiatives and investments that support selected developmental options.
- Open city: the Metropolitan character of the city, its connections with the Greek and Balkan hinterland and the Black Sea region, indicates the way for the opening of the city at all levels (cultural, business, social)
- Exploiting the capabilities of human resources and the high concentration of research and technology in academic and research centres.

### **3.3. The central aim of the strategy: the pursuit of wide range multiplying results**

Central aim of the Thessaloniki Innovation Strategy is to achieve high growth rates, followed by employment growth, based on knowledge for the production of high added value products and services. Specific objectives of this central aim are:

- Take advantage of the comparative advantages of the city and region
- Establish Thessaloniki as an international centre of knowledge in Southeast Europe.
- Creation of an enabling environment for attracting knowledge intensive and high value added investment and
- The reversal of the phenomenon of brain drain (internal to Attica as well as external)

Additionally the objective of increasing growth and employment should be tied with an objective to achieve an increase in the specific indicators measured by the annual Innovation Union Scoreboard, especially those in which RCM is lagging significantly, i.e. venture capital as% of GDP, R & D firms as% of GDP, employment in knowledge-intensive activities as% of total employment, exports of medium and high technology as a % of total exports. For the effective implementation of the Innovation Strategy, any developmental initiative taken up by institutions in the city, as well as any public investment must incorporate the following key directions:

- Leverage private investment: any public funded initiative should seek to leverage private investment and be able to demonstrate multiplying results.
- Assessment and continuous measurement of impact: the impact of the implementation of institutional initiatives and public investment should be clear and be measured as contributing to the growth rate of innovation, while contribution to local development and employment must be quantified.
- Sustainability of results: the viability of a project or initiative after the end of public financing should be the main selection criterion. For this reason priority should be given to initiatives and projects which have secured their continuation beyond the phase of initial public investment. In this context it is necessary to develop an appropriate system of incentives, and a monitoring system, which can ensure the sustainability of innovation related projects.
- Simplify procedures: any procedure, requirement and regulation that do not directly contribute to the objectives of the Innovation Strategy should be reviewed and - where appropriate – be amended and / or removed. The administration should encourage "good bureaucracy" (which ensures the achievement of developmental objectives) and fight against "bad bureaucracy" (which hinders innovation and development).

### **3.4. Priority areas for development**

To achieve these objectives the Thessaloniki Innovation Strategy needs to focus on specific sectors and areas of Thessaloniki and the RCM that present a comparative advantage or

have the physical infrastructure, human resources and critical mass of companies, which can present a competitive edge (Smart Specialization principle). An initial list of those sectors/ areas is:

- Agriculture / Nutrition: the city is the centre of a major agricultural region, whose traditional crops are declining and which should be re-oriented towards organic farming, functional foods and foods with high added value.
- Manufacturing: In the last decade, the industrial landscape of Thessaloniki has undergone major changes. In the period 1997-2005, the number of manufacturing companies decreased by 42.7%, employment by 17.8% and value added by 3.1%. In contrast, output increased by 17.9% and sales by 18.4% (National Statics Agency, at constant prices 2005). At the same time interest in knowledge-intensive industrial activity increased, as it became clear that knowledge provides a competitive advantage that can balance de-industrialization.
- Tourism: the city can emerge as an international tourist destination by exploiting its geographical position, its history (and especially its multinational character), its proximity to areas ideal for summer and winter tourism, and global areas of touristic interest such as Olympus, Athos, Vergina etc.
- Information and Communications Technology (ICT): the city and its surrounding area have a high level of human power, working either in local universities and research centres or the manufacturing sector. ICT can become a significant part of the dynamic economy of the region as they offer an ideal case of production and supply of high skills and value added, which does not depend significantly on the location.
- Centre for transport and logistics: the location of Thessaloniki and its history as a port of inter-territorial scope, suggests prioritizing the development of intermodal freight transport and logistics services.
- Education: Thessaloniki is a centre of higher education not only for Greece but for the wider region. The development of education, especially higher, driven by excellence, evaluation, merit, quality and rationalization will have multiplying effects in terms of overall improvement of the knowledge level of business and society.
- Health: The rationalization the country's health system, which is imperative because of the intensity of the current economic crisis, will lead to release of health care resources of high quality. These resources combined with existing major public and private infrastructure and the geographical location of the city could offer the ground for the creation of a high added value export oriented health care service sector which can also be coupled with high added value tourist services.

### **3.5. Guidelines for public sector policy**

Within the framework of the new EU strategies as expressed by Europe 2020, the Innovation Union and the objectives defined above, the "new role" of the public sector emerges as a key to the success of the Thessaloniki Innovation Strategy. The basic directions for the central government, the Region Authority of Central Macedonia, and the underlying local government institutions should be:

- Research and innovation policy should become an organic part of the policy to enhance competitiveness at the local level.
- The Regional Authority should be able to define an independent regional research and innovation strategy, taking into account national priorities as well as local conditions, needs and advantages.
- The regional strategy should have medium-and long-term targets that are well-elaborated with the participation of all stakeholders and that include a mechanism for measuring performance and are regularly reviewed to ensure efficiency.

- Development of new institutional arrangements which fight bureaucracy, encourage development of entrepreneurship and leverage private capital for investment should be a top priority for the local economic and productive system.
- Encourage innovation in public procurement, which can be combined with radical modernization of the public procurement system (i.e, reducing bureaucracy, using the 2 stages option in procurement, use of e-procurement, use of framework contracts, creating registries of suppliers, simplifying procedures to avoid judicial congestion etc)

## **4. The proposal: Institutional arrangements as facilitators of innovation multiplying effects**

### ***4.1. Institutional arrangements for implementing the Thessaloniki Innovation Strategy***

#### ***4.1.1. A Permanent Innovation Forum***

The establishment of a permanent forum for innovation will provide a solid basis for discussion, consultation, collective decision of the basic directions of innovation strategy and will collectively address regional problems of development and innovation in the region. The main functions of the proposed Forum are:

- Advisory role: the forum offers advice on the general directions and priorities of the regional innovation strategy, on major RTD and Innovation projects, on the strategy and the direction of the ERDF investments in the region.
- Analysis and evaluation: the Forum analyses and evaluates the results of innovation activities and offers an estimation of future trends and priorities.

#### ***4.1.2. Regional Innovation Council with the participation of all innovation stakeholders***

A key activity of the proposed Council will be to participate at a strategic level to the development of the regional programming for ERDF funds to be streamlined to RTD and Innovation.

#### ***4.1.3. Creating regional financial mechanisms for innovation***

Following the example of many European regions that have developed their own innovation financing mechanisms Thessaloniki should investigate the development of its own financial infrastructure to support innovation. On top of the creation of a regional seed capital fund to support spin-offs and innovative small businesses, other types of funding mechanisms can be created with the cooperation of regional authorities and entrepreneurship support institutions. For example:

- Regional Network of business angels: the network, possibly under the supervision of the Federation of Industries of Northern Greece (FING) and the Commerce and Industry Chamber of Thessaloniki (TCCI) or other bodies supporting entrepreneurship in the region, would be a network of private investors that provide capital to new technology start-ups. The supervising body would be the point of contact between individuals seeking investment opportunities and entrepreneurs who need funding.
- Creation of a Regional Innovation Development Fund: the main resources of the Fund could come from the European Investment Fund (EIF) or the European Investment Bank (EIB). Important initiatives that could be used are: a) JESSICA (Joint European Support

for Sustainable Investment in City Areas). The initiative allows financing of urban development projects, using a combination of grants from the Operational Programmes of Structural Funds and loans, or other appropriate funding bodies, and b) the JEREMIE initiative (Joint European Resources for Micro to Medium Enterprises), which enhances SME access to finance.

#### ***4.1.4. Measuring the impact of innovation activities in local development***

The measurement and evaluation of the impact of the innovation initiatives and programs is proposed to be done through a periodic study of a set of innovation performance indicators. A valid system and a specific method for the measurement of innovation should be created in order to facilitate the development of strategic directions for innovation in RCM and the documentation of their impact on development. Additionally it is proposed to create an effective system of ongoing evaluation of the impact of projects and results of innovation in local development, based on specific criteria and indicators. The assessment will provide useful information to the Regional Council, and by extension to the Forum, and will facilitate the selection of appropriate actions.

#### ***4.2. Recommended actions: ecosystems, innovation platforms for multiplying effects***

##### ***4.2.1. Brand name: Thessaloniki Innovation***

Both the regional economic system and the central government are trying to transform Thessaloniki to the "City of Innovation" for the last 20 years. The number of relevant innovation initiatives that have been implemented over those years, have now created the conditions for this to become a reality. A critical mass of resources (research institutions, intermediaries and business orientation towards innovation), and interaction between stakeholders (businesses, researchers, public authorities and indirectly other stakeholders), bring closer the local demand side for innovation with that of the local - and inter-territorial - offer. Therefore, an important element in the development strategy of the brand name of Thessaloniki in the field of innovation should be the transformation from consumer to producer of innovation. This transformation has two pre-requisites: (a) the production of new knowledge from research institutions in the region, and (b) translating this new knowledge into products and services with high added value, which is measured in the form of increased turnover of innovative products and services.

##### ***4.2.2. Clusters of innovation: types, bottom-up formation, business model viability***

As early as 2003 the EU recognized the need to strengthen its global competitive position. To do this the EU must concentrate its forces in developing regional production specialization and clusters guided by research that has resulted from global clusters of excellence. The spatial concentration of manufacturing and support services and infrastructure in Thessaloniki and Central Macedonia, form the framework for development of cooperation, knowledge acquisition and transfer of technology, which are the prerequisites for the development of innovative manufacturing activity oriented towards high quality and high added value products. There are six potentially viable clusters in Thessaloniki. These are (in parentheses the number of firms that can potentially participate in each of these):

- Food Sector: Food and Beverage Companies (90 units over 10 employees each)
- Clothing and Fashion: Business textile and clothing (app. 135 units)
- Chemical and Energy sector: Petrochemical, chemical, plastics (app. 65 units)

- Building materials and household equipment: Non-metallic minerals, wood and furniture (app. 90 units)
- Metal Sector: Metallurgy, metal products, machinery and equipment (app. 100 units)
- Electronics, electrical appliances and ICT: Electrical appliances, computers, communications and IT (app. 40 units).

In addition to these six clusters, the creation of a seventh "horizontal" cluster dedicated to "green technology" has been proposed. This will operate within each of these six clusters, and will be dedicated to developing green products, waste management, recycling, using green materials with renewable energy technologies, etc. The six clusters described above offer areas of consensus on achieving 'triple helix' partnerships and creating a knowledge environment. Requirements for this to succeed are:

- a shift from the idea of cooperation per project to the logic of long-term institutional cooperation within each cluster, and
- each cluster to collectively identify its technological needs and priorities, as well its own technological platform of reference.

#### **4.2.3. Targeted platforms**

By the term "targeted platforms" we mean a collaborative approach at a regional level, which examines and suggests concrete approaches and pathways for the development and implementation of selected technologies. The main precondition for the effective functioning of a targeted platform technology is finding common ground between the parties involved in its activities, which create a common vision and a common methodology for the development of a technology or multiple technologies, which ultimately form the thematic area which focuses on the technological platform. The following "technological platforms" are proposed: a) broadband networks, b) energy c) materials d) food technology, and e) logistics. With this proposal, industry, regional authorities, local research community users of technologies, and financial institutions will utilize a comprehensive, integrated strategic research agenda, to create a realistic vision of development for Thessaloniki and the region which is based on the local comparative advantages.

#### **4.2.4. Network of universities and research institutes with local businesses**

The need for bringing together supply and demand of research results and innovation in Thessaloniki has led to a re-assessment of interactions and links between the productive sector and academic/research institutions. The existing "Digital Research Centre" of Aristotle University of Thessaloniki can play an intermediary role between production and academia. The "Digital Research Center" aspires to facilitate the access of public and private sector to results of research projects and contribute to wider dissemination and use of products and services based on academic research. It also provides integrated support for both research laboratories that wish to promote the products of their research, and businesses / organizations that want to use them.

#### **4.2.5. Platform for start-ups: massive creation of new knowledge-intensive firms**

Taking into account that the creation of new knowledge-intensive businesses is a modern strategy for strengthening the competitiveness of an industry and create new prospects for growth, the creation of start-ups can be a part of the solution for ending the current crisis. A mechanism for transferring research results from local research centres to the market by

creating start-ups is proposed. Structures and institutions such as the existing incubators, the Technology Park, the “open coffee” initiative and individuals can be utilized for this purpose.

#### **4.2.6. Platform for promotion of innovation in the international market**

The integration of local firms in international markets and global networks requires the transformation of local business clusters in innovative clusters. Especially for companies in Thessaloniki that are classified as «technology modifiers» and «technology adopters», with some experience of developing new products for the international market, it is crucial to create such complex patterns of cooperation. Given the imbalance of supply and demand of research and innovation in the region, it is appropriate to create a platform to promote product innovation in the international market. The aim of this platform would be to promote innovative products from Thessaloniki to the international market. This will eventually improve the international technological cooperation between companies and research centres in Thessaloniki and RCM. An important result of international networking and promotion of innovation in the international market could be the international promotion of Thessaloniki as a location for companies from abroad to set up joint investment schemes in the region, to transfer best practices and to market innovative product development.

### **5. Concluding remarks**

The absence of a clear and structured framework for strengthening the capacity of Thessaloniki and RCM to innovate is a key limiting factor for growth and successful dissemination and implementation of technologies, which will enhance the competitiveness of local enterprises. This fact is coupled with the lack of continuity and coordination of the different regional policies and programs that support innovation. It is therefore clear that Thessaloniki should capitalize on the experience of past years and achieve substantial growth through the targeted exploitation of tangible and intangible infrastructure already existing in the area. It is therefore today, during the peak of the current period of economic crisis, that the need of the transition to the knowledge economy is more urgent and important than ever.

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# Fast Growing and Innovative SME are more Resistant to the Economic Crisis

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During the last decade Serbia started transformation of SME sector, as a part of overall transition process. Reforming achievements were impressive, especially measuring the share of SME in GDP, in total employment and SME in total number of companies. It was result of numerous measures realized for SME support and creating of an encouraging business climate. World economic crisis negatively affected Serbian economy, but somewhat less then countries within the Region. SME suffered as other companies a lot, among those shops and medium scale companies suffered mainly. The economic recovery started during 2010, but considering results of the business demography those positive signals were not matured yet within SME sector. Namely, SME and entrepreneurs are still afraid of possible new recession, especially perpetuated from negative influences from EU. It is important to bear in mind that good results of SME development during the period 2001-2010 are not so impressive if one envisage achievements in qualitative terms. The efficiency and competitiveness of Serbian SME companies are low in comparison to EU countries. The Government recognized that at the end of the last decade was right moment to shift SME support into more qualitative one. The Strategy for support efficiency and innovation was defined and Serbia started to implement specific policy measures. Fast growing and innovative SME have the most important role in this more qualitative approach. Moreover, those SME seem to be more flexible and stronger (resistant) than average (SME) company in crisis circumstances. The aim of the paper is twofold: firstly to illuminate new approach to SME support in Serbia and secondly, to envisage business results of innovative and fast growing SME in Serbia in crisis circumstances.

## Keywords

Crisis, gazelles, innovation, SME

## 1. Introduction

After political changes at late 2000 Serbia started overall market reforms. Among others a set of measures was introduced to strengthen SME and their role within the economy. Before world economic crisis started Serbian SME became important economic subject with high share in total employment, total number of companies and GDP formation. As the Government considered that a critical number of SME was established, as a strategic goal, the emphasis of supportive policy shifted into more qualitative.

Serbia in 2009 faced with deterioration of overall business climate after years of high rate of GDP growth. In 2010 for the first time more shops were closed then newly established. It seems that companies oriented more toward global market also suffered. There were signs of modest recovery and economic growth in 2010. Among SME micro and small companies



were successful in reorientation in business activities and recovered a bit, but medium scale companies could not and suffered mainly. From the second quart of 2011 there are clear signs of repeated recession, mainly due to financial problems within EU. During the first ten months of 2011 business demography was negative again for shops and for the first time for companies, as well.

Serbian companies, including SME, are less competitive and less efficient in comparison to EU average and other transitory economies in the Region. Serbia defined and started to introduce Strategy for competitive and fast growing SME in the period 2008-2013. For the first time some European reports on innovation development and ICT implementation covered Serbia. Some starting steps regarding support of innovation, competitiveness and ICT use within SME were realized. Figures show that innovative SME can easier then other companies to adjust on worsen economic circumstances.

In order to become more competitive on the global market Serbia should to implement those qualitative measures to support fast growing, and innovative SME. Considering negative business demography for shops and mediums scale companies those measures would be combined with quantitative one, prevailing in the past, in order to increase employment and support economic recovery.

## 2. SME are facing new recession

During transitory period SME sector developed fast and reached high share in total number of companies, GDP and employment. However, it was less successful in level of efficiency and competitiveness on the global market. Global economic crisis affected Serbian economy from the late 2008. All companies, including SME, faced severe problems, with certain differences among different sort of SME. One could see modest economic recovery from end of 2009 and during 2010, but from second quart of 2011 it seems that recession is coming again.

*During past ten years SME sector has developed with respectable growth rate and became important economic subject.* In 2010 the share of Serbian SME in total number of companies reached 99.8%, 45.4% in total employment and 33% in total GDP. At the same time those companies generated 44.5% of total export, while 52.3% of total import and 43.9% of total investments [1].

Considering macroeconomic environment for business it has to be noted that effects of world economic crisis were not annulled, but thanks to measures introduced some modest recovery was achieved with GDP growth of 1% in 2010. However, it was not enough to return to the level of economic activity in 2008 (drop of GDP in 2009 was 3.6%). The main consequence of overall crisis are as follows: FDI inflow is decreasing (the share of FDI in total investments dropped from 68% in 2006 to 24% in 2010), worsening credit conditions, including increasing interest rate (increasing country risk) and decreasing credit volume, decreasing external demand, increasing unemployment, increasing budget deficit (up to 4.5% of GDP) and external debt (74% of GDP)<sup>25</sup>.

*In such environment micro and small companies somewhat recovered their activities and refocused to less risky business, but medium scale companies in 2010 fully suffered, because they are less adaptive to worsen conditions.* So, it mainly influenced difficult recovery of overall SME sector.

Positive signals in SME development in 2010 can be summarized [1], as follows:

Number of companies is still increasing (1.1%),

Economic activity is improving (turnover increased 0.3% in real terms),

Productivity increased (5.7%),

- Profit increased (8.6%),

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<sup>25</sup> Republican Statistical office and National Bank of Serbia

- External trade volume increased (export 16%, import 2%).

At the same time negative signals prevailed and overall business environment deteriorated [1]:

- Decreasing tempo of company establishment, while closing of companies got momentum (each 10 establish companies covered by 10 closed, while 10 closed shops were covered by 9 new established only),
- Increasing unemployment (6.6%),
- Some economic ratios were under the average (profitability 36:39 and productivity 5.7:7.4) and some negative (GVA -1.4%),
- Regional discrepancies stood as same as before and industry concentration, as well.

After modest, but encouraging recovery from ending 2009 and during 2010, there are signals of so - called W effect – repeat recession, from the second quart of 2011, mainly due to negative development and fiscal policy problems in US and especially EU Southern periphery. The last projections corrected rate of growth down for 2011 and 2012 (USA 1.7% and 2% GDP growth, EU 1.6 and 0.2%) [2]. National Bank of Serbia did the same, correcting GDP growth down to 2% in 2011 and 1.5% in 2012 [3].

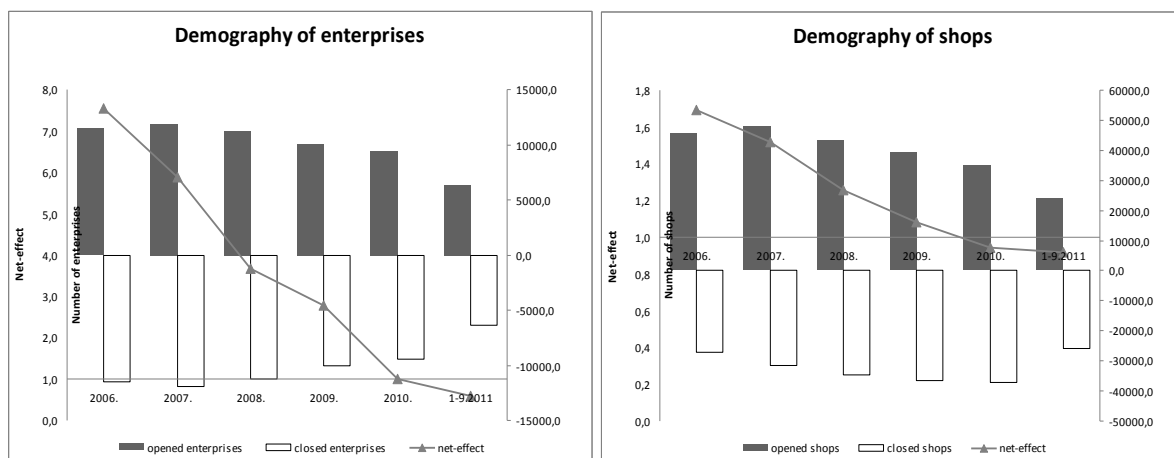
**Table 1** Serbia - Growth/fall of business indicators 2009-2010

	<b>Comp.</b>	<b>Micro</b>	<b>Small</b>	<b>Medium</b>	<b>SMEE</b>	<b>Large</b>	<b>Total</b>
2009.							
Number companies	226.241	76.243	9.873	2.470	314.827	529	315.356
Number Employees	259.383	153.074	200.954	259.129	872.540	435.751	1.308.291
Turnover (mill RSD)	924.491	935.282	1.229.336	1.291.436	4.380.545	2.078.312	6.458.857
GVA(mill RSD)	193.688	119.187	212.145	253.088	778.108	584.771	1.362.879
Export (mill RSD)	6.037	60.090	68.647	140.603	275.378	270.437	545.814
Number exporters	1.955	6.166	3.131	1.175	12.427	333	12.760
Import (mill RSD)	6.450	155.321	217.929	247.447	627.147	402.030	1.029.177
Number importers	2.556	12.040	4.252	1.452	20.300	398	20.698
Investments (mill RSD)	50.231	40.374	100.095	69.096	259.796	234.170	493.966
2010.							
Number companies	228.680	77.989	9.614	2.257	318.540	504	319.044
Number Employees	232.176	153.264	194.450	234.695	814.585	412.966	1.227.551
Turnover (mill RSD)	805.140	1.074.186	1.396.636	1.401.972	4.677.933	2.482.401	7.160.334
GVA(mill RSD)	185.300	136.832	234.073	261.213	817.417	645.309	1.462.726
Export (mill RSD)	6.534	83.040	95.023	155.248	339.845	393.232	733.077
Number exporters	1.822	6.366	3.116	1.102	12.406	321	12.727
Import (mill RSD)	6.531	163.930	247.223	262.865	680.549	573.291	1.253.840
Number importers	2.230	11.922	4.163	1.379	19.694	396	20.090

Source: Statistical Office of RS processing by Republican Development Bureau

Business Demography data proves deteriorating economic climate in 2011 [4]. The tendency of increasing number of closed and decreasing number of newly established SME continued. In first ten months of the year 7.097 new enterprises were established (12% less than year

earlier) and 26.519 new shops (12% less then year before). However, *for the first time during the transition number of those closed was higher then those established in meantime for both shops and companies*. The relation between number of new established and closed companies was 0.6:1 (net effect) and for shops 0.9:1.



**Figure 1 Business Demography**

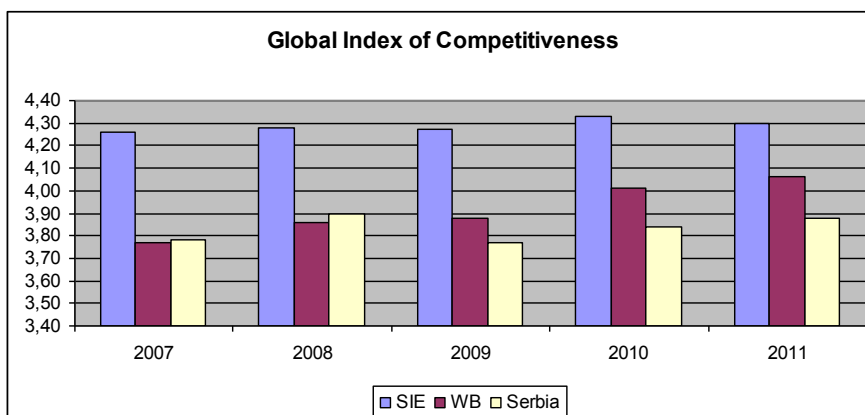
Source: Republican Business Registry, processing by Ministry of Finance, Department for National Development

### 3. Innovation and competitiveness improvement

According to the Global Competitiveness Report 2011 prepared by the World Economic Forum Serbia was ranked as 95<sup>th</sup> of all 142 countries, with Global Index of Competitiveness (GIC) of 3.88. In comparison to year earlier Serbia improved its position for one and GIC was improved for 0.04. It is obvious that improvement was modest, even if one consider enlargement of the list of countries included from 139 to 142 [5]. If we compare Serbian rank and GIC value with countries of South East Europe and Western Balkans in the period 2007-2011 then two sub - periods can be distinguished. In the sub - period 2007-2008 Serbia was on the level similar to the Western Balkan average according to both; the rank and GIC value, but during the last three years the discrepancy widened. During the Crisis Serbia worsened its position firstly for eight and then for further three places, although GIC value was improved from 3.77 to 3.84. The deeper investigation of those results pointed very interesting results. At the same time countries of Western Balkan improved their positions for nine places in comparison to 2008. It can be explained either by stronger influences of the crisis to the real Serbian competitiveness or by the structure and quality of data included into GIC value.

The analysis of GIC structure was performed in order to measure separate influences of the first group of results obtained on the basis of pool investigation (soft data) and the second group of results extracted from statistical data basis (hard data) [6]. The investigation pointed out that worsening of Serbian rank during the crisis period can be explained with 2/3 by worsening values of data obtained from pool investigation (soft data), as values based on statistical data (hard data) were not changed a lot. The analysis also found that all countries of Western Balkan had higher GIC value according to soft sub - indicators in comparison to GIC value of GIC based on hard data (obtained exclusively on the basis of statistically comparable data), excluding Serbia and FIROM only. The highest discrepancy above GIC average for soft data can be seen for Croatia and Albania, while for Montenegro values are same for soft and hard data. At the same time for Serbia GIC values for hard indicators are for 20% less then for soft sub - indicators. The results reported by World Economic Forum are important and low Serbia ranking, as well, whatever realistic or not. Generally speaking, the low ranking resulted in a bad image of the certain country within world economic

environment, with bad signals especially to potential foreign investors and different rating agencies, which implies high country risk and increasing interest rate.



**Figure 2** Global Index of Competitiveness

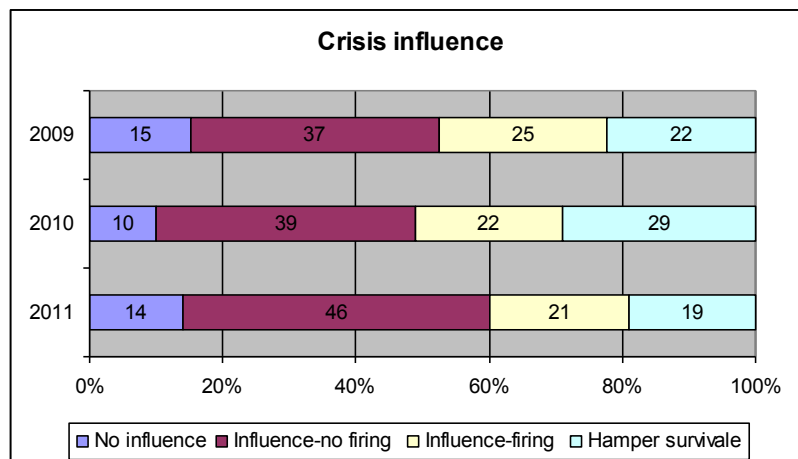
According to the Report of World Bank “Doing Business 2011” Serbia was ranked as 89<sup>th</sup> out of 183 countries ranked. Serbia was better ranked than B&H, Greece and Moldova. It is matter of worrying that Serbian reforms slow down with all negative consequence to the business environment, including competitiveness. In comparison to countries from Western Balkan Serbia is above average according to credit granting procedure and procedure of closing of enterprises. At the same time the rank of Serbia was worsened maximally in relation to firm establishment procedure and company start – up, which explains a lot.

Knowledge and innovation based development is the key of development strategy formulated by EU “Europe 2020” [7]. In development of the knowledge based society Serbia is lagging behind EU-27 average and advanced transitory economies within the Region, in spite of its constant improvement. The education level of citizens became one of the limiting factors for the goal mentioned above. The average education level of citizens in Serbia is increasing, but slower than in EU. According to results of the pool investigation for 2010 educational structure of citizens above 15 years of age is as follows: 3.2% are non - educated, 34.5% are with primary school, 48.4% secondary school level and 13.9% university degree [8]. Only positive sign is the share of citizens with secondary school level higher than in EU-27 (44.6%). At the same time qualification structure of Serbian employees is not favorable, as well. There is tendency of increasing share of the above secondary school level in total employment, while decreasing share of qualified workers. The Comparative analysis pointed high share of secondary school employees (56% while EU-27 is 49%), low share of those with primary school (16% and EU-27 is 22%) and low share of employees with university degree (21% while EU-27 is 29%) [9].

*It was proved that those transitory economies with highest level of innovation activities are at the same time the most advanced in the knowledge based society characteristics. According to the investigation for 2010 Serbia is among modest innovators together with Latvia, Turkey, Bulgaria, Lithuania, FIROM and Romania. Serbia has average value of innovation index 0.237 and lagging behind EU-27 average (0.516) and advanced transitory countries. In comparison to countries within the Region Serbia has a better performances than Bulgaria and FIROM, in line with Romania and lagging behind Croatia (less) and Slovenia (more) [9]. Considering innovation comparative advantages of Serbia are: human sources, openness toward global market, quality and performances of the research system and effects (results). At the same time disadvantages are: intellectual capital and innovators.*

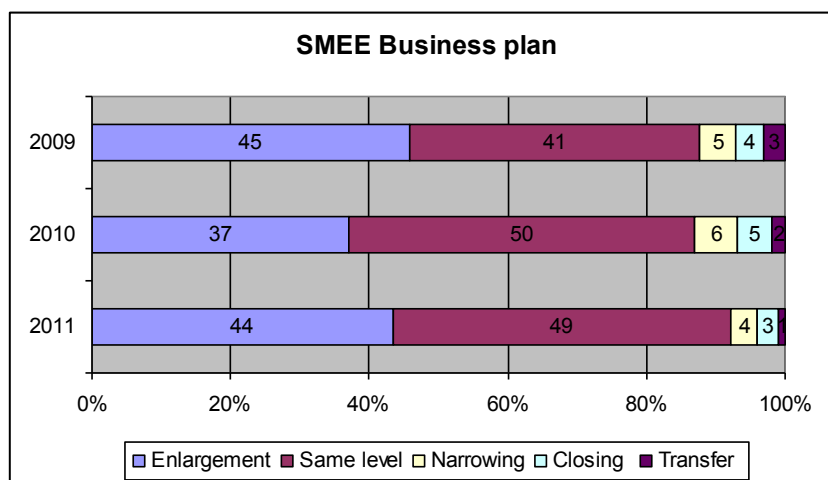
Volume and quality of ICT use in all aspect of the society (business, administration, and every day life) is key factor for achievements in transition and the knowledge based society.

*There is fast development of ICT use in Serbia, but it is still behind EU-27 average and advanced countries in the Region. In 2010 there were 2.4 million of Internet users, with increase of 2.3% in comparison to year earlier. Internet is used the most often by companies (97% and similar to EU average 98%). However, Internet use by households is pretty lower (37%, while in EU 70%). The situation is somewhat better regarding internet use by citizens (44%, while in EU 71%). There is positive development in Internet access, as broadband access is increasing, while modem access is decreasing and highest increase was evident for DSL (ADSL) access [8].*



**Figure 3** Crisis influence

The National Agency for Regional Development in 2011 realized investigation on the basis of questionnaire for SMEE, with aim to examine current state, problems and need of SME and entrepreneurs<sup>26</sup> [11]. *The main finding is that fear regarding crisis by SMEE was somewhat less emphasized in 2010 in comparison to year before, but was stronger in 2011, even more then in 2009.* SME is usually establishes as limited company, ¾ of covered SME are running business for more than 6 years, 2/3 are 36-55 years of age and only 1/5 have women as a manager. Considering financing sources for financing current assets 24% are of external sort, while 44% are external for investments.



**Figure 4** SMEE Business Plan

There were downfall in investments and investment plan from 2009 to 2010 (from 60 to 47% and 61 to 53%, respectively), but investments and investment plans were improved in 2011 (63% and 63%). Serbian SME are not well equipped, as ½ of SME have equipment 5-9

<sup>26</sup> The statistical sample covered 3.500 SME and entrepreneurs of all sorts: micro, small, medium and entrepreneurs.

years old, 1/3 equipment older than 10 years and only 1/5 of SME have recently produced equipment. The one fourth of SME covered by the investigation introduced some certificate on standards, which proves that SME are domestic oriented mainly. Among all SMEE 1/7 are involved in some kind of innovative activities, and 1/14 have experienced some kind of cooperation with other business subjects or institutions in innovations. When questioned about problems and limits SMEE pointed as the main as follows: the lack of financial sources, legal environment for business, lack of workers with specific knowledge and qualification, discrepancy between business and quality standards and the lack on informations on market and technology. The Investigation pointed out illiquidity problem as very important, as SME are late in payment and repayment on regular basis, as well. The prerequisites for business improvements are seen as follows: the Government support (30%), less state limits (20%), stronger banks support (17%), the local community support (17%), better cooperation (8%) and better management (7%). Less then half of SMEE see its own business enlargement in the future (44%), out of which medium sized companies more than others (59%), 32% micro, 46% small and 29% shops.

For the first time Serbian SME were subject of investigation, precisely innovative companies, fast growing companies and gazelles, in broad EU environment [10]. Those companies from EU countries were analyzed comparing the current state in 2009 and in 2011<sup>27</sup>. One third of SME (33%) in the EU stated that they have introduced a new or significantly improved products or services to the market. This was the most likely innovative activity among SME in EU. Over a half of SME in Malta, Montenegro, Serbia (53%) and Latvia said that they have introduced a new or significantly improved products or service in the last 12 months, much higher then in EU. The spread of activity is somewhat more pronounced with regard to introducing a new or significantly improved production processes or methods. Malta had significant increase, on the one hand, and decrease was noted in Romania, on the other hand. Serbia (53%) again, together with Montenegro and FIROM, was above EU average (32%). Regarding introduction of new organization of management during the last 12 months EU average is slightly above 1/5 of SME, while Serbia (35%) together with Czech Republic and Montenegro were pretty higher with organizational innovation introduced in SME. During the last year around two fifths of SME in Ireland and Malta have introduced a new way of selling gods or services, ahead of Romanian and Greece, while Serbia was on the level as Malta (40%).

When asked how much their firm had grown on average per year over the last 3 years in terms of number of employees, the largest proportion of SME in EU (39%) said they have experienced "no growth". At the same time over 1/4 (26%) said that their business did see growth of up to 20%, a further 11% said that their *business grew over 20% per year (so - called gazelles)* and finally, nearly 1/4 (23%) said that their business "got smaller". The proportion for Serbia measuring employment growth was as follows: 11% (got smaller), 28% (no growth), 45% (growth up to 20%) and 17% (*over 20% of growth*). Those results are not surprise as Serbia was in the first phase of SME development, when fast employment growth can be expected. In terms of turnover EU-27 proportion (for 2011) is: 15% (*over 20% per year*), 37% (les then 20%), 20% (no growth) and 26% (got smaller), while Serbian proportion is: 19%, 16%, 43% and 22%. Unfortunately, majority of Serbian SME are facing severe problems and fewer chances then before. *The investigation also covered gazelles, as high growth companies with average growth over 20% per year, and included both SME and LSE.* According to the investigation in EU-27 2% of all companies can be labeled as gazelles and in Serbia 1%, only - not surprisingly. It is interesting to note that the analysis proved that innovative companies increased faster than non innovative. The proportion for growth of turnover for innovative companies EU-27 was: 18:37:18:25 and non innovative: 12:36:23:27.

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<sup>27</sup> Although data for Serbia (and other countries of Western Balkan) were given for 2011 only and can be questioned regarding quality and objectivity, as it was investigation on the basis of questionnaire fulfilled by SME managers, results are interesting and useful.

## 4. Conclusion

Serbia was successful in developing relatively strong SMEE sector, which became important economic agent in the period 2001-2008 with high share in GDP formation, in total employment and foreign trade. It was result of improvement of overall business climate due to market reforms introduced, but supportive measures realized in an aim to establish critical number of SME, as well. After the global economic crisis started to influence negatively the national economy overall business climate deteriorated, GDP dropped and foreign demand and FDI inflow, as well. SME suffered, among them micro and small companies the most at the first moment. Those companies succeed to reorient their activities to less risky productions and services, in line with overall economic recovery at the end of 2009 and during 2010. At the same time medium scale companies still suffered, which mainly influenced modest performances of SMEE sector. Serbia enacted Strategy for support fast growing SME and gazelles before the crisis came and some pioneering steps were performed. This is very important activity considering EU experience, which proved that fast growing and innovative companies are better adapting to worsening overall economic conditions. It is also relevant as one can conclude that in the future Serbia has to improve efficiency and innovation of SMEE in an aim to be more competitive on the global market. From the second quart of 2011 there are clear signs of so - called "W effect" – repetition of the recession on the global level and in Serbia, as well. In Serbia for the first time in the first ten months of 2011 business demography was negative for shops and companies also, which indicates fears and low expectations of entrepreneurs. At this very moment it would be important to combine qualitative supportive measures for fast growing SME and gazelles and to introduce again quantitative measures with broad support to SMEE in order to stop negative business demography [12].

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# Innovation Management in New Product Development Processes

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Although the process of innovation is one of the most important drivers behind the growth and prosperity of today's global economy, it is still not clear for many organizations how they should address this challenge at a strategically, tactical and operational level. This paper aims to address specific problems in carrying out new product development processes. There are crucial issues related to product design processes like inefficient project management, increasing product complexity, conflict management, shortfall of existing methods and tools, and high failures in new product introduction. A new approach has been proposed for a system based platform, which consist of a product platform, a process platform, and a technology platform. Even if there is no single solution to these complex problems the proposed method can offer a more structured way of attacking the issues.

## Keywords

Innovation, Project management, New Product Failures, Platform Based Product Development

## 1 .Introduction

The challenge for organizations is to master the process of innovation by creating new competitive advantages as creating more attractive products, using better processes or delivering better services.

Products are here in accordance with David Smith's [1] terminology understood as tangible physical objects. Services as typically intangible things like education, after sale service and maintenance. When producing products and offering services companies use processes. Not only understood as manufacturing processes in which materials are transformed into shaped products but also like working processes like project management processes etc.

Product innovation may be divided into incremental innovation, modular innovation, architectural innovation and radical innovation. In the radical innovation new components are linked in a new configuration or architecture. This strategy and the architectural innovation, where improved components are linked into new configurations, may contribute to the Blue Ocean Strategy defined by Chan Kim and Renee Mauborgne [2].

Now we see innovation models which link changes in scientific insights, in technological capabilities, in product design and in market demand. Innovation also means creative destruction of established habits and routines. That is why people often resist changes and therefore produce obstacles to systematic innovation. To overcome this it is vital to have a culture and basic values in the organization where innovation is the focal point. That is why innovation is a matter for the top management as well as for the board of directors.

Innovation management is about realizing changes and readiness to move into new areas and adapting new knowledge and building new competencies in particular fields. Tidd & Bessant [3] introduces the key factors for managing the innovative processes in relation to its



products, processes and technologies. Effective implementation mechanisms, project management skills, ability to develop both the market and the technology simultaneously. The ability to manage sourcing and to identify key competencies which should stay in house may lead to competitive advances for the company. Effective external links to establish close interaction with markets, with suppliers of technology and knowhow and other organisational players are crucial for enabling the innovative process. Having a good understanding of user needs and involving lead users in the development will improve the chance of success.

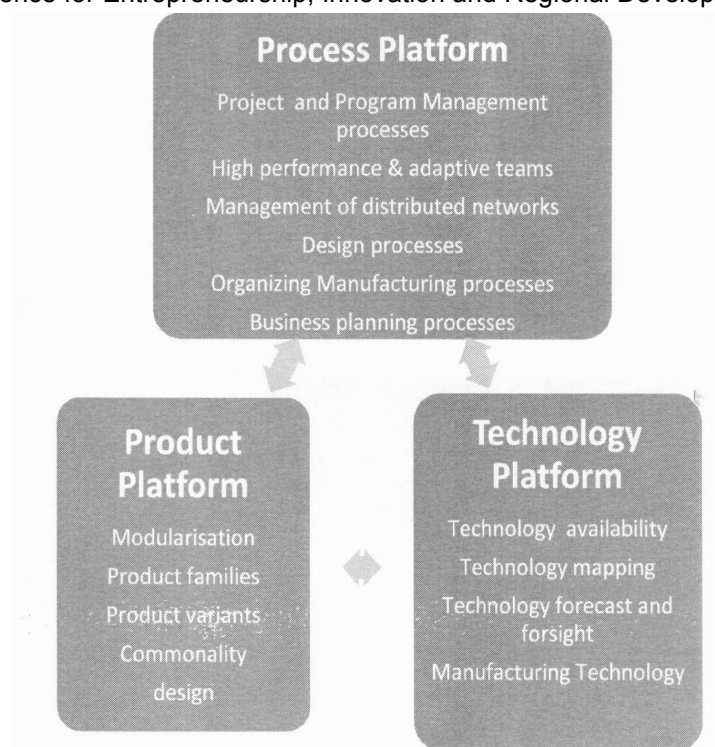
Not many authors offer operational models for product development processes; In the KUBUS model Herlau and Tetzschner [4] put focus on the project phase where the basic ideas of the innovation project are created and developed. Cooper [5] states that firms have made the system more flexible, adaptive and scalable, and he developed Stage-Gate system in mid-1980s as an operational model for driving new products to market. Jim Highsmith [6] argues that linear thinking, prescriptive processes, and standardized, unvarying practices are no match for today's volatile product development environment. So as product development processes swing from anticipatory to adaptive, project management must also change. It must be geared towards mobile experimentation, and speed. But first, it must be geared to business objectives.

It is clear that there is a strong need for more holistic and operational model for carrying out innovative product development processes. The following chapters will give more details of our proposed platform based product development process.

## 2 .The Proposed Platform Based Model

In fig. 1 we present a holistic model which gives an answer on how we can pin down the key factors for approaching a successful new product development process (NPD). The overall system platform consists of interacting elements; the product platform, the process platform and the technology platform.

Figure 2. The System Platform Model for NPD Processes New Ideas 3 Proceedings of International Conference for Entrepreneurship, Innovation and Regional Development ICEIRD 2012



**Figure 2** The System Platform Model for NPD Processes

### ***The product Platform***

It is the base of how the product portfolio is constructed, which common constructional building blocks form the individual product configuration and link the products within the product families together. A well structured product platform will improve the firm's ability to react fast on new market demands and launch new product variants with less impact on the supply chain. This means at the same time keep a lean and agile NPD process which normally is known as contra dictionary processes. The product platform is closely interfaced to the supply chain. A well structured product platform may be more robust to unpredictable dynamic changes in the supply chain and it will give the supply chain manager a better room for establishing a more robust supply chain.

The Product platform thinking must be tightly connected to the understanding of the actual market demands and the future trends. It is impacted by the development of the technologies used in the actual products and manufacturing processes as well as future trends in the development of new technologies, which may cause more radical innovation.

### ***The Technology Platform***

It defines the technological foundation of the products and manufacturing processes. Which technologies are forming the backbone of the product and processes and are unique for the position of the product on the market and for the manufacturing of the product. This platform must be defined and recognized in the organization and be protected by means of Intellectual Property Rights (IPR), knowledge transfer and development. In the innovative organization focus must be on developing methods for technology forecasting and scouting. Open innovation environments with close cooperation with universities and other knowledge sources may be valuable for detecting future trends in the technological development.

### ***The Process Platform***

It links the two other platforms together. In the global market, the organization launching new product onto the market must possess competences within forming high performance teams acting in an agile project oriented environment in a global context. On one hand, standard procedures for carrying out project activities as well as experienced and certified project managers may create a robust basis for the innovative and creative processes. On the other hand, new ways of creating virtual networks using new technologies may be investigated. The challenge is to combine quality thinking and innovative thinking in a new way. Highly educated and motivated people connected in global networks must know the organization's overall business goals, basic ideas and policies as a frame-work for acting as innovative high performance teams. The maturity of the system platform and the adaptability of this to the ongoing processes decide how agile the product development process can run and therefore how fast and adaptive the process is executed.

## **4. Conclusions**

Through the last decades organisations have changed their culture and habits because of new business philosophies such as TQM, lean manufacturing and project management. Adapting to these, companies are now confronted with the demand of innovation management, which considerably conflicts with the previously adopted philosophies. Radical innovation is based on a culture where risks are taken while TQM and project management try to diminish uncertainties and failures. Increasing focus on the customer needs, competition and the market, together with global sourcing and networking will push the development of new knowledge about how to handle innovation in a practical way.

A new platform based model has been described to show new ways for overcoming these obstacles as it is an operational and holistic approach. It enables companies to investigate tools on tactical and operational levels. New Ideas 4 Proceedings of International Conference for Entrepreneurship, Innovation and Regional Development ICEIRD 2012 The future work will concentrate on developing the present concept into a more detailed model, which will be tested in praxis.

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# Crowdsourcing: Past, Present and Future

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**Crowd sourcing refers to engaging crowds to solve problems which would otherwise be performed by internal or external employees. Crowd sourcing, the term for which was coined by Wired magazine journalist Jeff Howe in 2006, is a growing phenomenon, and has become a dominant means for accomplishing work online. It is a distributed problem-solving model that has emerged in recent years. Crowd sourcing is a growing phenomenon, which has been strikingly boosted by the advent of the Internet. Despite its vibrant presence in the popular press, extant literature witnesses limited academic studies on it. Studies on crowd sourcing are mostly based on single case studies. However, firms' incentive structures and users' motivational factors differ from one platform to another as the activities are different from one to another. The objective of this study was to explore the overall crowd sourcing platform phenomenon by considering issues such as incentive, inception, motivation, countries of origin, and the evolution of crowd sourcing platforms. The data were collected in between October and December 2011. To accomplish this objective, data from over 400 online crowd sourcing platforms was collected by visiting each platform. The names of the platforms were found from literature and several websites where platform names are listed. The overall structure of incentive, inception, and motivation are revealed. Moreover, geographical dispersion of online platforms shows very interesting insights.**

## **Keywords**

Crowd sourcing, Incentive, Motivation, Online Platforms, Proliferation

## **1. Crowd sourcing**

Crowd sourcing refers to engaging crowds to solve problems which would otherwise be performed by internal or external employees [2]. Crowdsourcing, the term for which was coined by Wired magazine journalist Jeff Howe in 2006, is a growing phenomenon, and has become a dominant means for accomplishing work online. It is a distributed problem-solving model that has emerged in recent years [1]. However, the concept of crowdsourcing goes

back to the 18<sup>th</sup> century when the Oxford dictionary was crowdsourced by volunteers providing word definitions on paper slips. Similarly, in 1715, a contest called the Longitude prize was held to find a navigation solution. The concept encompasses widely distributed problem solving in which tasks are posted on a website to crowds as an open call. Interested crowds solve posted problems in return for incentives. Crowdsourcing helps organizations to improve productivity and creativity and minimize research expenses [3]. Firms have been traditionally relying on internal staff for innovation [4]. Organizations are outsourcing creativity to get fresh ideas [5]. One way of idea outsourcing is “crowdsourcing”. Many firms have been successfully using online crowdsourcing platforms to tap the wisdom of crowds. For example, Lego (design), Starbucks (coffee), and Threadless (t-shirts) attract thousands of consumers to suggest, discuss, and vote on new product ideas [6]. Crowdsourcing is an important development in the past decade for technological and social innovation. Innovation is no longer limited in closed wall because good ideas can come from outside of company [10]. Over the past years, numerous ideas have come out based on the contribution of huge numbers of crowds [7]. Wikipedia is a classic example of this kind. Crowdsourcers use project-oriented volunteers and/or contestants and these crowds are flexible, self-trained and self-maintained [8]. Even though crowdsourcing contests attract tremendous attention, there are limited theoretical and empirical studies on it [9].

Open source software is an initial evidence of this phenomenon [11]. There are numerous applications for crowdsourcing facilitated mainly by the Internet. The most common applications include compiling the efforts of multiple people to solve a problem or to create, for instance, a new product, facilitating the participation of people to democratic decisions, building general knowledge bases and wikis, or collaborating to make arts or music. Vukovic presents a categorization for existing crowdsourcing platforms [12]. According to Vukovic, the different functions of crowdsourcing are design and innovation, development and testing, marketing, and sales support. The platforms found in support category include, for instance, Amazon Mechanical Turk, FixYa.com, GetSatisfaction.com and Askville by Amazon. These represent examples of community-information centric systems that are newer versions of online help systems developed from user groups and discussion forums. So far, almost all, if not all, of the studies on crowdsourcing are based on single case study. The incentives vary from one platform to another. Hence, we tried to see the global holistic perspective of crowdsourcing platforms. The definition of crowdsourcing given by Howe is very broad [13]. It is not possible to distinguish what is crowdsourcing and what is not from his definition. Brabham tries to draw a boundary between what is crowdsourcing and what is not [1]. For the sake of simplicity, we considered platforms where unknown people engage, contribute and share to generate some kind of new ideas and contributions, as a whole.

The objective of this study is to understand the overall crowdsourcing platform phenomenon by considering incentive, inception, motivation, countries of origin, and the evolution of crowdsourcing platforms. The rest of this paper has been structured as follows. Section two describes the methodology adopted for this study. Section three includes the analysis and discussion. Finally, the conclusion is drawn in section four.

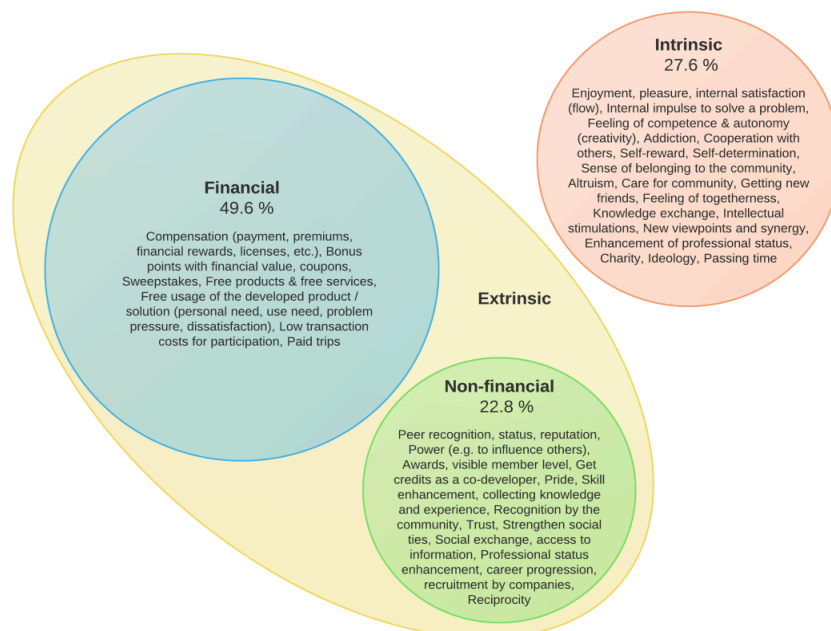
## **2. Methodology**

Data from over 400 online crowdsourcing platforms was collected by visiting each platform. The names of the platforms were found from literature and several websites where platform names are listed. Each platform website was visited and information on incentive, inception, country of origin and type of task performed in the platforms was collected. In some cases, several visits were needed to get adequate information. Moreover, press releases, news, and people working with platforms, are considered as additional information sources. The data was collected mostly between October and December 2011.

### 3. Analysis and Discussion

#### 3.1 Incentives and motivations

The overall incentive categories used in different platforms have been collected. We broadly classified them into two categories: 1) Financial Incentives, and 2) Non-financial Incentives. Financial incentives are single time incentives, perpetual or based on revenue from idea generated. The range of financial incentives is very wide and largely depends on the task accomplished. They can range from several hundred US dollars to one hundred thousand US dollars. On the other hand, non-financial incentives are numerous and it is challenging to array them into different clusters. So, the size of incentives not only varies in different platforms but also within a single platform. It includes both financial and non-financial incentives. Extrinsic incentives are mostly used in the online platforms for crowdsourcing. Extrinsic incentives are used in 72.4 % of the platforms and intrinsic motivation is used in the remaining 27.6 % (Fig. 1).



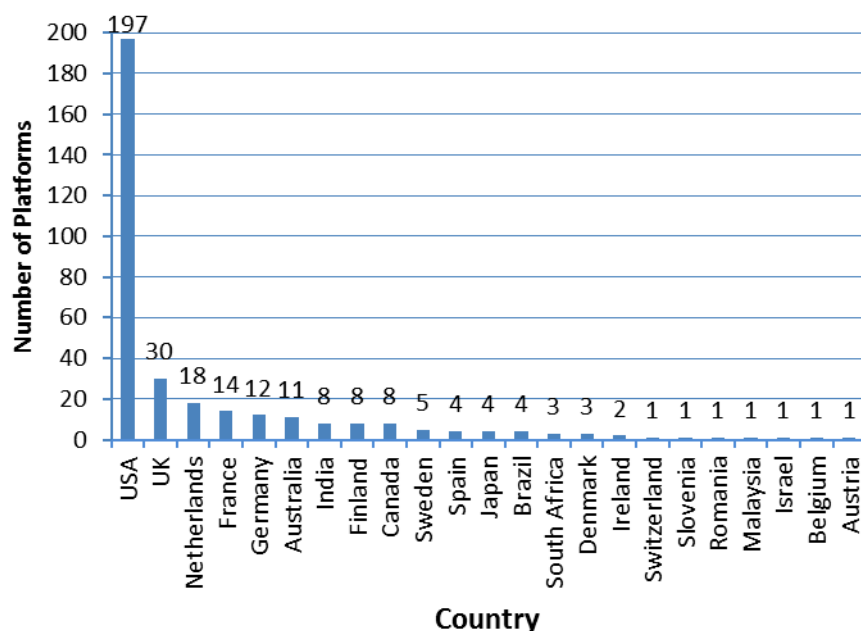
**Figure 1** Primary incentives and prevalent motivation for participation in online crowdsourcing platforms (n= 268)

It has been revealed that in 49.6 % of the considered platforms, financial incentives are used. Moreover, within extrinsic incentives, financial incentives include 50% of the total platforms considered. Several platforms listed more than one incentive with the emphasis on financial incentives. Half of the platforms utilized financial incentives, whereas intrinsic and non-financial incentives were primary incentives in around a quarter of the platforms. Users' motivation to participate in online platforms is numerous as shown in Fig.1. In the vein of the incentive classification, motivational factors are primary classified into two categories: 1) Extrinsic, and 2) Intrinsic. Moreover, extrinsic motivational factors have been divided into two segments: 1) Financial and 2) Non-financial. The list of motivational factors is very wide and consists of a large range of factors. Financial motivational factors are relatively lower than non-financial and intrinsic factors. Financial motivational factors include compensation, bonus points, free products, free use of development products, lower transaction cost, free trips etc. On the other hand, non-financial extrinsic motivational factors include peer recognition, status, reputation, power, awards, credits for contributions, skill enhancements, trust, social ties, social exchange, additional information, career opportunity, reciprocity etc.

Intrinsic motivational factors consist of enjoyment, pleasure, internal satisfaction, inner guts to solve problems, feeling competent, autonomy, addiction, self-reward, self-determination, altruism, care of community, getting new friends, a sense of belonging, knowledge exchange, time passing, and ideology, among many others. Extrinsic motivational factors are more dominant in crowdsourcing platforms.

### 3.2 Geographical Origins of Platforms

In the age of the Internet, many people believe that the geographical location of people and country of origin, language spoken etc. are not issues to consider. Our study revealed strikingly different picture of this idea.

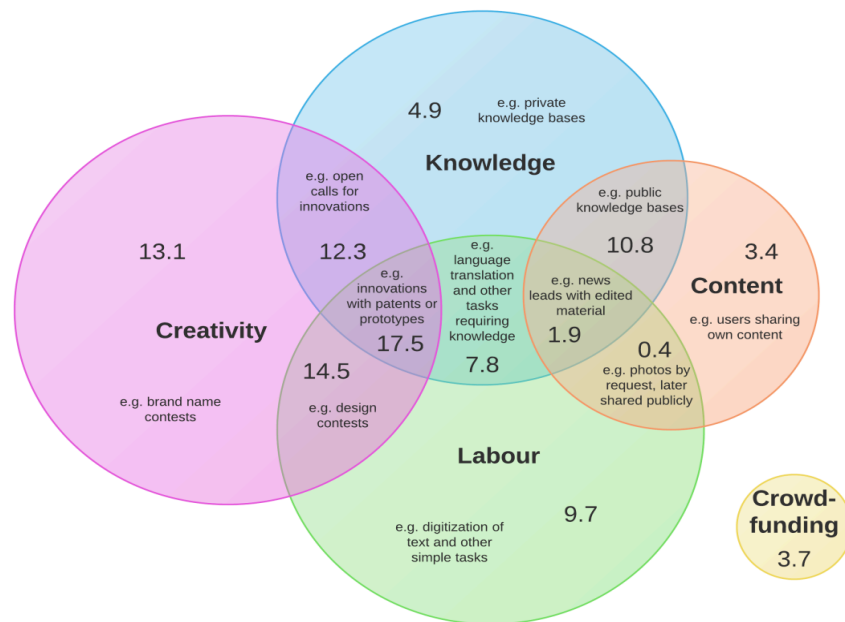


**Figure 2** Country-wise Origin of crowdsourcing platforms (n= 345)

Among the platforms considered for this study, a total of 197 online platforms originated from the USA (Fig. 2). UK is the second most common location of platform origin, though the number (30) of platforms in UK is much lower than the number of platforms in the USA. The Netherlands (18), France (14), Germany (12), Australia (11), Finland (8), and India (8), are the other dominant places of online platform origin. Additionally, in most of the other developed and highly developing countries, the idea of online platforms is present.

### 3.3 Value of Crowd sourcing on the Platforms

The value gained in the crowdsourcing platforms was divided into five categories: labour, knowledge, creativity, content and funding (Fig. 3). The first four of the above are considered to be the main categories. Among these four main categories, creativity, knowledge, and labour etc. are almost equally present in crowdsourcing platforms. 57% of the crowdsourcing tasks in the platforms involve creativity. Knowledge was crowdsourced on approximately every second platform (55.2 %). Labour crowdsourcing follows the previous two categories (51.8%). Content was crowd sourced in nearly every sixth (16.5 %) platform. Typically value was gained in more than one category at a time; the most common case was crowdsourcing knowledge, creativity and labour, e.g. arranging an open call for innovative products. Crowd funding was used in 3.7 % of the platforms.



**Figure 3** Value of crowd sourcing in percentages (n= 268) and examples of the categorisations

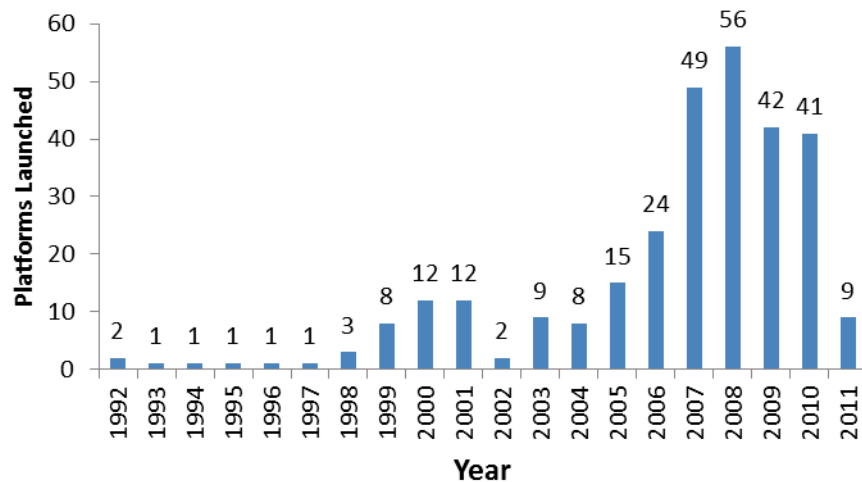
Many of the platforms do crowd source several types of value (Fig. 3) simultaneously. On the other hand, some of the platforms are heavily involved with only a single category of crowdsourcing. As we see in the above figure of a Venn diagram, value gained overlaps in many of the four major categories.

Moreover, in the categorical relation, creativity and labour (32%), creativity and knowledge (29.8%), knowledge and labour (27.2%) etc. are almost equally prevalent. However, content category has most relation with knowledge category (12.7%) followed by the relation with the labour category (2.3%). The relation among creativity, knowledge and labour is remarkable at (17.5%).

### 3.4 Evolution of crowd sourcing platforms

How the trend of crowdsourcing platforms evolved over the years has been analysed. The launching of crowdsourcing platforms is highly noticeable in 2007 and 2008. In 2009 and 2010, the launching of crowdsourcing platforms plummeted, with only nine platforms being launched. As 2011 is still on-going, analysing the number of platforms launched this year is not possible. Overall, the last several years have been a booming time for crowdsourcing.





**Figure 4** Year of launch of crowdsourcing platforms (n = 296)

Even though online crowd sourcing platforms have been used from the early 90s, the movement has gained attention primarily in the late 1990s and in the early 2000s. From early 2000s, the number of crowd sourcing platform launches has been increasingly continuously.

## 4. Conclusions and Foresight

This study is the first of its kind because to the best of our knowledge, no study has been conducted to determine the overall motivational factors and incentives used in different platforms, geographical locations, and value gained thorough crowdsourcing under in different categories and the sectors where the crowdsourcing phenomenon is more widespread. Both financial and non-financial incentives are almost equally important. However, incentive largely depends on the type of activity to be accomplished. Generally, in time consuming, scientific problem solving tasks, financial incentives are predominantly used. Moreover, in tedious tasks, the presence of financial incentives is evident. Both financial and non-financial motivations are almost equally dominant in crowdsourcing platforms. Extrinsic motivation is more dominant than intrinsic motivation. Geographical origin of the location of the crowdsourcing is heavily concentrated in the USA followed by some European countries. The presence of crowdsourcing platforms in developing countries is not an evident.

The values gained thorough online crowdsourcing platforms, under four categories; creativity, content, knowledge, and labour are almost equally present. Value gained in the content category is less prevalent. Crowd funding is a relatively new and growing phenomenon in the crowdsourcing arena. The evolution of crowdsourcing platforms started primarily in early 2000s and it is growing strikingly.

This study has several limitations. The information has been collected from various sources, which may not be fully reliable. There might be many platforms which use other communication languages than English, so collecting information from those platforms is beyond our scope. Future studies may consider more detailed information, such as considering variables like the number of employees, turnover, profit margin, growth, challenges etc. Moreover, platforms which used language other than English could be included so that more platforms can be included.

As the study shows, crowdsourcing phenomenon has proliferated considerably during the last decade. Different tasks from small, mundane work to creative, industrial problem solving can be outsourced even in small scale to a vast pool of labour with often relatively low cost. As a phenomenon this is an interesting research subject, since in addition to studying the

development of the phenomenon in the past, it might be extremely interesting to study the possible future developments that crowdsourcing could inflict.

Perhaps the most radical, although not the most far-fetched consequence of the crowdsourcing phenomenon could be a profound change in the concept of work for the modern society. Crowdsourcing could enable a change in not only the mundane, mechanical working tasks, but also in the creative and knowledge-intensive tasks, such as research and development of a company. And, as we see from the results of this study, this is already a reality in many fields although not in a full scale. But still, there is a substantial possibility, be it then a risk or an opportunity, that crowdsourcing enables a similar revolution to knowledge-intensive workers than industrial automation did for the blue collar workers in the 20th century.

## Acknowledgement

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# Bottom of the Pyramid is the Next Focus for Open Innovation

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Open innovation is a relatively newly emerged idea and so is the concept of base of the pyramid (BoP). So far, the open innovation concept is largely considered in developed countries and some highly developing countries. Moreover, this concept is focusing on high income customer group. 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 base 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. There are strikingly a large number of people who are living with very low income. Moreover, they have increasing access to information and communication technologies. The products and services should be developed to fit this group of people with little individual purchasing power but huge market as a whole. Now, no one can be considered as isolated. Everyone is a part of global village. There are some challenges to tap this group of people. Open innovation could help to alleviate these challenges. But we need to concentrate on the low income stratum for sustainable development.

## Keywords

Base 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 the high income customers is considered as exceedingly competitive comparing the middle class and the low income markets. Prahalad [1] believe that there are over 4 billion people in the world who are considered as poorest socio-economic group and this group is largely ignored in the eyes of the multinationals. The concept of BoP is to new profitable business opportunities through satisfying the needs of the disadvantaged groups in a society [1], [37]-[40].

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. 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. 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]. Dissemination pattern of innovation ideas 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. World's R&D share had increased from around 10% in 1990 to 21% in 2000 [11], [12]. 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.



**Figure 1** \$5 trillion market at the BoP (total by income segment) [41]

The BoP makes up 72% of the 5,575 million people and a large majority of the population live in the developing countries such as Africa, Asia, Eastern Europe, and Latin America and the Caribbean [41]. The people of this stratum have purchasing power of \$5 trillion.

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, an 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. 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.

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.

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].

Larger number of people lives at the bottom of the pyramid. Around four billion people live at the lowest stratum and their income per annum is less than \$ 1500 [31]. 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.

### 3. 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].

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 countries 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. 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.

#### 4. Challenges at BoP and Solution through Open Innovation

Karnani [42] criticises BoP for being concentrated in seeing BoP people mainly as consumers. He also claims that the profit opportunities at the BoP are modest at best and any initiative to alleviate poverty should consider the poor as producers. Companies should therefore review their supply chains and stress on buying from the BOP markets instead of selling to them. London and Hart [44] suggest that existing biases associated with top-of-the-Pyramid markets can blind managers from the realities of conducting business at the base of the Pyramid. Whereas, Karnani [42] advocates that the best way for private companies to help eliminate poverty is to invest in upgrading the skills and productivity of the poor and to help creating more employment opportunities for them. Challenge and Hurdle are shown in the Table 1.

**Table 1** Challenge and Hurdle to Bop Recommendation Derived from the Strategy Literature [41]

	Recommendations from BOP Research	Challenges and Hurdles
Ability to Create Value	<p>Multiple strategies aimed at different income levels.</p> <p>Need for new resources and capabilities.</p> <p>Local access of resources/capabilities.</p> <p>Fundamental rethinking of business models and supply chains.</p> <p>Multiple partnerships.</p> <p>Selling to the poor.</p>	<p>Lack of focus and spreading resources too thin; inadequate capabilities.</p> <p>Value known only in their existing use; value in new uses, particularly in BOP environments, unclear.</p> <p>Resource scarcity and lack of factor markets.</p> <p>Causal ambiguity of finding the right configuration; difficulty of combining many individual factors into a complex business model.</p> <p>Alliances tend to fail; potential for conflict may limit effectiveness and efficiency.</p> <p>Creates a focus on cost cutting because income levels are not increased.</p>
Costs	<p>Need for new resources and capabilities.</p> <p>Local access of resources/capabilities.</p> <p>Multiple partnerships.</p>	<p>May take too long to be practical; cost-benefit assessment in new uses difficult.</p> <p>Unclear what information is available to value them correctly and why they would create profits.</p> <p>Governance costs.</p>

Relying on present technology, products, partners, channels, and metrics may not work. Rather than creating centrally developed ‘one-size-fits-all’ global solutions, or adapting solutions created elsewhere to local conditions, successful pursuit of base-of-the-Pyramid markets seems to require companies to build, consolidate, and leverage learning through the ‘bottom up’ [44]. Seelos and Mair [41] opine that challenges of BOP recommendations can be overcome. The need for companies to coordinate various strategies aimed at different income groups can be avoided by having two separate organizations operating the pro-poor business model and the higher income business model respectively (table 1). Often, it might be necessary to collaborate with other companies, governments or organisations, sometimes everything must be done alone as certain suppliers or distributors might not exist at the BoP. Partnerships might also cost more time and effort compared to value gained. Process innovation is a critical step in making products and services affordable and accessible for the poor [37]. Localisation demands extra costs and effort. How to deliver is as important as what to deliver to the consumers. Crucial challenges for innovation in BOP markets revolved

around redefining the process to suit the infrastructure. For fresh innovations, companies should also keep in mind the capability levels of customers as well as cultural aspects.

## 8. Conclusions

The concept of BoP comprises poor people with very low incomes. In contrary, the open innovation concept largely focuses on rich countries and the customers with high purchasing power. Now, it is important to consider open innovation to meet the needs of the people with low incomes. Open innovation brings numerous opportunities for the companies to boost their businesses. Closely scrutinising these two concepts can be useful to develop products and service which may well fit for the low income people. There are challenges and hurdles to approach this matching but proper combination may have benefits for the companies, the customers, and the society as whole.

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# Entrepreneurship and SMEs' Competitiveness

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Entrepreneurship is considered as a central force of economic development, as it generates economic growth. The entrepreneurs create new jobs for themselves and others. They provide society with different solutions to management, organisation and business problems as well as to the exploitation of entrepreneurial opportunities. Entrepreneurship is the main mediator of change. Promoting a country's small and medium enterprises (SME) sector plays a crucial role in maintaining high employment and income generation and is therefore critical for achieving sustainable growth. Competitiveness is considered to be a prerequisite for maintaining high levels of income and employment. Competitiveness can be assessed at the enterprise level. SME capacity building requires dedication by key stakeholders. SMEs face a number of challenges. A high level of competitiveness is a result to a lot of factors. These include appropriate business models and strategies, the ability to enter a market, and strong leadership, access to capital and technological development. Many of the initiatives to develop competitiveness of the SMEs focus on the areas of financial assistance, business matching, partnership and technological development. SMEs, the major component of the private sector, can be engines of economic growth, foundation for creativity and innovation, and basis of entrepreneurship. SMEs competitiveness is determined by the business environment in a country, together with other factors, such as the level of innovation, the availability of specialized research and training services, the availability of capital, etc. SMEs in R. Macedonia have great potential that still needs to be realised. This paper will focus on entrepreneurship and its relation to SMEs' competitiveness, with a specific emphasis to Macedonian case, using the examples of the companies supported of Business Start up Centre Bitola.

## Keywords

Competitiveness, Economic growth, Entrepreneurship, Small and medium enterprises

## 1. Introduction

In entrepreneurship is the act of being an entrepreneur, which can be defined as "one who undertakes innovations, finance and business acumen in an effort to transform innovations into economic goods". This may result in new organizations or may be part of revitalizing mature organizations in response to a perceived opportunity. In more recent times, the term entrepreneurship has been extended to include elements not related necessarily to business formation activity such as conceptualizations of entrepreneurship as a specific mindset resulting in entrepreneurial initiatives e.g. in the form of social entrepreneurship, political entrepreneurship, or knowledge entrepreneurship have emerged.

Small and medium sized enterprises (here and after SME) are found in a wide array of business activities. Statistical definition of SMEs varies by country and is usually based on the number of employees, and value of sales and/or value of assets. Its competitiveness is crucial for development of the business and taking a competitive advantage in front of the other companies. This paper will describe firstly the basic concepts of entrepreneurship, then the crucial factors for SMEs competitiveness, then the linkage between entrepreneurship and SMEs competitiveness globally, as well as in R. Macedonia and the example of the Foundation Business Startup Centre Bitola. (here and after BSC Bitola)

## **2. Entrepreneurship-Basic Concepts**

The word entrepreneurship has many meanings. Many people use the terms entrepreneurship and small business owner as synonyms, but in reality these terms are different and there is a difference between entrepreneurship and small business. Entrepreneurship differs from businesses in the following ways:

Benefits - versus traditional employment and the gradual increase of the average profit, entrepreneurs are millionaires

Speed of wealth creation - successful small businesses have a profit of several million during their existence, while this figure the chickens approach entrepreneurs often for 5 years.

Risk - the risk of an entrepreneurial venture is always very high.

Innovation - entrepreneurship often has to be a sustainable idea and a creative idea, while small businesses often are not of this type. Innovation can be a product or service, or the way it is implemented. [1]

Entrepreneurship is more than just a mechanical economic factor. Entrepreneurship has to do with change and is also commonly associated with choice-related issues. Existing definitions of entrepreneurship often relate to the functional role of entrepreneurs and include coordination, innovation, uncertainty bearing, capital supply, decision making, ownership and resource allocation. Indeed, three of the most frequently mentioned functional roles of entrepreneurs are associated with major schools of thought on entrepreneurship. [2]

The entrepreneurial process involving all the functions, activities, and actions associated with the perception of opportunities and creation of organizations to pursue them has generated considerable academic interest. However, there is a lack of an agreed definition of entrepreneurship and a concern over what entrepreneurship constitutes as a field of study. Like many other disciplines, there is growing concern that entrepreneurship as a discipline is fragmented among specialists who make little use of each other's work. [3]

The six key elements of entrepreneurship are the following: Motivation & Commitment: It's important to get the basic ingredients of start-up right; Abilities & skill: The second element is one of ability and skills. The individual has to have skills appropriate to the kind of business they're proposing to run; The third element is resources. That's not purely about money and equipment; it's also about intellectual capability. The fourth element is strategy and vision in terms of thinking four or five years ahead and having some idea of where that business might be in the future and putting in place a plan to achieve that goal; The fifth element is planning and organization; The sixth element is the idea and more specifically, the idea in relation to the market place. [4]

## **3. Small and Medium Sized Enterprises**

Small and medium-sized (SME) enterprises are a very heterogeneous group. SMEs are found in a wide array of business activities. Statistical definition of SMEs varies by country and is usually based on the number of employees, and value of sales and/or value of assets. Due to its ease of collection, the most commonly used variable is the number of employees.

The EU and a large number of OECD, transition and developing countries set the upper limit of number of employees in the SMEs between 200-250, with a few exceptions such as Japan (300 employees) and the USA (500 employees). [5] On 6 May 2003 the Commission adopted Recommendation 2003/361/EC regarding the SME definition which replaced Recommendation 96/280/EC as from 1 January 2005. [6]

Contribution of SME can be observed in a number of aspects such as employment creation, income generation and distribution, poverty alleviation, training grounds for the development and upgrading of entrepreneurship skills and as important vehicles for promoting forward linkages in geographically and economically diverse sectors of the economy in many countries.

SME development requires a crosscutting strategy that touches upon many areas (e.g. ability of governments to implement sound macroeconomic policies, capability of stakeholders to develop conducive microeconomic business environments, inter alia, through simplified legal and regulatory frameworks, good governance, abundant and accessible finance, suitable infrastructure, supportive education, sufficiently healthy and flexibly skilled labor as well as capable public and private institutions, and the ability of SMEs to implement competitive operating practices and business strategies). Thus, SME development strategy must be integrated in the broader national development strategy and/or poverty reduction and growth strategy of transition and developing countries.

Dialogue and partnerships between the stakeholders (public sector, private sector and civil society) fosters ownership of these strategies, engenders them more implementable (by better addressing SME needs), making them politically credible, and sustainable. Access and integration into local, national, and global markets require substantial investments in sustainable institutional and physical infrastructure development and service delivery to SMEs in all areas, including those that are rural and/or remote. Continued dialogue and partnerships between stakeholders into implementation and review of supportive measures, particularly, those related to capacity building in executing institutions, yields improved outcomes.[5] The influence of the role of entrepreneurship on economic development has been explained by a number of authors. [7]

## **4. SMEs Competitiveness**

Effective participation of SME in a developing economy has many advantages, as demonstrated in the successful development. While there has been some progress on other aspects of SME support (especially credit provision), "linkage-inducing" policy is for the most part a new and experimental area. Horizontal cooperation among SMEs contributes to "collective efficiency"--the competitive advantage derived from local external economies and joint action. The benefits from trade between--or cooperation among--small firms are related in part to the fact that the most efficient small firms are usually those that restrict the range of functions they perform, relying on market transactions to supply the other required products and services. This is one of the requirements of successful clusters of SMEs as well. Public policy is important both in the provision of relevant general and technical education and of technical assistance, short courses and the like. The successful SME countries of East Asia, beginning with Japan, have strong technical support systems to complement large-to-small technical assistance and to raise the efficiency of smaller firms more generally. [8]

Competitiveness can be viewed from vantage point of firm's potential versus actual performance. Factors for competitiveness are the following: relative market share, relative profit levels, sales, relative productivity, quality, technology, innovation, management, organization, marketing, costs and price. Static Competitive advantage is consisted from: price/costs, cheap labour, abundant raw materials. Dynamic Competitive advantage is consisted from: product/process quality, innovation, invention and new products, problem-solving to meet specific, often sophisticated market.

Technology is a vital engine of competitiveness. The more dynamic and forward-looking regional SMEs are adjusting by upgrading old technology and acquiring new technology, but the majority of SMEs still use outdated technology. Research and development are also critical and more mechanisms like the entrepreneurship and innovation are needed. Entrepreneurship and innovation are the driving force that continually creates new competitive advantages and opportunities for profit and growth. Competitiveness is most sustainable when based on technology, innovation, invention and quality. SMEs constitute the largest economic and business entities and assume a major role in employment generation. As such, many member countries place great importance on the development of the competitiveness of SMEs so that they can serve as the engine of growth for national economies.

A high level of competitiveness is attributable to a number of factors. These include appropriate business models and strategies, the ability to penetrate a market, and strong leadership. The SMEs, being small enterprises, however, will have to take into account other additional factors, such as access to capital and technological development. Given this, many of the initiatives to develop competitiveness of the SMEs focus on the areas of financial and capital assistance, business matching and partnership with large corporations, and technological development.

National competitiveness is based on numerous and diverse factors: institutions, infrastructure, macro economy, health and primary education, higher education and training, market efficiency, technological readiness, business sophistication, and innovation. The private sector can contribute to economic growth, job creation, and national income—and hence to national prosperity and competitiveness. Invariably, domestic private sector resources in any economy are much larger than actual or potential external resources. The private sector contributes substantially to the Gross Domestic Product, and thus unleashing domestic resources—both financial and entrepreneurial—is likely to create a more stable and sustainable pattern of growth. Governments are becoming more sensitive to the need to create a friendly business climate, supportive of the needs of the private sector.

SMEs the major component of the private sector, can be engines of economic growth, cornerstones for creativity and innovation, and seedbeds of entrepreneurship. [9]

## **5. Entrepreneurship and SMEs competitiveness**

Faced with growing challenges from globalization and the related shift towards a knowledge-based economy many countries altered the stance of entrepreneurship and SME policies. Stronger emphasis came to be placed upon innovation as a key agent driving firm productivity growth. Emerging as a major target variable of entrepreneurship and SME policies, innovation generally spans a wide range of different forms, including product, process, individual and collaborative innovations. Under the new policy approach, business start-ups and SMEs with high growth potential as well as collaborative innovations have generally been singled out as priority areas.

A successful entrepreneurship and SME policy evolves through time with the maturing of both innovative processes and supporting service units. Three policy phases are usefully distinguished, the first one spurring research and development and innovation. During the second phase, the innovations are spread through improved scientific networks, specialized institutions and better access to venture capital. In the third and final phase, the innovative momentum gathers pace stimulated by learning effects and the transition to the knowledge economy. A successful entrepreneurship and SME policy evolves through time with the maturing of both innovative processes and supporting service units.

With stronger research and development efforts, better education and training opportunities, stronger innovative activity and expanded support services and networking facilities, most large firms and many SMEs are internationally competitive. Stimulating the growth-oriented entrepreneurial activity of these “excluded” firms requires broadened support programs, tailor-made network building, as well as better policy co-ordination among major stakeholders of entrepreneurship and SME policy. Moreover, creating collaborative innovations will help small and micro firms enter international markets. Rising SME exports will then contribute to reducing the large current account deficit, opening doors for interest rates to fall. This sequence points to the indirect link connecting the internationalization of SME activities and the easing of barriers to finance. [10]

As a key element in securing the competitiveness of developed countries, entrepreneurship is even more central to developing countries trying to attain competitiveness in international markets. There are various strands in the empirical literature on entrepreneurship and economic growth using different measures of entrepreneurial activity. For instance, while one strand of empirical studies measures entrepreneurship in terms of the relative share of economic activity accounted for by small firms, other studies use data on self-employment, the number of market participants (competition) or firm start-ups as an indicator of entrepreneurial activities. The growing number of SMEs and increasing outsourcing by large firms are a reaction to greater dependence on flexibility and knowledge as factors of production brought about by technological change and the intensification of global competition. Smaller business entities appear to be better suited to cope with the conditions of increased globalization, since they show higher flexibility and propensity to innovation and are an outstanding vehicle for channeling the entrepreneurial ambitions of individuals. [2]

In the frames of the European Union, the new Program for the Competitiveness of enterprises and SMEs will run from 2014 to 2020 and will focus (besides other activities) to strengthening the sustainable competitiveness of EU enterprises. And as a result member States will be in a better position to maintain the competitiveness of their industrial basis, increase the number of their entrepreneurs, and raise their employment rate. [11]

### ***5.1 The Macedonian case-the link between entrepreneurship and SMEs competitiveness***

In Macedonia, entrepreneurship is guaranteed by the Constitution category. The Strategy for SME Development (2002-2012) is the basis for creating entrepreneurial setting. Reforming the business environment gives positive results, but it is a process that constantly needs to be upgraded. In the strategy for SME Development are defined general guidance to the sector's development of entrepreneurship and SMEs in the Republic Macedonia. In this strategy as the main objectives to be achieved by end of 2013 are as follows: Increasing the number of SMEs, Increasing the number of employees, increasing the participation of SMEs in GDP.

One of the major premises in the economic strategy of the Macedonian economy is the commitment to open and market economy that means accepting the principles of liberalization and integration of markets. So with cheaper, higher quality and recognizable products, the Macedonian economy should become more competitive in European and other markets in the world. This approach ensures the long term growth and solves the current problems in our economy, especially unemployment and trade deficit. In order to improve the competitiveness of the economy, we implement policy reforms, programs and measures to reduce the cost of business in Macedonia.

In terms of industry development the goal of the Macedonian economy is to increase the competitiveness of domestic industry, based on knowledge, innovation and research that will lead to growth and development, creating a stimulating business and investment climate and support enterprises to improve their competitiveness and access to new markets. This policy is consistent with the industrial policy of the European Union, which follows the

recommendations of the Lisbon strategy to create knowledge-based economy, innovation and entrepreneurship. There are defined several areas of intervention: an international collaboration of key players in economic development, applicable research, development and innovation, environmental technologies, products and services for sustainable development, SME development and entrepreneurship, and collaboration clustering and networking. Considering the fact that competitiveness is a complex category, it is necessary to affect the various measures aimed at increasing the capacity of firms with new knowledge, encourage research and development, enabling easier access to information and measures that encourage collaboration, creativity and development of entrepreneurial spirit among firms. There are several programs: Program to encourage the competitiveness of Macedonian products and services, program development of entrepreneurship, innovation and competitiveness of small and medium enterprises, and Program for Development of Clustering, which will create a favourable climate for work and encourage the development and competitiveness of SMEs and the economy.

No less important for improving the competitiveness of firms is clustering, that encourages cooperation in clusters and business networks by regional connectivity and networking of cluster associations, support the formation of new clusters, cluster-organization of a regional conference, etc. In order to improve access to loans with favourable interest rates, important is the role of the Macedonian Bank for Development Promotion (MBDP). This is one of the major reforms to support the business and because the government. Furthermore fiscal policy reforms, (the introduction of flat tax, reduced tax rates and income tax and etc). By reducing the costs of doing business in Macedonia, the companies become more competitive. [12]

In order increase of the competitiveness of Macedonian enterprises, first it has to be analyzed the real needs which are related in terms of training and skills for their employees. The definition of training needs is a priority because it will contribute to defining the relevant training needs for companies will also contribute to the development of policies for SMEs and increase the competitiveness of Macedonian products and services to domestic and foreign markets through increasing the effectiveness and efficiency of enterprises.

Although in recent years the market for training and capacity building has increased dramatically, we can say that very often it is offered to meet this market demand by companies. This is the result of inadequate analysis or surveys conducted in the country that it should, but does not show the actual needs of enterprises in the area of training. National, comprehensive analyses of training needs of the enterprises are still not in the Republic of Macedonia, according to research done by the Agency for Promotion of Entrepreneurship of the Republic of Macedonia and the Fund for development of human resources. The development of the SME sector in the country and providing the necessary support of the sector are very important priorities.

## ***5.2 Business Startup Centre Bitola support of entrepreneurship and SMEs competitiveness***

Foundation BSC Bitola supports small and medium sized enterprises and promotes the entrepreneurship in R. Macedonia. BSC helps the companies to be more competitive on the market on different ways. BSC Bitola has different strategies for promotion of entrepreneurship and competitiveness.

SMEs are still not enough good in marketing and sales, and lack of training and quality control and production management. This image of enterprises, which account for 99 percent of the Macedonian economy, imposes a serious need for access in activities in the field of education and training for small and medium companies, so they can bring in good shape and become competitive on foreign markets. Therefore BSC Bitola supports the entrepreneurship and SMEs competitiveness through:

- Business Plan Competition, supporting entrepreneurs in the development of their business ideas, with awards including access to the portfolio of benefits below;
- Business skills trainings
- Loan Guarantee Fund
- Business Incubator tenancy space for eight startups, free to use and access BSC-Bitola services and facilities (e.g. conference room, training room).
- Technical and financial support for company registration, plus access to professional consulting, mentoring and coaching services (database of consultants and trainers used in prior activities).
- ISO and HACCP certification training, consulting and financing services (50% co-financing of certification expenses up to €10,000)- (service provided from 2008-2010)
- participation in conferences, exhibitions, workshops, business forums and other promotional events and preparation of promotional materials for certain industries
- Business planning, marketing, market access and promotion services, plus numerous professional seminars and training opportunities in technical and administrative areas.
- Access to BSC publications: more than ten publications

Below is the table with the results presented of BSC Bitola reached in the field of the support of entrepreneurship in the period from 2007 till present.

**Table 1** Results from the support of the entrepreneurship and SMEs competitiveness

	<b>Results (2007-present)</b>
Supported companies	186
Job places	326
Promoting export and new employment in small and medium sized enterprises through co-financing of internationally recognized standards such as (ISO, HACCP, CE)	Total amount of support 200.000euros  Number of companies 53
Number of business trainings conducted	121
Number of participants in the business trainings	2864

Furthermore, in order to increase the competitiveness of Macedonian enterprises, analyze of the real needs which are related in terms of training and skills for their employees are needed. The definition of training needs is a priority because it will contribute to defining the relevant training needs for companies will also contribute to the development of policies for SMEs and increase the competitiveness of Macedonian products and services to domestic and foreign markets through increasing the effectiveness and efficiency of enterprises. Therefore the BSC Bitola offers business skills trainings in order of promotion the competitiveness of the supported companies.

The ability of SMEs to create, access and commercialize new knowledge on global markets is fundamental to their sustained competitiveness. Also Business Startup Centre makes efforts through principle strategies to support competitiveness including:

- The network strategy, in which SMEs work and co-operate with other firms, be they SMEs or large enterprises in order to improve their ability to access and absorb innovations.



- The cluster strategy, in which SMEs locate in close proximity with competitors in order to take advantage of knowledge spill-overs, especially in the early stages of the industrial lifecycle.

## 6. Conclusion

The hypothesis that entrepreneurship is linked to economic growth and SMEs competitiveness finds its most immediate foundation in simple intuition, common sense and pure economic observation: activities to convert ideas into economic opportunities lie at the very heart of entrepreneurship.

Entrepreneurship is a source of innovation and change, and as such spurs improvements in productivity and economic competitiveness. Entrepreneurship is closely associated with knowledge and flexibility, two factors that have gained new significance as a source of competitiveness in an increasingly globalized world economy. With technological change and the intensified global competition brought about by globalization and economic liberalization, the assumption that fostering entrepreneurship means fostering a country's competitiveness today appears more valid than ever.

It is up to the SMEs to implement competitive business operating practices and business strategies. However, the options available to SMEs are also closely related to the quality of institutions, markets and organizations that constitute the business environment. It is the efficiency and effectiveness of institutions, markets and organizations that encourage or discourage SMEs to take their cues for learning new ways of doing business, compare their own competitive characteristics with those of their rivals, and makes their decisions to invest, including the introduction of innovations into their business strategies. If the environment is weak, SMEs' ability to detect market signals that would enable them to invest and grow will also be weakened. SME development cuts across sectors, involves multiple stakeholders and necessitates concerted actions by the public and private sectors. Therefore, SME development should be mainstreamed into the national development framework. Building up market institutions should be accompanied by capacity building of appropriate institutional structures. To enhance SME competitiveness, therefore, requires the creation of enabling legal, regulatory and administrative environments, access to finance and capable institutional structures, and most importantly human capital and a sustainable environment.

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# A System Dynamics Approach towards the Role of Innovation in Fostering Trade and Regional Development throughout Southeastern Europe

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Recent developments in the international economic landscape, in conjunction with the strategic location of the region of Southeastern Europe (SEE), further highlight the substantial role that the region can have in the worldwide trade operations context. In addition, the relationship between the technological competitiveness and trade is well documented. Thus, SEE countries need to encourage the development of novel, entrepreneurial and innovative businesses and leverage the latent dynamics underlining the development of innovative products, services and organic changes in order to usher a new era of growth that can foster increased trade volumes and prosperity throughout the region. However, assessing the output of innovation in relevance to trade can be quite challenging. To that effect, System Dynamics (SD), a simulation-based technique that has been proven quite successful in policy-making and strategy decision-making, could be employed to capture the relationship between innovation capacity and the ability to export national innovation performance in terms of goods and services. Such modelling could provide interesting managerial insights about the merit of innovations towards trade and financial growth. In the past, SD has been employed only infrequently to model innovation and trade. Under this contextual framework, and motivated by the desire to support analytical research on innovation and trade, in this work we propose: (i) a new methodological approach for the structuring of innovation to foster trade in innovative offerings, within the confines of the globalized environment, and (ii) a first-effort generic SD methodological framework that could assist governmental authorities, regulators and managers in designing and adopting effective policies for monitoring and assessing the relationship between innovation and trade performance.

## **Keywords**

Innovation, Southeastern Europe, Strategic framework, System Dynamics, Trade

## **1. Introduction**

The recent recession throughout the EU has triggered a number of dismal chain reactions in the regional economy of SE Europe. It is widely admitted that within the confines of the current financial crisis, one way for countries to enhance their economic development is through overcoming the obstacles that limit competitiveness and export performance. However, a major prerequisite for developing national export capacity is innovation [1]. It is well documented that national competitiveness affects positively export performance and the composition of merchandised goods [2], [3]. Under this context, Southeastern European

(SEE) countries need to improve their export position in innovative offerings through undertaking initiatives that will assist them in the opening of new markets and in the reduction of their production costs. Southeastern Europe, a geographical region that suffered major political instability in the past, has been integrating within EU, while the latter has undertaken many objectives towards this goal such as the "European Territorial Cooperation" objective and the "Investment Compact for South East Europe" program. These initiatives aim at fostering investments in SEE and promoting trade initiatives in the region.

Nevertheless, the current political and financial crisis is a serious threat for the export performance of SEE countries. As a result, the emerging economies of Southeastern Europe will face a decline in the demand for their exports, while investments in the region are not considered any more a priority [4]. It is fact that SEE countries' exports contain on average only 5% of high technology products, whereas this percentage is 10% for Central and Eastern Europe and 20% for average OECD countries [5]. Thus, considering that the major proportions of regional exports refer to agricultural and textile products, it is clearly deduced that innovation policies should be implemented to boost competitiveness and promote exports of innovative goods and services.

In addition, despite the major investments by the EU in the area, the lack of monitoring tools to assess the impact of domestic innovation to the national export performance is a major setback in the overall effort. To that effect, this paper aims to provide a state-of-the-art critique to the key factors that affect the export of national innovation capacity in EU-15 and SEE region and to also develop a first-effort generic System Dynamics (SD) framework to assess the impact of policy-making decisions in relevance to innovation and export performance. This could assist governmental authorities, regulators and managers in designing and adopting effective policies for monitoring and assessing the relationship between innovation and the capability to export national innovation performance.

The remaining of the paper is organized as follows. In Section 2, we present the data and the methodology we followed in our analysis. In Section 3, we demonstrate the results of our statistical analyses. In Section 4 we introduce the SD model. In Section 5 we proceed to a short discussion and recommendations based on the results related to high-tech exports of SEE countries. We sum up in the last Section with conclusions.

## **2. Data and Methodology**

The current manuscript considers the Southeastern European Countries throughout the 2006-2010 period: Albania (AL), Bosnia and Herzegovina (BA), Bulgaria (BG), Croatia (HR), Greece (EL), Montenegro (MT), Romania (RO), Serbia (RS), The Former Yugoslavian Republic of Macedonia (FYROM) and Turkey (TR). These countries are characterized by new economic and political realities and over the past decade they have insituted significant economic reforms. However, SEE countries are in various stages of the accession process to the EU [6]. In addition, in a benchmarking effort we leveraged data from EU-15 countries which are considered developed countries and the cornerstone of the European development and prosperity. The EU-15 group is comprised by the following countries: Austria (AT), Belgium (BE), Denmark (DK), Finland (FI), France (FR), Germany (DE), Greece, Ireland (IE), Italy (IT), Luxembourg (LU), Netherlands (NL), Portugal (PT), Spain (ES), Sweden (SE) and United Kingdom (UK).

Data on exports were obtained by the International Trade Centre (ITC) that are based on the United Nations "COMTRADE" statistics. Regarding the exports, we only leveraged the data available to the SIC codes that relate to the medium and high technology products, such as electronics, optics and pharmaceuticals (SITC Rev. 3 product codes: 266, 267, 512, 513, 525, 533, 54, 553, 554, 562, 57, 58, 591, 593, 597, 598, 629, 653, 671, 672, 679, 71, 72, 731, 733, 737, 74, 751, 752, 759, 76, 77, 78, 79, 812, 87, 88 and 891). Respectively, there are the exports of knowledge-intensive services, which are measured by the sum of credits in

EBOPS (Extended Balance of Payments Services Classification). The classification codes of the selected services are: 207, 208, 211, 212, 218, 228, 229, 245, 253, 260, 263, 272, 274, 278, 279, 280 and 284. This product and services classification was carefully conducted after reviewing the relevant OECD categorization and the European Innovation Scoreboard (EIS) indicators for innovation. Furthermore, we accommodated the input of other seminal works regarding the impact of technology and innovation to the export performance of developed countries, both at a firm and at a national levels [7], [8], [9].

Data on innovation are obtained from the European Innovation Scoreboard. EIS attempts to benchmark, on an annual basis, the innovation performance of Member States, drawing upon statistics from a variety of sources, primarily the Eurostat and the Community Innovation Survey. The annual EIS reports are prepared by the Maastricht Economic and Social Research and the Training Center on Innovation and Technology (UNU-MERIT) with the contribution of the European Commission.

The overall innovation index of a country is estimated by capturing a number of other indicators, as these are identified by the EIS. The indicators that are used in this manuscript are: new doctorate graduates per 1000 population, percentage of population having completed tertiary education, public R&D expenditures (as a % of GDP), venture capital (as a % of GDP), business R&D expenditures (as a % of GDP), venture capital (as % of GDP), patent applications per billion GDP, the community trademarks per billion GDP, the SMEs introducing product and process innovations, and the SMEs innovating in-house and in-collaboration with others (as a % of SMEs).

Regarding our methodology, we are aiming at statistically determining those national innovation-related factors that relate to the export performance of SEE countries. In our analysis we leveraged data only for a five-year period (2006-2010) as data were available only for this period, as EIS is a new EU initiative. Naturally, the relatively modest sample size of data indicators poses several statistical challenges. The scale of measurement of the indicators is that of 0 to 1. In our statistical analyses Albania, Bosnia and Herzegovina and Montenegro were not considered as data for the innovation performance of these countries is not available.

Initially, we conducted a k-means cluster analysis of the EU-15 and SEE countries to identify the relative position of each country regarding its national innovation performance, as measured by Eurostat, and their ability to "export" this innovation. In this analysis, we determined also the k centroids, one for each cluster, and at a further extent we were able to identify the performance trend of each country.

Following the spirit of the above analysis, we conducted an ordinal regression analysis in order to serve a plethora of purposes. Firstly, ordinal regression helped us "screening" the factors that have a profound impact on the overall capability of exporting innovation, both in terms of medium and high-tech products and in knowledge intensive services. To a greater extent, ordinal regression assisted us in determining the relative classification trends of each country i.e. to calculate the possibilities that each country is well categorized in each class. Additionally, we leveraged the ordinal regression method to model the relationship between the ordinal outcome variable, i.e. the probability of a country falling within a particular category regarding the composite factors that comprise the effect of "Innovation", as identified by Eurostat. Finally, we applied the SD methodology to capture the export capability of a country considering relative factors in our framework.

### **3. Statistical Analysis & Results**

Initially, it is worthwhile pointing out the significance of national innovation performance to the societal prosperity in SEE countries by demonstrating that the Innovation Index (INI) is relevant to the national GDP per capita (GDP calculated at purchasing power parity, PPP). Within the period under study, from 2006 to 2010, there is strong statistical evidence that the

innovation performance is associated to the national purchasing power per capita (correlation coefficients of 0.879, 0.877, 0.904, 0.916 and 0.901 respectively for the years 2006 to 2010). The notable exception is Turkey where, despite being a low-innovator, the PPP in the country is relative high and in the same levels to that of Croatia and Romania.

In addition, we conducted a classification analysis of both EU-15 states and SEE countries in order to investigate the divergence among them with reference to their national innovation performance and their ability to create export dynamics through leveraging their domestic innovation capacity. As various SEE countries still aspire to integrate to the EU, this classification could provide an indication of the magnitude of the effort that is required in order to be able to reach analogous performance levels. Therefore, the classification analysis was based on the indicators of the INI and the Innovation Exports' Index (IEI) of each country.

To that effect, we need to clarify that IEI is a particular indicator that was developed and employed in our analysis, and is the weighted average of the normalized values of the indexes that represent the exports of Medium and High-Tech Product (HTP) and the Knowledge Intensive Services' (KIS) exports. This indicator represents the relative export capability of each particular country compared to analogous innovation performance of the EU-15 countries. The weighting coefficients of the two composite indicators were calculated as the corresponding percentage of either product or services exports' values to the total value (in thousands €) of both products and services exports. The weighting procedure was significant in order to consider the innovative export dynamics of each specific country under study towards its overall export performance.

Furthermore, to implement the statistical analysis, we concluded that the appropriate number of classes to be used would be three in order to extract realistic, interpretable and reasonable results (Table 1). The connotation of "High", "Medium" and "Low" in cluster characterization is based on empirical research of the indicators and the distances among the means of the corresponding classes.

**Table 1** Clustering of EU-15 and SEE countries based on the Innovation and Innovation Exports' Indexes national indicators for the period 2006-2010.

	<b>Cluster 1</b>	<b>Cluster 2</b>	<b>Cluster 3</b>
Cluster Characteristics*:	(High, High)	(Medium, Medium)	(Low, Low)
Countries:	United Kingdom	Greece	Serbia
	Denmark	Italy	FYROM
	France	Portugal	Croatia
	Belgium	Romania	Bulgaria
	Ireland	Netherlands	Turkey
	Austria	Spain**	
	Sweden		
	Finland		
	Germany		
	Luxembourg		

\*. (Innovation Index, Innovation Exports' Index).

\*\*.. In the case of Spain there were considered only the exports of Medium and High-Tech products due to lack of the relevant data over the Knowledge Intensive Services' exports.

The countries classified in cluster 1 are characterized by high levels of innovation performance (mean of cluster = 0.625) as well as high values of the IEI indicator (0.684). Additionally, the countries classified in cluster 2 are characterized by medium levels of innovation capacity (0.385) and medium competence regarding the IEI (0.486). Moreover, the countries classified in cluster 3 are characterized by low values of innovation index (0.217) and low shares of IEI (0.219).

The above statistical analysis clearly demonstrates that the EU member states outperform significantly SEE countries, excluding Greece and Romania. Notably, SEE countries demonstrate distinctive performances when merely considering this group of seven countries (Table 2); however, when compared to the agglomeration of the EU developed countries, most of the SEE states demonstrate analogous national innovation characteristics and export capabilities, and are categorized within the same, low-performance class. The sound exceptions are Greece and Romania. Greece, being benefitted by the merits of the EU integration and development policies during the last decades, exhibits the highest INI and IEI within the SEE region, while Romania, despite its low innovation capacity, demonstrates a rapid development in terms of its innovation export capability.

**Table 2** SEE countries based on their Innovation and Innovation Exports' indicators (2006-2010).

	<b>Cluster 1</b>	<b>Cluster 2</b>	<b>Cluster 3</b>
Cluster Characteristics*:	(Medium, High)	(Low, Medium)	(Low, Low)
Countries:	Greece	Croatia	Bulgaria
	Romania	Turkey	Serbia
			FYROM

\*. (Innovation Index, Innovation Exports' Index).

Herein, considering only the case of SEE countries, it is concluded that the countries classified in cluster 1 are characterized by medium levels of innovation capacity (mean of cluster = 0.287) and high shares of IEI (0.496). Additionally, the countries categorized in cluster 2 are characterized by low levels of innovation (0.230) and medium performance in terms of IEI (0.286). What is more, the countries inserted in cluster 3 are characterized by low levels of national innovation performance (0.208) and low values of IEI (0.171).

In accordance to the results from the analysis in Table 2, it can be inferred that Greece and Romania are the "leaders" in exporting their national innovation capacity. On the one hand, and considering the relevant data of products' and services' exports, Greece exhibits a leading performance (within its group) regarding the exports of national knowledge intensive services, almost three times to those of the medium and high-tech products. On the other hand, Romania demonstrates a more balanced performance between the exports of services and products. To a further extent, Romania can be regarded as the most exogenous SEE country as it demonstrates a significant increase in the export of its innovation performance during the last five-year period under study (~15% annual growth). Additionally, Croatia is characterized by high levels of innovation capacity when compared to the rest of the SEE countries (follower innovator). Nevertheless, it seems that the country fails to exploit the full potential of its innovation capacity and its exports attain very low levels. The major reason for this trend is that the country exports only products, whereas in the services' domain it is the worst performer within its group. Turkey on the other side is characterized by low levels of innovation capacity and presents an analogous performance to that of Croatia in terms of exports of products and services. Regarding Bulgaria, although the country is placed at the bottom of the innovation and exports rankings, it has made a leapfrog step forward as for its innovation performance with an annual growth rate of 9.2% resulting in a corresponding annual increase in its innovative exports of 16.8%. Serbia is a low performer in exporting products and mediocre one when it comes to services' exports. Finally, FYROM is referred for the magnitude of the increase in its annual exports as its IEI is the highest in the region (~35% annual growth).

To obtain a relationship that could assist policy-makers in identifying the classification of their country according to their policy implications, we proceeded to a regression analysis. Considering the ordinal regression analysis, this was based on the grounds of an ordinal classification of the EU-15 and SEE member states. To be more specific, we leveraged the Ordinal Regression procedure, or PLUM (Polytomous Universal Model), which is an

extension of the general linear model to ordinal categorical data. Despite the previous classification, at this point the categorization of countries was based only on the IEI. Following thorough case analyses, we concluded that four classes were appropriate in order to provide robust results and clear statistical separability of the available data. The new classification of the countries is tabulated below (Table 3).

**Table 3** SEE countries based on their Innovation and their Innovation Exports' national indicators for the period 2006-2010.

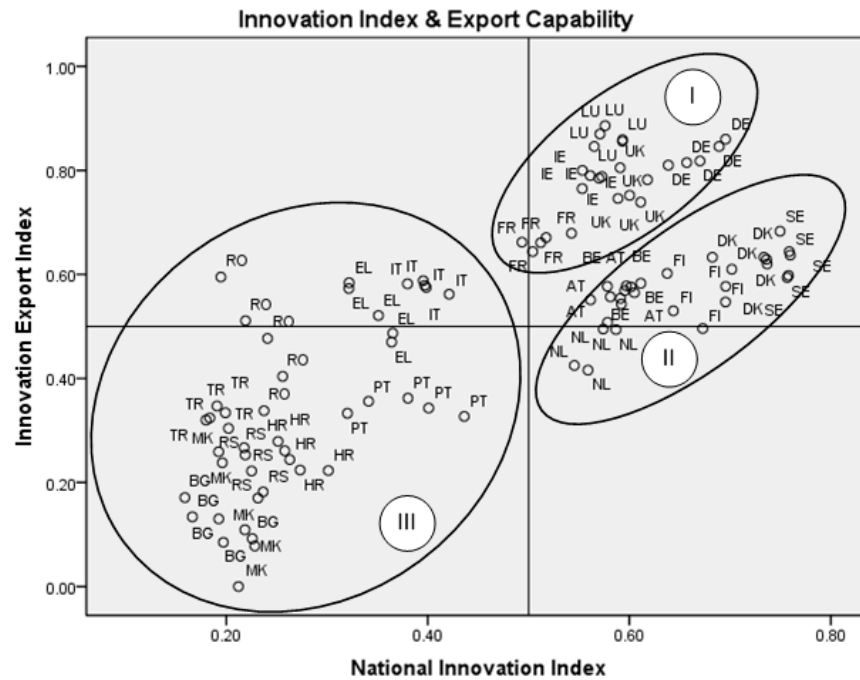
	<b>Cluster 1</b>	<b>Cluster 2</b>	<b>Cluster 3</b>	<b>Cluster 4</b>
Cluster Characteristics*:	(High)	(Medium)	(Low)	(Very Low)
Countries:	Germany	Austria	Netherlands	Bulgaria
	Ireland	Belgium	Portugal	Croatia
	Luxembourg	Denmark	Romania	FYROM
	UK	Finland	Turkey	Serbia
		France		
		Greece		
		Italy		
		Sweden		

\*. (Innovation Index, Innovation Exports' Index).

Regarding these classes, the countries in cluster 1 are very efficient in exporting their national innovation capacity (mean of class = 0.8109). The surprising result in this categorization is the presence of countries like Ireland and Luxembourg. Both countries, despite being small in terms of national population, are very extrovert and export their innovation capacity effectively. The countries that belong to the second cluster (0.5637) are characterized by high levels of national innovation performance (for example Denmark, Finland and Sweden), but fail to realize their full export potential of their innovation competences, both in terms of products and services. Countries in the third (0.2910) and fourth (0.1151) clusters are both low innovators and low exporters of this innovation.

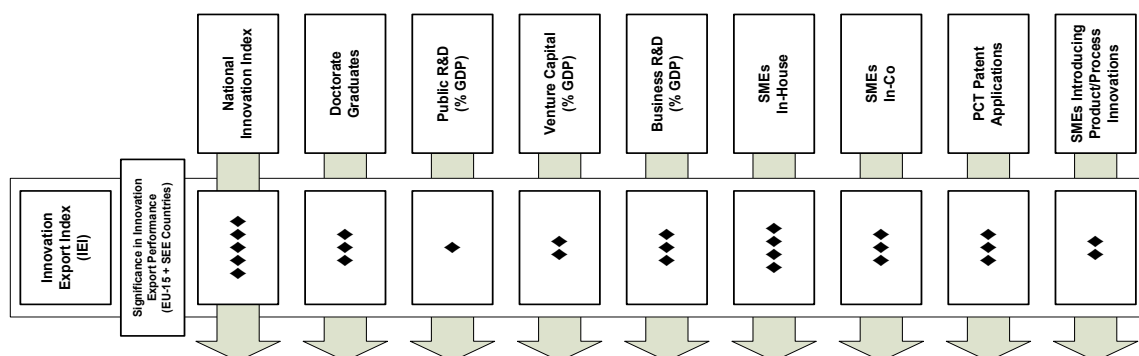
In Figure 1 the separation between leader innovators in EU and SEE countries is quite obvious (see gap between Regions I & II and Region III). The innovation gap amongst these countries is significant implying that the EU candidate countries need to aggressively proceed to reforms in order to catch-up with the rest of the EU countries. Better scrutiny of the Figure 1 reveals that there is a clear separation among the innovation leaders themselves as well (Region I and Region II). For example, while Sweden (SE) has a greater innovation capacity than Luxembourg (LU), it cannot export this innovation excellence.





**Figure 1** Discrimination of EU-15 and SEE countries along the axes of innovation index and innovation export capability.

It is also worthwhile mentioning that amongst the plethora of pivotal factors that are considered in the annual EIS reports, only seven out of nine factors were considered crucial (Figure 2). These are, in sequence of declining significance, the following: (1) New doctorate graduates per 1000 population aged 25-34, (2) Innovative SMEs collaborating with others (as % of SMEs), (3) All R&D expenditures in the business sector (as % of GDP), (4) SMEs with in-house innovation activities (as % of SMEs), (5) Venture capital (as % of GDP), and (6) PCT patent applications per billion GDP (in PPP€). However, the Public R&D expenditures (as % of GDP) and the SMEs that introduce new products or processes to one of their markets (as % of SMEs) are not considered significant to the capability of exporting innovation. The indicator of the national "Innovation Index" is significant in affecting the overall export capability of a country.



**Figure 2** Significance of factors to the capability of EU-15 and SEE countries in exporting their national innovation capacity.

In the remaining part of this section we proceed with the introduction of the ordinal regression model. Positive coefficients would indicate an association of increases in the predictor variable with lower scores on the dependent variable. To make the interpretation of

coefficients more intuitive, for the three derived clusters, the respective ordinal regression models follow the general equation below:

$$\ln\left(\frac{Y_j}{1-Y_j}\right) = -a_{0j} - (-40.329 \times X_1 + 13.727 \times X_2 + 4.712 \times X_3 + 8.725 \times X_4 - 14.835 \times X_5 - 19.291 \times X_6 + 11.939 \times X_7 + 11.334 \times X_8 - 6.339 \times X_9)$$

Where the variables are:

- $X_1$  : National Innovation Index
- $X_2$  : New doctorate graduates per 1000 population aged 25-34
- $X_3$  : Public R&D expenditures (as % of GDP)
- $X_4$  : Venture capital (as % of GDP)
- $X_5$  : Business R&D expenditures (as % of GDP)
- $X_6$  : SMEs with in-house innovation activities (as % of SMEs)
- $X_7$  : Innovative SMEs collaborating with others (as % of SMEs)
- $X_8$  : PCT patent applications per billion GDP (in PPP€)
- $X_9$  : SMEs introducing new product or process innovations (as % of SMEs),

and  $a_{0j}$  are the constants for each cluster:

$$\begin{aligned} a_1 & \text{ (for cluster 2) } = -29.078 \\ a_2 & \text{ (for cluster 3) } = -13.336 \\ a_3 & \text{ (for cluster 4) } = -4.963 \end{aligned}$$

Positive variable coefficients indicate an association of increases in the predictor variable with higher scores on the dependent variable, controlling for the rest of predictors in the model. Negative coefficients indicate a similar association but with lower scores on the dependent variable.

An outcome of the regression model is the estimation of the possibilities that each country is positioned in a cluster (Table 4).

**Table 4** Classification probability and development trend of SEE countries.

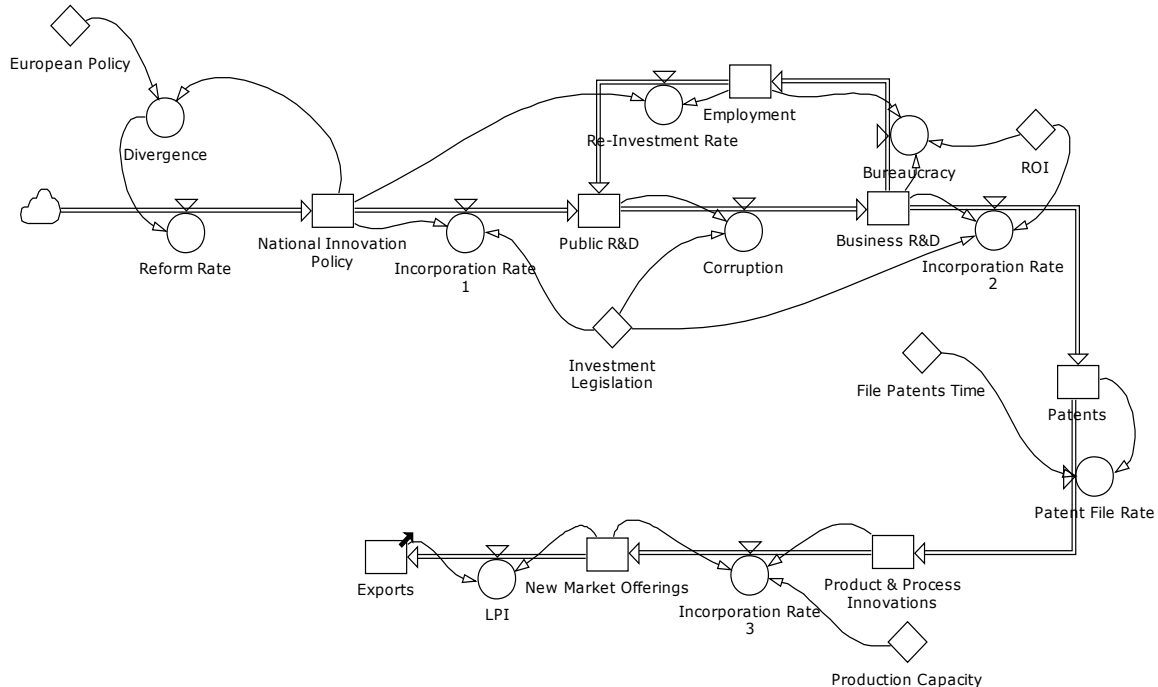
Country	Cluster 1	Cluster 2	Cluster 3	Cluster 4
Bulgaria	-	-	10%	90%
Croatia	-	2%	28%	70%
FYROM	-	1%	17%	82%
Greece	-	50%	43%	7%
Romania	-	3%	36%	61%
Serbia	-	13%	65%	22%
Turkey	-	6%	55%	39%

## 4. System Dynamics Framework

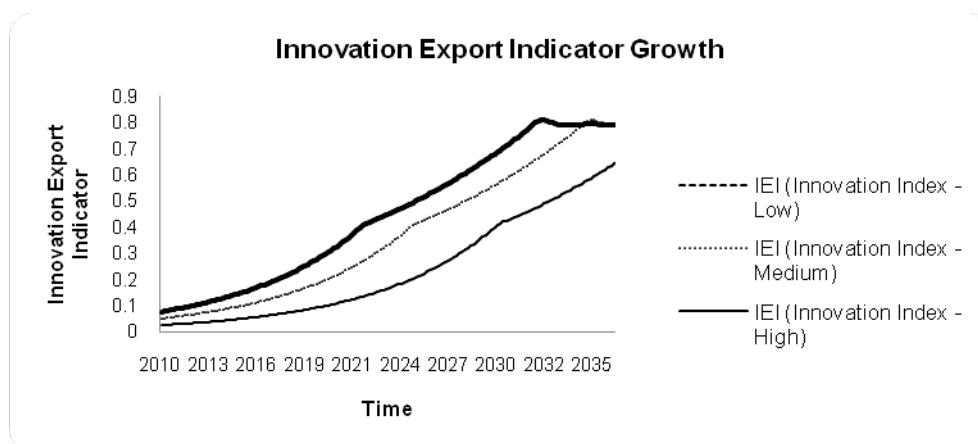
- System Dynamics is a simulation methodological tool which is appropriate to analyse and understand the development and the behaviour of complex systems over time and was developed in 1956 by MIT Professor Jay Forrester. Originally, the tool was used by Forrester to examine the instable employment environment in General Electric (GM) while over the years the SD tool was employed to conduct simulations of diverse scientific and engineering systems [10], [11]. According to Roberts, the feedback control characteristics of the SD

approach render it to be the appropriate tool for decision-making at the strategic level regarding a wide range of problems, from managerial and socioeconomic to organisational ones [12].

- The relative stock and flow diagram of the system including innovation factors that relate to high-technology exports is exhibited in Figure 3 along with all its associated variables and parameters. In the SD framework we also took into consideration the Logistics Performance Index (LPI) as documented by the World Bank because this can be considered a major factor that affects national exports [13], [14]. We assume a rather generic model with initial parameter values. In the simulation process, we examine the evolution of IEI for the next 40 years. We made the hypothesis that the innovation factors increase through the time and naturally the simulation yielded the well-known S-shaped empirical development pattern (Figure 4). The stock variable "National Innovation Policy" describes the annual innovation performance of each country according to the applied innovation policies at national level. This variable is enhanced by the rate with which reforms are implemented at each state and the magnitude of these reforms is implied by the divergence with the EU innovation performance levels. The embedment of the national policies aims at improving the public research and development scheme which is however affected by the relative legislation and hindered by the corruption levels of the public entities. The outcome of this effort further supports the business investment environment which in turn is restricted by the bureaucratic setbacks present in each national entrepreneurial landscape. The greater the business growth in a country, the greater is the employment level of the educated personnel which decreases the investment rates as businesses grow. The business re-investment rate however further promotes public investments. What is more, business expenditures in research activities increases the patents filed at an EU level and the rate of successful patents increases the amount of product and process innovations of firms. The incarnation of these innovations increases the number of new and breakthrough offerings which are translated into an indicator of innovative product and services' exports.



**Figure 3** Stock and flow diagram of the innovation and trade performance framework.



**Figure 4** Evolution pattern of IEI.

## 5. Discussion & Policy Recommendations

The results in the previous section clearly demonstrate that SEE countries need to outline national development strategies and promote significant reform policies in order to foster innovation activities. Despite their improvement, the chasm between EU-15 and SEE countries is significant. Thus, improving innovation performance will lead to the extroversion of the latter countries, with the subsequent growth in trade and the overall financial viability of the countries. The statistical analysis leads to an up-to-date synthesis of the following strategic recommendations for the successful development and overall prosperity of SEE:

- The development in SEE region is not being realized in a homogenous manner. Domestic political and societal traits probably affect the overall regional development effort and need to be scrutinized carefully.
- The Innovation Index is closely related to the national welfare of a country, as a means of PPP, and this relation is prominent in SEE countries. Thus, SEE countries need to alter their funding efforts towards R&D activities leading to value-added products and services.
- In EU-15 and SEE countries the public R&D expenditures need to be better focused in contributing to export improved performance.
- In the EU-15 and SEE region the venture capital (VC) industry does not appear to play a pivotal role in the export dynamics of a country, as the industry is rather weak when compared with countries such as the US, the world leader in VC funding. Policies to attract high levels of venture capital funds need to be outlined.

## 6. Conclusions

The need to design effective policies that will foster innovation in SEE countries is well documented [15]. Financial recession and emerging fierce global competition imply that the SEE region needs to adopt an innovation oriented vision. The main goal will be to assist the countries in the region in enhancing their exports of innovative offerings and in realizing their true financial potential. In this manuscript we present the clustering analysis of EU-15 and SEE countries to clearly identify the magnitude of the divergence between the countries and the trend that each SEE country can exhibit towards its classification. In addition, we develop a first-effort SD simulation model of the relation between the capability of a country to export its innovation capacity. Our rather simplistic simulations, as they represent a first effort, reveal that the innovation performance of a country determines the growth rate of the innovation through the time.

Our future research aims at determining the real factors that result in the major gap among even the leader innovators in EU. Our research reveals that even small countries are able to export more effectively their innovation capacity. In addition, we have to focus on the analysis of specific high-tech sectors in SEE countries at a firm-level in order to develop relevant robust, dynamic models and accurate policies, tailored to the idiosyncrasies of each business sector. This will help us to identify other crucial factors that have not been examined in the past and could yield insightful managerial insights and policy-making recommendations.

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# Corporate Social Responsibility and Public Policies in Romania: Competitiveness and Development through Economic and Social Growth

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The aim of the present research paper is to reposition the role of corporate social responsibility (CSR) in the European Union, in general, and in Romania, in particular, in the context of the renewed EU strategy 2011-2014 and the new CSR definition of the European Commission. In order to strengthen economic and social growth in the framework of the deep transformations that are affecting countries and societies across the world, a new type of collaboration between companies and governments should be emphasized, also known, in the specialized literature, as co-responsibility and inter-relationship, or sharing responsibilities in the areas of common economic, social and environmental interest between companies, governments and society as a whole. Following this general idea, the present paper presents the role of competitive CSR in Romania in complementing public policies, with mutual advantages for the responsible companies and the community at large. In this sense, the paper is structured into five main parts, corresponding to the research interests of the author: overview of the role of governments and companies in promoting and implementing CSR; analysis of CSR models regarding the endorsement of CSR public policies in Europe and inclusion of the Romanian case in one of the four models mentioned above; presentation of CSR and public policies in Romania; empirical research of the relationship between CSR and strengthening of public policies in Romania by considering and analysing a number of 125 case studies and socially responsible corporate initiatives; recommendations and conclusions. The special focus of the paper is put on the Romanian case and the way in which companies acting on the Romanian market are able to consolidate their competitive advantages through CSR initiatives aimed at increasing economic and social growth, but also complementing public policies. This work was co-financed from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/89/1.5/S/59184 "Performance and Excellence in Postdoctoral Research in Romanian Economics Science Domain".

## **Keywords**

Competitive advantages, Co-responsibility between companies and governments, Corporate social responsibility (CSR), Multi-stakeholder relations, Public policies in Romania

## **1. Introduction: Overview of CSR Promotion and Implementation**

In the latest communication of the European Commission regarding CSR that was published at the end of October 2011, a new definition of CSR is offered in order to better express the changes in nowadays societies: "the responsibility of enterprises for their impacts on society"

[1], emphasizing one more time the increasing economic, social and ecological role of the companies especially in unstable times.

In the same document of the European Commission, the strategic role of CSR is reaffirmed since the beginning of the communication by stating that “addressing corporate social responsibility is in the interests of enterprises and in the interests of society as a whole”. The most important competitive advantages that CSR could bring for the responsible companies could be summarized as follows: maximizing corporate opportunities at global level by anticipating societal changes and answering to social needs; improving relations with all the stakeholders; increasing brand value over medium and long-term; fostering business on the operating markets; minimizing operational associated risks by decreasing the necessity of regulative intervention from the governments; competitive differentiation in what concerns the products and services offered [2]. On the other hand, the advantages that CSR could induce at the level of communities at large are obvious and they mainly envisage sustainable growth through the simultaneous achievement of economic, social and environmental criteria. In the present context, marked by the negative effects of the economic and financial crisis, the CSR in European countries is usually associated with a deeper involvement of the companies in solving the social problems (e.g.: job losses) that become a priority at this point. The new members of the European Union are the countries that reflect better this special focus on social issues, considering the private support of the companies at least as important as the governmental intervention.

Given the highly complex nature and adaptability of CSR, governments all over Europe strive to harness its potential for public policy goals, as can be seen in the variety of CSR-supporting policy frameworks, European countries being among the first in the world to adopt public policies in order to promote CSR among their businesses [3]. However, an important aspect of CSR is its voluntary character (no matter the overlap between some objectives of the public policies and the CSR strategies): governments are to promote CSR, to create a general supportive framework for a responsible business conduct and to ensure corporate accountability, meanwhile the companies are the only in charge for their involvement in CSR practices.

## **2. Analysis of European CSR Models of Public Policies**

“CSR” and “public policies” are two concepts usually associated in the specialized literature for two main reasons: firstly, the implementation of CSR practices by responsible companies frequently leads to the simultaneous achievement of regular objectives of public policies in different fields of activity (social, environmental, educational, cultural, regional development etc.); secondly, a more recent trend emphasizes the necessity of national public policies for specifically promoting CSR according to a set of European directives. The CSR models of public policies presented in this section are generic and cover both meanings.

The relationship between CSR and public policies was studied in the specialized literature more or less explicit in the last years (see, for example, [4], [5] and [6]) for emphasizing the bidirectional link between the two concepts: by proving their corporate involvement in the social problems of the communities, companies are avoiding or postponing the introduction of stricter rules and regulations by the governments, meanwhile the public interest – expressed in the public policies – is supported by the corporate financial implication. The economic and social research was complemented with a political and administrative one in 2005, by five authors [7] that identified four models envisaging the performance of European public policies with respect to CSR and the role of European governments regarding the promotion and implementation of CSR (the research was conducted in 2004 and it only covers the 15 EU member countries at that moment). The purpose of presenting the general characteristics of these four models is to potentially delineate the inclusion of Romania in one of them, for determining the main theoretical features of the relationship between CSR and public policies, that will be empirically tested in the fourth part of the present research paper.

*The Partnership Model* (European Northern countries – Denmark, Sweden, Finland and Netherlands; Welfare States) emphasizes the public-private partnerships (PPP) as having the central role in CSR, meanwhile the creation of a common area between the public administrations and the companies represents the general characteristic of the model. The role played by the state in promoting CSR is gradually changing from protective to facilitator. In this model, the solving of social problems and the CSR implementation are especially realized through the PPP, and the relationship between governments and companies is based on social negotiation and positive collaboration, consensus, participation. The model affirms the promotion of social co-responsibility and dialogue for forging alliances between the key-actors in the field of CSR, respectively public administrations, companies and social organizations. The main CSR themes are: social issues, social and economic challenges on the labour market, protection of the environment.

*The Business in the Community Model* (European Anglo-Saxon countries – UK and Ireland) considers that companies are playing the central role in CSR, and the general characteristics of the model could be the following: corporate involvement in community problems, social cohesion, volunteering and transversality. The role of the state in the policies promoting CSR is rather facilitator, promoter, stimulator or mediator. The model is based on the failure of the Welfare State in the Anglo-Saxon countries at the end of the 20<sup>th</sup> century, leading to the appearance of CSR. The governmental actions in the CSR area are especially designed to support private sector and economic sustainable development. The model affirms the solving of the social problems through the CSR policies mainly implemented by companies. In this way, the governments in the Anglo-Saxon countries have found an innovative solution for tackling the social challenges: the creation of corporate networks and PPP in order to involve companies in the social investment projects of the community. In these countries, the governments are applying “soft-intervention” policies for CSR and fiscal and entrepreneurial incentives, affirming the importance of voluntary corporate initiative (corporate self-regulation and governmental non-intervention). The main CSR themes are: economic or social deficits and necessity of improving the economic and social conditions in the disadvantaged areas.

*The Sustainability and Citizenship Model* (European Continental countries – France, Germany, Austria, Belgium and Luxembourg) emphasizes the legal and governmental framework for stimulating the corporate involvement in social actions as having the central role in CSR. In this model, the citizenship represents the updated version of the existent social contract, meanwhile the necessity of a sustainable development strategy and the regulator role of the state in CSR issues (in France) are strongly affirmed. The role of the state in the policies promoting CSR is a stimulator and regulative one. Two sub-models could be identified: *The Citizenship Sub-Model* (Germany, Austria, Belgium and Luxembourg) and *The Regulation Sub-Model* (France). The governments of these countries have begun to promote CSR after the publishing of the European Commission’s Green Paper (2001) and the governmental actions in the field envisage the consolidation of CSR, the creation of different incentives for companies to involve in CSR and the support for PPP. In this model, the companies represent the engines of the economic and social development of the communities at large and they activate in a highly regulated framework. The companies play an active role in the sustainable development policies and strategies of the communities they are acting in, contributing to the creation of social capital. In this model, the companies are considered to be citizens of the society, with corresponding rights and obligations. The main CSR themes are: sustainable development, human rights and labour rights.

*The Agora Model* (European Mediterranean countries – Italy, Spain, Portugal and Greece) considers that the stakeholders and the multi-stakeholder groups are playing the central role in CSR. The public open debate in the process of creating or developing multi-stakeholder CSR policies represents the general characteristic of the model. The state has a promoter role in the CSR policies. In these countries, the actions of the European Commission (during 2002-2003) led to the development of CSR at governmental level, meanwhile the CSR public strategies and policies are still at an incipient level. Research reports and studies on CSR



analyse the development of this concept in the European countries and the needed governmental actions. The importance of voluntary corporate initiative (although do exist incentives from the governments) and the lack of traditional PPP are other two important characteristics of the model. Finally, the main CSR themes envisage the social issues.

Considering the four models presented above in a descending order of their complexity, Romania could not be included as such in any of them (because it still is in its initial phase of CSR development), but certain similarities with the Agora Model are identified (e.g.: the importance of stakeholders, the promoter role of the state, the pre-eminence of social issues), especially taking into account the fundamental correspondence in economic, social and cultural terms with the countries in the last model. After Romania's accession to EU, the role of CSR has increased [8] and a National Strategy for Promoting CSR during 2011-2016 period was published [9], especially because of the CSR role in generating regional development through economic and social growth.

### **3. CSR and Public Policies in Romania**

The lack of coherent public policies for promoting CSR in Romania is one of the weak points that the National Strategy for Promoting CSR during 2011-2016 period is trying to eliminate by proposing a set of strategic measures. For this reason, the relationship between CSR and public policies in Romania only functions in one way, means identifying those domains of the public policies that could be strengthened by the private intervention of the companies.

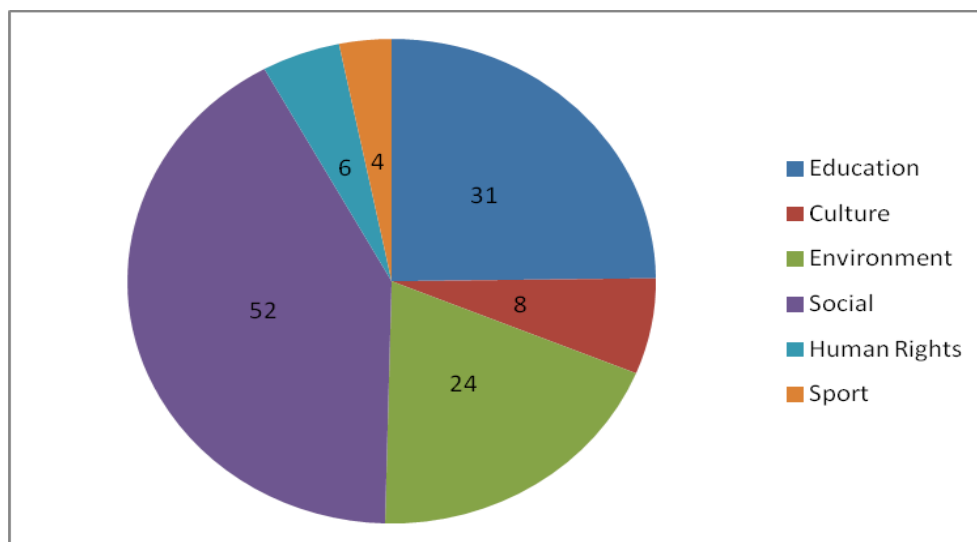
In the next section of the research paper, those public policies mainly supported by the most responsible companies in Romania will be emphasized, from a total of 19 public policies (PPs) indentified in the literature [10]: PPs on budget and finances; PPs on industry; PPs on services; PPs on business development; PPs on transports and communications; PPs on natural resources and agricultural processing; PPs on regional development; PPs on environmental issues; PPs on civil society and democracy; PPs on public administration; PPs on culture and arts; PPs on education and sciences; PPs on tourism, sports and relaxing activities; PPs on social and occupational/labour issues; PPs on medical assistance; PPs on external affairs; PPs on national security; PPs on justice and legal aspects; PPs on internal affairs.

### **4. Empirical Research of the Link between CSR and Public Policies in Romania**

Especially in the last years, the companies operating on the Romanian business environment have begun to consider their implication in CSR initiatives, complementing a significant part of the public policies and offering financial and human resources for the economic and social growth of the communities they are acting in. At the same time, these responsible companies are gaining relevant advantages: on one hand, they are trying to respond to the increasing pressures that the society puts on them even stronger than before the economic crisis and, on the other hand, they are winning competitive advantages in terms of image consolidation versus their competitors less preoccupied by the CSR initiatives. The empirical research conducted and presented in this section of the paper is going to emphasize the public policies mainly supported by the most responsible companies in Romania, their reasons for preferring specific public policies and the potential correspondence with one CSR model of public policies that is specific for the CSR development in Romania (*The Agora Model*).

For the purpose of the present research study, they were taken into account 40 responsible companies acting on the Romanian business environment and all their corresponding 125 case studies or corporate responsible initiatives (during 2004-2011 period) presented on the public Romanian site [www.responsabilitatesociala.ro](http://www.responsabilitatesociala.ro) [11], one of the most relevant sources of information in the field. The 40 companies presented on the above mentioned site are

complying with a specific set of criteria and their involvement in CSR activities is well-known. Basically, on this site the CSR initiatives (or case studies) of the 40 responsible companies are structured in six CSR domains (Education, Culture, Environment, Social, Human Rights and Sport), that are also used in the present empirical research because of their evident correspondence with specific public policies in Romania. In *Figure 1 CSR domains of the analysed corporate responsible initiatives (125) in Romania* is emphasized the specific number of case studies existent and considered for each CSR domain, with a special focus on social, education and environment issues.

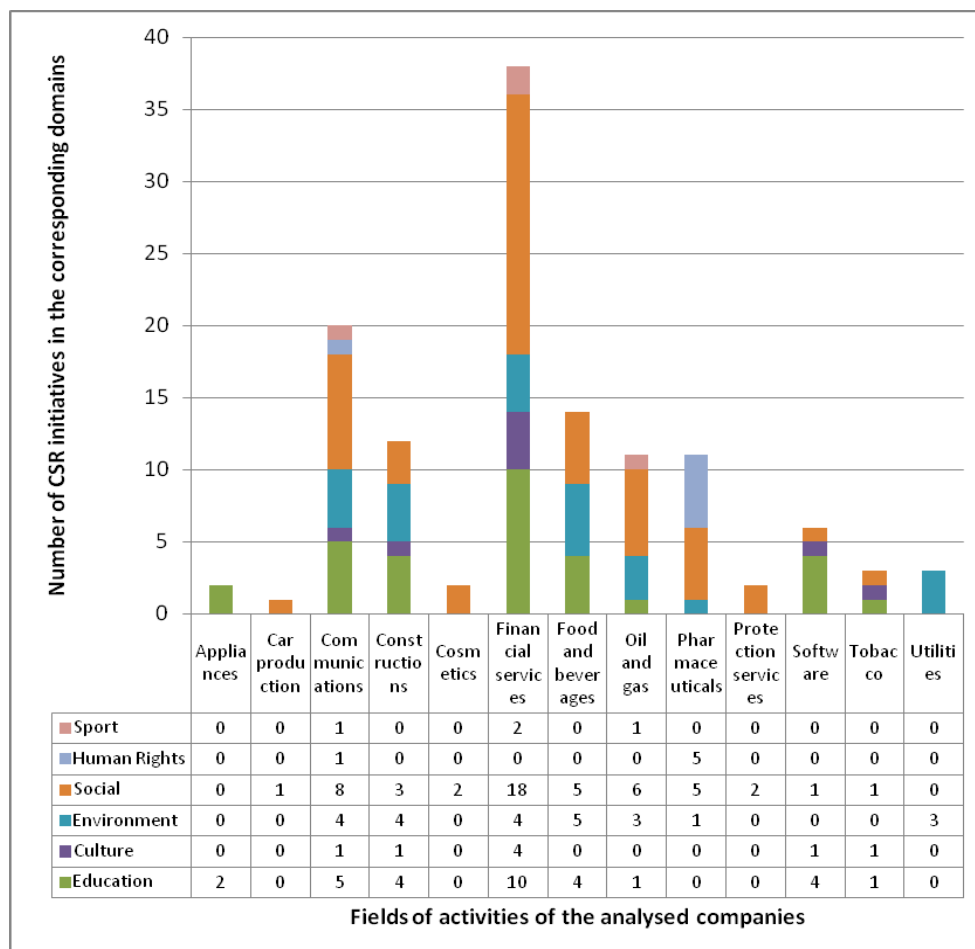


**Figure 1** CSR domains of the analysed corporate responsible initiatives (125) in Romania

Source: Author's graphical representation using the data presented on the site [www.responsabilitatesociala.ro](http://www.responsabilitatesociala.ro).

More than that, in order to have a clear picture about the propensity of supporting specific CSR initiatives of the companies pertaining to different sectors, the 40 companies were clustered according to their industrial characteristics and the following 13 fields of activities were created (see also [12]): Appliances (1 company – Arctic), Car production (1 company – Dacia Groupe Renault), Communications (4 companies – Germanos Telecom Romania, Orange Romania, UPC Romania, Vodafone Romania), Constructions (6 companies – Carpatcement Holding, Dedeman, Holcim Romania, Praktiker Romania, Romstal, Teraplast SA), Cosmetics (1 company – Avon Romania), Financial services (9 companies – Banca Transilvania, BCR, BRD-Groupe Société Générale, OTP Bank Romania, Provident Financial Romania, Raiffeisen Bank, RBS Romania, UniCredit Tirioc Bank, Western Union Romania), Food and beverages (5 companies – Alexandrion Group, Coca-Cola HBC Romania, Smithfield Prod, Tuborg Romania (URBB), Vel Pitar), Oil and gas (3 companies – MOL Romania, Petrom, The Rompetrol Group), Pharmaceuticals (5 companies – A&D Pharma, LaborMed Pharma, Novo Nordisk Romania, Terapia Ranbaxy, Zentiva), Protection services (1 company – BGS), Software (1 company – SIVECO Romania SA), Tobacco (1 company – JT International Romania) and Utilities (2 companies – Apa Nova, Transgaz). In *Figure 2 Distribution of the CSR initiatives (125) of the analysed responsible companies in Romania (40) according to their corporate fields of activities*, the clustering of the companies on their main fields of activities emphasizes, one more time, the focus on social, education and environment issues. Another characteristic of the social involvement of the analysed companies is their primary consideration of those specific CSR aspects that are strictly related with their object of activity (e.g.: Constructions – environment issues, Financial services – social issues, Food and beverages – social and environment issues, Pharmaceuticals – social and human rights issues, Software – education issues, Utilities –

environment issues etc.), which will represent a clear link, in the second part of the study, between the CSR involvement and the corporate pragmatic interests of supporting specific public policies that are affected by or could influence the corporate activity on medium and long term.



**Figure 2** Distribution of the CSR initiatives (125) of the analysed responsible companies in Romania (40) according to their corporate fields of activities

Source: Author's graphical representation using the data presented on the site [www.responsabilitatesociala.ro](http://www.responsabilitatesociala.ro).

After structuring the corporate involvement of the 40 analysed companies according to the main CSR domains and the specific fields of activities, a number (55) of relevant public policy domains were identified by analysing the qualitative data presented on the 125 case studies of the above mentioned site (see *Table 1 Areas of supported public policies by the most responsible companies in Romania*). The purpose of this broad analysis is to identify later on the main public policies supported by the most responsible companies in Romania, by clustering and summing up the number of occurrences of complementary public policy domains (more details about the methodology used could be presented on request).

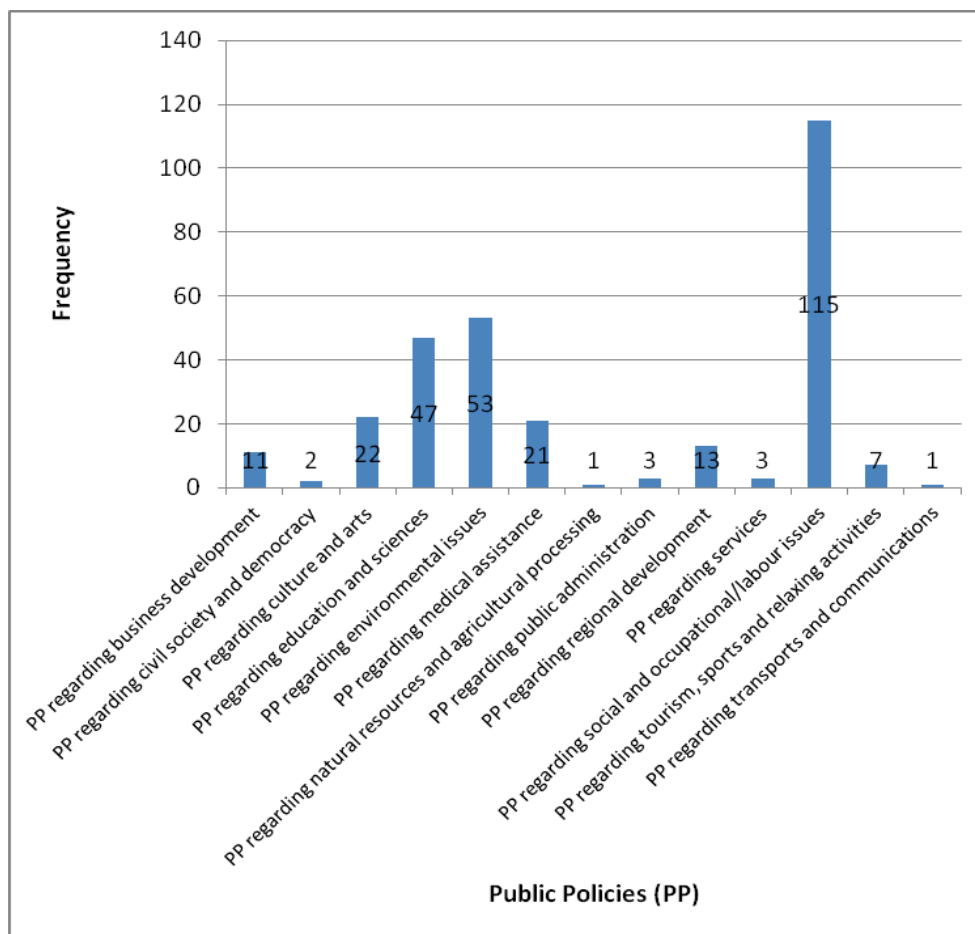
**Table 1** Areas of supported public policies by the most responsible companies in Romania

Public policy domains	No. of occurrences
Art education	2
Biodiversity conservation	2

Business education	2
Civic and environmental education	10
Civic and social education	5
Civic behaviour	1
Civil society and democracy	2
Climatic changes awareness	1
Communications	1
Community partnerships	6
Greening	3
Economic education	2
Environment protection	30
Financial and banking education	4
Gender equality	7
General education	4
Improvement of business environment	3
Informational education	3
Literary education	4
Local communities	10
Music education	3
Nutritional education	1
Pollution reduction	5
Poverty reduction	11
Public administration	2
Public participation	1
Recycling	1
Reduction of deforestation negative effects	1
Reduction of domestic violence	6
Reduction of electronic waste	1
Reduction of social exclusion	35
Regional economic development	3
Rehabilitation of green areas	6
Rehabilitation of natural protected areas	1
Road education	2
Selective waste collection	1
Services for building activities	1
Social and financial assistance for arts	7
Social and financial assistance for culture	15
Social and financial assistance for sports	7
Social assistance and services	12
Social assistance for children with special needs	4
Social assistance for disadvantaged people	24
Social assistance for family and children	5
Social assistance for women and children	8
Social trade and services	2
Society healthcare and medical assistance	21
Sustainable development education	1
Sustainable forest management	1
Technical education	1
Unemployment reduction	2
Uniform assistance for business development	2
Urban education	1
Vocational education	2
Water saving	1

Source: Compiled by the author using the qualitative data presented on the site [www.responsabilitatesociala.ro](http://www.responsabilitatesociala.ro). The methodology could be presented on request.

In *Figure 3 Main public policies supported by the most responsible companies in Romania* are presented the 13 public policies frequently complemented by the private involvement of the companies in order to achieve economic and social growth: Public policies regarding social and occupational/labour issues; Public policies regarding environmental issues; Public policies regarding education and sciences; Public policies regarding culture and arts; Public policies regarding medical assistance; Public policies regarding regional development; Public policies regarding business development; Public policies regarding tourism, sports and relaxing activities; Public policies regarding public administration; Public policies regarding services; Public policies regarding civil society and democracy; Public policies regarding natural resources and agricultural processing; and Public policies regarding transports and communications. For strengthening the effectiveness of the private involvement (usually financial) in complementing the public policies in strategic fields, the responsible companies have governmental or public institutions and authorities as partners in their endeavours (e.g.: ministries, central governments, municipalities, national agencies, county councils, school inspectorates, police etc.), leading to the creation of public-private partnerships and sharing responsibilities in the areas of common economic, social and environmental interest. The results achieved by appealing to this type of partnerships generate economic and social growth for the responsible companies (consolidation of the corporate image on the market and greater visibility) and for society as a whole (contribution to the solving of the identified social problem).



**Figure 3** Main public policies supported by the most responsible companies in Romania

Source: Author's graphical representation using the qualitative data presented on the site [www.responsabilitatesociala.ro](http://www.responsabilitatesociala.ro). The methodology could be presented on request.

In what concerns the potential correspondence with the fourth CSR model of public policies that is specific for the CSR development in Romania (*The Agora Model*), the achieved results of the empirical research confirm the theoretical findings in the section two of the present paper, especially considering the pre-eminence of the social issues as one of the main pillars of the relationship between CSR and public policies in Romania.

## 5. Recommendations and Conclusions

At the EU level, the co-responsibility, inter-relationship and sharing responsibilities between companies and governments in the areas of common interests are promoted as key-elements for strengthening economic and social growth, prerequisites of the regional development. Particularly for the new EU member countries (Romania and Bulgaria), the necessity of adopting coherent public policies for promoting CSR becomes even more imperative in the context of the economic and financial crisis, when a decrease in the available resources should be replaced with an increase of the strategic actions.

On the other hand, the CSR involvement could support and complement the achievement of the objectives of different public policies, especially if public-private partnerships are forged. As was the case with the empirical research conducted for the Romanian business environment during 2004-2011 period, the social issues represent a priority nowadays, surpassing other “classic” CSR issues like education and environment. The main challenge of the responsible companies is to transform their social involvement in economic growth, through a well-defined and coherent CSR strategy over medium and long-term.

## Acknowledgements

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# Social Networking & Loyalty Program as Mobile Value Added Services Using NFC

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The purpose of the paper is to describe the development and presentment of mobile value added services through use of contactless and near-field communication technologies. Although number of smartphones with NFC capabilities is increasing, so far they have not been widely adopted in the South East European region, and the research examines the reason for not fully acceptance of NFC services. The concept was developed taking into consideration some of the accepted NFC use cases for service initiation. By using SIT Innovation Tools (Systematic Inventive Thinking) the results make sure that the product is able to attract interest from the customer and fit within the company's, that supports the service, existing positioning and available resources. The research paper finds that with help of technology and right Innovation tools new products emerge even before signs for new market demand as in the form of "inside-the-box" thinking. It examines whether "social networking" and "loyalty program" (ticketing & couponing) can be used as a key to the success of the service when introduced, and also whether the full NFC benefit is realized when integrated with services based on users location. This increases interest when the service can interact with other applications/mobile services so that it can receive promotions and offers on products of interest. The paper also touches the points of infrastructure that is available and what is being developed around the mobile ecosystem to deliver the new service, in comparison to other methods or technologies that can substitute the new developed service.

## **Keywords**

Innovation Tools, New NFC application & services, Social networking, Virtual ticketing and couponing

## **1. Introduction**

In future ubiquitous communication environments, users expect to move freely while continuously interacting with the available applications through variety of devices.

Future users will be equipped with different devices and expect to be able to access personal services from any device.

The major interest of NFC is to facilitate access control, micropayment but in this paper we propose a new social networking and loyalty programme for mobile operators through the use of NFC. Mobile device users with NFC enabled handhelds can download VAS (Value Added Services) content like songs, ringtones, wallpapers, games, all of it through Smart Poster [1].

Facebook is a very popular social networking site. There are millions of users who have joined this site for a good number of reasons: to stay in touch, create new relationships and interact with one another. [2]



As social media is becoming the most powerful online activity accounting for 19% of all time spent online, with Facebook being the leading social networking site. [3] Similarly in Macedonia, more than 85% of internet users are Facebook users. [4].

For one thing, they know which people will make great endorsers by simply checking out the stuff that is written on their profiles. In an instant, they will have some sort of background on a particular user and know if this one will be interested in the products and services they have. This is a great way to weed out the inactive members and those who are hyper and always raring to connect to others.

When advertisers get to these people, they send their group ads and events and let these users become a part of it.

When you are a user and become part of something that is being advertised, you automatically become its endorser – which is exactly what Facebook wants.

## **2. Applications developed**

Face book applications are becoming so popular for Facebook users since they provide so much fun and they give a lot of interactions. And it is for this reason that every now and then, there are more and more Facebook applications that are being developed. Sometimes they seem to be just the same with the others but still people appreciate them and are adding them on their pages. [2]

If movies are one of your passions, then you can also check out the Flixster application. With this, you would be able to rate several movies and then from the ratings, you will see compatible friends that have same interests as you.

But if you are a bookworm, you can check out iRead. This application will help you track those people who have the same reads as you do. This application will also allow you to rate different books. [2]

### **1.1 Innovation tools**

The innovation adoption process from Rogers [5] innovators is the enthusiasts that drive the market as they pursue new technologies. The targets are early adopters as they bring the potential of high tech market segment. For the research five techniques of Systematic Inventive Thinking [6] are applied to the new product. To use S.I.T. first the components listed are:

#### **Internal components**

- Profile page of Network operator
- Account registered in CRM system
- MSISDN/Customer phone number
- Mobile device
- Friends
- VAS contents for download through NFC
- Loyalty points

#### **External components**

- Facebook account
- Facebook Wall
- Facebook Posts
-

To identify the potential benefits of the new market five tools are applied appropriately with the configuration. In this research paper attribute dependency is used because as a tool allows creating dependencies between internal and external attributes.

VAS contents for download through NFC, Loyalty points, Facebook Posts are combined and this creates an attribute dependency virtual product: "The more likes and postings customer collects for his purchased contents customer becomes more eligible for promotions."

Market filter of the newly created virtual product: "As the average time spent on social networking sites increases dramatically and social networking is already the key Internet category when it comes to times spent, this channel can be utilized when it comes in terms of engaging your customer base and attracting the new generation target group."

Technology filter: "The application pulls out information from the customers' social network (Facebook) and matches it with customers account through the loyalty interface of the CRM system and grants him with the appropriate promotion."

Benefit to the customer: "This has certain advantages to better target offers through loyalty programmes and reduce wasted spend by less communication to the people that don't want to know about the promotion/programme."

The new model ensures that there is not much attention on IT and there is more attention on the customer by providing simple use cases."

## **2.1 NFC (part of technical solution)**

Traditional NFC communication integrates RFID tags and reader in order to allow peer-to-peer communication. The reader generates a radio frequency RF field to request a response from the tag and the tag uses the energy in the reader's RF field to respond [7]

An NFC device can have one of two roles; initiator or target. The initiator uses its RF field to contact targets. The target only senses for initiator RF fields and does not turn on its own RF field unless requested by an initiator as part of communication. A protocol using NFC must include at least one initiator and one target to have successful communication. [7]

The setup testing of the NFC consisted of Google Nexus S and Nokia 6120 both with NFC chip embedded.

When the user swipes the mobile device close to the NFC tag, the NFC initiator detects the NFC target and triggers the service initiation.

NFC applications can be divided into different categories [8]:

- Touch and Go: in this category we find applications such as access control systems, logistics reporting systems or security technology as well as ticketing systems. Here the NFC device behaves like a contactless smart card that contains an access code or ticket and has only to move quickly past the reader.
- Touch and Confirm: applications such as mobile payment where the user has to confirm the interaction by pressing a button or entering a PIN into the NFC device.
- Touch and Capture: here, the NFC device is located close to the transponder (smart label) which for instance can be attached to a smart poster. The NFC device can read out transponders for information such as phone numbers or a URL for further information.
- Touch and Link: applications that require an online connection of the NFC device. Data read by the NFC interface are forwarded via an online connection (GPRS, UMTS) to a server. The server can process these data and send back information to the NFC device where it is shown on the display.
- Touch and Connect: a connection of two NFC devices for transmitting images, MP3 files or simply for matching phone directories of two NFC-enabled mobile phones.
- Touch and Explore: it is possible to randomly combine the above categories. Touch and Explore allows the user to intuitively 'find and explore' new applications [8].

Public Transports is one of the applications where the greatest potential exists but for markets where education of the market is needed, first move is to provide with use cases that engage the customers.

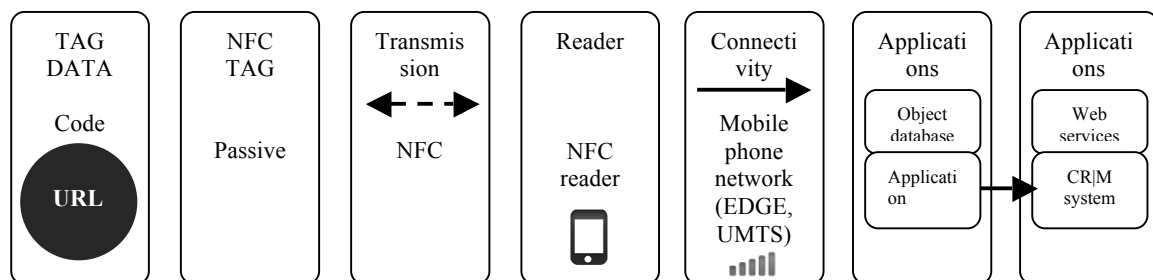
There are clear signs that in the future the mobile phone will be the personal NFC device. As most people carry their mobile phones on them all the time there is a valuable additional benefit if everyday services can be provided through an NFC-enabled mobile phone. Starting in 2005, throughout the world NFC applications are being introduced.

Special advantage of mobile phones is that via GSM interface OTA services can administer data in the secure element of an NFC enabled phone. Using OTA services ensures secrecy of personalization data due to strong encryption and authentication [8]. This way it makes it possible to send to customers an automatically monthly bundle at the beginning of the month which the customer can save it in his or her phone.

The system consists of the following components:

- NFC tag that stores information regarding the item that is being purchased
- NFC capable device (phone that reads NFC tags) that reads the stored information
- Application that manages loyalty programme
- Server that manages the database
- Device for writing NFC tags

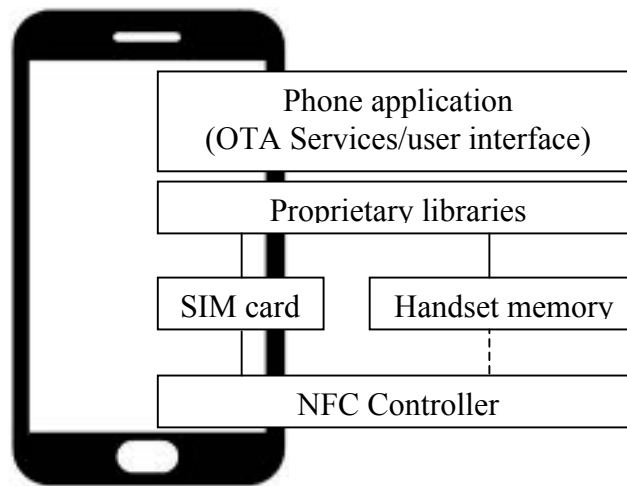
The customer can then go to any poster with NFC tag and by swiping or placing the NFC phone near the tag receives the information from the tag. All the components are displayed in picture below.



**Figure 1** Components

The tag data contains the URL code stored on the chip, which in this case is a passive NFC tag. NFC is the radio frequency transmission and being read by NFC reader (phone), while transmitting it using mobiles phone network connectivity. The application matches the code with the CRM system to identify the subscribers ID and update his profile.

Developing NFC application is adopted for Android OS and tested on Google Nexus S hardware model through additional phone related Application Programming Interfaces (API) and is based on the contactless proprietary libraries to read/write NFC tags. Similar is with BlackBerry which is good as it allows close interaction with the Operating System, unlike being based on JSR 257 [9] API for JavaME devices. The API (defined in android.nfc [10] package) uses intents to call the appropriate NFC-based application. The NFC phone implements the contactless side, while the phone application uses Over-The-Air (OTA) and provides the user interface.



**Figure 2 Overview**

### **3.1 Purpose of the application**

The main purpose of this kind of Facebook application is to make something that will be valued by users for a long time. This means that users will continue to use this for long duration with low risk of being uninstalled. Users might not rapidly grow overtime but a quality audience can be built. With this use case one goal is to raise population understanding and awareness of NFC technology.

Who are the leaders in changing social networking?

Generation G: all that were born after 1998 are part of a generation that is technologically savvy, socially networked, and competitively oriented than any other in history. And are leaders in playing hybrid games/social networking sites. With the increasing penetration of network attached handhelds the group is set to be the first truly mobile, social generation.

Achieving success in social media is not coming from how many people got the message, but it's found in how many people thought the message was remarkable. How many of them were intrigued enough to by the point you made to comment and pass to other friends [11]. Moreover in [11], the message multiplier, how many people reposted the message, tells how many people thought the message was worthy of repeating, how quickly the message spread are the essential measures whether you are resonating with the target audience.

With the new tool we want to make sure that we are measuring the ability to get the right message from the right people at the right time.

As Joel Brodie in [12] describes "The power of games to affect consumer behavior is almost limitless—and examples of powerful social games are all around us. Game-Based Marketing is the first look at combining the power of games with the power of marketing to create an exciting new user paradigm: Funware. This is clearly the future."

The basic concept is that stickiness is a qualitative measure, most closely aligned with two standard Internet metrics: time spent on a site and number of repeat visits per user. When you consider those statistics together, you get a composite view of a site's stickiness.

When applied outside the world of the Web, stickiness is often referred to by another name: loyalty. [12]

Customers spend a lot of time chasing points, levels, badges, and rewards – both real and psychological. Combination of both online and offline programs by taking into a fun and long term customer loyalty program.

All these facts lead to the design of new game mechanic developed that it satisfies the customer but at the same time create additional VAS revenues combined with a new marketing channel for the Mobile Network Operator (MNO).

Game mechanic: “Scoreboard/Leader board (earning points/badges for each campaign) The premise of the game is to find deals in the real world and post it on their social networking pages. A player earns points for every like or reposting of the content on their own pages.

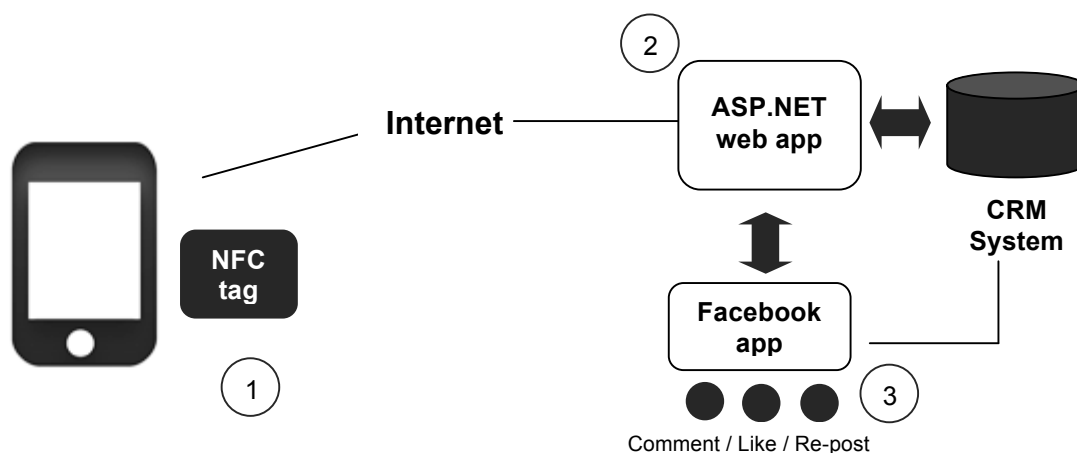
Comparison with other friends is available.”

First prerequisite is that the customer owns a mobile phone that has NFC reader capabilities. Next step is that whenever a customer puts his phone to a close proximity of a Smart Poster (considers a radius of 4-5 cm around the NFC tag) branded with the Mobile Network Operator logo that contains a link to the official portal he should be able to download different content like music, wallpapers, games, applications available in the portal. Mobile network operator implements NFC technology as part of its marketing campaign.

Once the purchase is made, the NFC application starts up and checks if the user is logged in to Face book. Then it posts on customers Face book wall to notify all his friends about the new product/promotion he is using from the network operator. Certain points are added on customers loyalty programme for this activity, but additional extra points are added for every comment/reposting the customer gets on his wall for the particular post.

The campaign manager defines the rules of getting awards and also the levels which can be unlocked at certain stages, and define eligibility rules of which promotions/rewards the customer can get with the existing points/achievements the customer has collected.

The Face book engine is connected with the CRM system of the Mobile Network Operator. It informs the CRM system that based on his collected points which promotion can be applied on his MSISDN.



**Figure 2** Application/Solution overview

Step 1 - User taps the NFC tag

Step 2 - Request runs over phone's internet connection toward the ASP.NET web app. When it reaches it, provides the CRM system with the UserID of the user and increases the reward points to the CRM system

Step 3 - Every comment, like, re-posting generates additional points that the Facebook application informs the CRM system.

## 4. Conclusion and Future Work

This paper presents a solution for new and innovating marketing of products, with the specific example of NFC (near field communication) technology.

Future work should include developing similar scenarios for other businesses like retail stores, restaurants. Moreover, for simplicity reasons, we have only addressed micro-payment method that involves the secure element. Further integrations that involve payment for additional services which are not available for the MNO should be investigated.

#### Future trends

Future trends stress the different research topics that should participate to solve some still existing problems in contactless payment [13]. We can consider that there are two main actors involved in the NFC payment with different objectives and limits.[14]

Lesson learned from the implementation is that the new solution has never been introduced in the market and as a such the process is not defined yet so it makes it easier to deploy it as according to [14] for new companies it's easier to start up with new processes, then for already established companies to adopt to new processes that are created.

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# Clarifying 'Fuzziness' in Systemic Welfare Service innovation

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Various studies have addressed the problem of fuzziness in innovation processes. Despite the popularity of the theme of fuzziness in innovation studies, there is no agreement on the conceptualization of the concept itself. Ironically, it seems that a great deal of fuzziness exists about the concept of fuzziness. It can be argued that fuzziness is still poorly studied, and therefore an inadequately understood issue. The underlying rationale of this paper is that, although the presence of fuzziness in innovation processes is recognized by many scholars, a detailed and coherent description of fuzziness and its implications for innovation management is missing. This paper has two contributions: 1) the paper reviews the existing literature on fuzziness and establishes its own classification of fuzziness in relation to innovation processes; and 2) the paper demonstrates how different forms of fuzziness manifest in systemic innovation processes. This paper has both practical and research implications. For practitioners dealing with welfare services this paper provides insight and inspiration on how to approach fuzziness in systemic innovation. From the research point of view, this paper complements previous studies which argued that instead of being a linear and rational process, innovation is a process of muddling through while in states of uncertainty, complexity and ambiguity.

## **Keywords**

Systemic innovation, welfare services, fuzziness, uncertainty, complexity, ambiguity

## **1. Introduction**

Several studies have identified the potential for innovation in public services [e.g. 1, 2, 3, 4]. However, those studies also indicate that the realization of that potentiality in relation to innovation is not an easy task. This paper hypothesizes that this is due to two mutually interdependent reasons. Firstly innovations in public welfare services are markedly *systemic* in their nature. More precisely, innovations are complex to implement and operate, because they emerge from, and must address, the multifaceted interplay between political, administrative, technological, institutional, economic, and legal issues. Secondly, due to this multifaceted interplay, systemic innovations like knowledge creating processes take place in a state of *fuzziness*, which arises from incomplete and ambiguous information and knowledge.

As a research theme, the fuzziness of new product or process development is not new. It has become a rather popular research theme for innovation scholars. The rationale for this is obvious: innovation, by definition, is a process in which a new idea, practice or object is implemented within some social system. It is also reasonable to argue that the process of creating something new is based on something other than just conducting a sequence of clear and known procedures. Various studies have addressed the problem of fuzziness in innovation processes [e.g. 5, 6, 7, 8]. Despite the popularity of the theme of fuzziness in innovation studies, there is no agreement on the conceptualization of the concept itself. Ironically, it seems that a great deal of fuzziness exists about the concept of fuzziness. It can

be argued that fuzziness is still poorly studied, leading to it being an inadequately understood issue. Inspired by the above observations, this paper has two aims: 1) the paper reviews the existing literature on fuzziness and establishes a classification of fuzziness in relation to innovation processes; and 2) the paper demonstrates how different forms of fuzziness manifest in systemic welfare service innovations. Methodologically, this paper can be considered to be qualitative research because, in addition to the literature review, it is based on the author's observations of an ongoing innovation project called the Virtu channel (see Section 3).

This paper is organized as follows: In section 2, existing literature on fuzziness is reviewed. The section ends by presenting a classification of fuzziness in relation to innovation processes. In section 3, the systemic innovation case study organisation – the Virtu channel – is introduced. Section 4 presents and discusses how fuzziness reveals itself in systemic innovation by using the classification constructed in section 2. Finally, in section 5, conclusions and implications for practitioners and for further research are drawn.

## 2. 'Fuzziness' in previous studies

There is a consensus within researchers that the basis of innovation is *knowledge* [e.g. 9, 10]. Rogers [11], for example, has defined the innovation-decision process as “essentially an information-seeking and information-processing activity”. The logic behind this argumentation is that innovation is realized through the ability to use knowledge in identifying and pursuing opportunities. Similarly, according to Nonaka [9], innovation is the process of creating and defining problems and then actively creating new knowledge to solve them. The arguments offered by Rogers [11] and Nonaka [9], and many others, also support the claim that innovation takes place in a state of fuzziness which has its roots in incomplete and ambiguous information and knowledge. Given that fuzziness is an inherent part of innovation, it can be supposed that the very problem of fuzziness in innovation is a problem of managing knowledge [cf. 7]. Therefore, following the line of thinking developed by Zack [12], this paper frames the elaboration of the fuzziness of innovation by posing a question: if managing knowledge is the solution [in innovation], then what is the problem? Based on previous studies this paper identifies three distinct problems of processing knowledge, which can be deemed relevant and useful in the context of innovation. The knowledge processing problems are *uncertainty*, *complexity* and *ambiguity*.

*Uncertainty* has been a rather frequent theme in organizational studies over the past decades. One of the most notable definitions of uncertainty is offered by Daft and Langel [13]. According to them, uncertainty reflects the absence of information. This resonates, for example, with the definition made by Galbraith [14], who has linked uncertainty with the success of performing certain tasks. Galbraith [14] defines uncertainty as the difference between the amount of information required to perform a task and the amount of information an organization already possesses. A slightly different definition of uncertainty comes from Ellsberg [15]. Ellsberg has introduced a concept of ‘known uncertainty’. Known uncertainty refers to situations where key variable and outcome probabilities are known but their factual values remain unclear. Despite small differences in nuances, all those three definitions of uncertainty draw on the notion that individuals and organizations work in an environment where uncertainty can be reduced by increasing the available amount of information. A **rough categorization of** previous studies focusing on uncertainty in innovation classifies them into two major approaches. Firstly, there are studies whose aim is to understand how uncertainty affects organizational innovation processes [e.g. 16, 17, 18, 19, 20] and particularly the managerial implications contained in uncertainty [e.g. 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35]. Secondly, some scholars have been interested in the sources of uncertainty. The main sources of uncertainty in innovation have been identified as follows: technical, market and political, and economic uncertainties [36]; technological, commercial and organizational uncertainties [37]; technological, market and regulatory



uncertainties [38]; consumer, technological, competitive and resource uncertainties [16]; technological, market, and behavioral uncertainties [39].

Based on the findings of previous studies this paper summarizes that innovation uncertainty in a welfare service system arises from a lack of information or factual knowledge, which pertains to various internal and external matters of the welfare service system.

*Complexity* refers to non-linear interactions between parts of a larger system. A situation can be seen as complex if the amount and intricacy of elements and relationships that must be considered simultaneously is too large to process with ease. Following Simon [40], who defined complexity as a situation where there are “a large number of parts that interact in a nonsimple way,” Zack [12] and Brun [41] have argued that, although predictions are difficult to make in complex situations, they are not necessarily vague or unpredictable. Stacey [42] goes slightly further, when he points out that the relationship between variables are time and context dependent, which means that complex events are unique. Whether seeing complexity as a situation where predictions are difficult due to a relationship between elements or due to the uniqueness of events, what is significant is that complexity cannot be reduced simply by increasing information. This is because the confusion that people and organizations face does not arise from an absence of information; rather it is a “by-product of complexity” [cf. 43]. For Appleby [43], the “by-product of complexity” means that all intended actions have potentially unintended consequences. The potential enrichment of complexity can be realized “only if our managerial capacity expands accordingly” [43]. Therefore, what is needed when addressing complexity is an increase an organization’s knowledge processing capacity, which, according to Zack [12], is a function of what is known and familiar to the organization and its members. The greater the number and diversity of organizational knowledge resources, the more knowledge capabilities it has and the greater the fit is [cf. 44]. Alternatively, organizations may try to respond to complexity by restructuring their problems roles and routines to simplify those problems or render them more familiar [12].

Based on the findings of previous studies this paper has argues that innovation complexity in the welfare service system arises from the intricacy and connectivity of elements, which pertain to various internal and external matters of the welfare service system.

*Ambiguity* refers to an inability to interpret or to make sense of something [12]. Zack [12] has distinguished two forms of ambiguity: surface ambiguity, which represents having interpretative knowledge but not being able to recall it due to insufficient informational cues; and deep ambiguity, which refers to a lack of interpretive knowledge. Surface ambiguity resembles (known) uncertainty, because both of them are basically based on a lack of information. The difference between uncertainty and surface ambiguity is that the latter concept implies that information acts as a trigger which activates interpretation, while uncertainty emphasizes information itself as the missing resource. In deep ambiguity, events are perceived as so new and unfamiliar that one cannot make reasonable guesses about what is important or what might happen [45]. The third manifestation of ambiguity arises from multiple meanings of the same thing. Daft and Lengel [13] have named this kind of ambiguity equivocality. According to Daft and Lengel [13] equivocality is a state where “participants are not certain about what questions to ask, and if questions are posed, the situation is ill-defined to the point where a clear answer will not be forthcoming”. Ambiguity as equivocality represents a situation where two or more meanings can be assigned to the same informational cue [46]. In addition to multiple meanings, those interpretations can be in conflict with each other. However, despite different manifestations of ambiguity, the underlying problem in ambiguity is the absence of ‘reference frames’ [7]. Therefore, ambiguity is resolved, if at all, by acquiring appropriate interpretive knowledge [41].

Based on the findings of previous studies it can be stated that innovation ambiguity arises from the multiple interpretations which pertain to various internal and external matters.

Previous studies show that there exists a particularly remarkable fuzziness at the front-end of an innovation process. The front-end of innovation is fuzzy because the early stages of an innovation process are especially prone to manifesting a situation “that does not fit well with

an approach that requires accurate and stable up-front information" [41]. Emphasizing the fuzziness at the front-end of an innovation process implies that the reduction of fuzziness is a function of time, i.e. fuzziness reduces as time passes. The early stages of innovation processes can be described as fuzzy due to the "high perceived variability and low perceived analyzability" of the tasks in question [16]. As the process progresses and more information becomes available, variability will decrease and analyzability will increase [16]. The linkage between timing, 'fuzziness' and innovation success can be found from innovation literature. Macdonald and Jianling [47], Schilling [48], Halbesleben et al. [49] and Moensted [50] and many others have all stressed that timing is a crucial success factor in innovation processes. Implicitly, it is argued that organizations which are able to make sound decisions during the fuzzy front-end stage of an innovation process will succeed. This kind of reasoning resonates with the commonly held truth that the most important decisions, i.e. those with the greatest implications, are made in the early stages of the innovation process, before all relevant information is available.

While acknowledging fuzziness in the early stages of innovation, this paper, however, supposes that there is also fuzziness in the later stages of innovation processes. This presumption is based on previous studies which have found that fuzziness may persist or even increase as innovation processes progress [e.g. 17, 39, 51]. This implies that the nature of fuzziness changes as an innovation process advances.

### **3. The Virtu channel as an example of systemic innovation**

Following the argument by Jaspers [52], this paper takes the view that systemic innovation is the norm rather than the exception for many organizations developing new services. A fundamental characteristic of systemic innovation is the high interdependence of its different parts. This means that systemic innovation requires simultaneous changes in the integrated system of practices, processes, services, technologies and organizations, which form a new mode of operation when combined. In accordance with the paradigm shift in innovation research from rational and linear models to dynamic ones, scholars have started to emphasize the complex nature of interplay within systemic innovation. Barlow et al. [2], for example, have stated that many innovations in public welfare services are systemic and emerge from, and therefore must address, the complex interplay between political, administrative, technological, institutional, legal and financial matters.

In this paper, the Virtu channel serves as an empirical illustration of systemic innovation. The Virtu channel is a new kind of social media service model for the well-being of elderly people in the archipelago areas of Finland, Åland and Estonia. The Virtu channel is an example of an emerging phenomenon called *virtual services*, which are rationalized by the fact that traditional services are expensive and will not be able to provide enough support to all older people in the future. In addition to meeting economic challenges, virtual services are seen as a convenient way of integrating older citizens into modern society and reducing social exclusion [53]. This is also valid in the case of the Virtu channel. At the heart of the Virtu channel are a handy touch screen and a small camera that are connected to televisions in people's homes as well as a broadband connection, which functions as a link between elderly people, the Virtu channel experts and municipal care workers. The Virtu channel provides several services to elderly people, including interactive programmes produced by educational organizations, municipalities, voluntary sector organizations or commercial companies; communication between elderly people and health care and elderly care personnel; communication between elderly people and their relatives; and communication between elderly people themselves. The Virtu channel necessitates changes in the municipal service delivery system, in the working environment of the municipal personnel and in the organization of elderly care. Comparing the characteristics of the Virtu channel and the arguments offered by Barlow et al. [2], this paper states that the Virtu channel meets the criteria of systemic innovation because 1) it is founded on change in the supply and demand

of service provision; 2) it requires changes in the organization and the motivation of production; 3) the value it generates has not been generated before; and 4) its value creation is based on co-operation between various public and private sector organizations.

On the whole, the Virtu channel provides a new service delivery system in which elderly people are not seen merely as service receivers but also as active participants and developers of the provision. At best, the Virtu channel also enables the birth of a unique virtual community, in which different actors (elderly people and their relatives, educational organizations, technical service providers, municipalities, commercial companies and voluntary sector organizations) from different locations are able to co-operate with one other. However, given the systemic nature of the Virtu channel, it is tempting to think that systemic innovations are inherently *fuzzy* to implement and operate. This is because they involve a combination of technological and organizational renewal within an environment that contains a diversity of actors. The following section demonstrates how the three elements of fuzziness may be present in systemic innovation with reference to the Virtu channel.

## 4. Fuzziness in systemic welfare service innovation

By combining the early findings of the ongoing Virtu channel project with previous studies this paper argues that fuzziness in systemic innovation can be classified along two dimensions: the *subject of fuzziness* and the *nature of fuzziness*. Subjects of fuzziness include the issues the developers of the Virtu project have experienced fuzziness with. “The developer” refers herein to the personnel of the technological companies, the personnel of educational organizations, and the personnel of the municipalities (including decision-makers, local politicians and care workers). The subjects of fuzziness include *technology*, *market*, the *institutional environment* and the *welfare service system*. These are subjects that can be also identified in some form or another in earlier research. The four subjects are used in this paper as follows: ‘technology’ refers to both the technical tools and the knowledge needed to use the tools; ‘market’ consists of potential customers, i.e. elderly people who are expected to be interested in virtual services; ‘*institutional environment*’ refers to the political and legal context, which is needed in order to constrain and enable innovation activities; and ‘the welfare service system’ is composed of municipalities and their care organizations, technology firms, educational organizations and voluntary organizations who aim to develop, adopt and disseminate virtual services in elderly care. The nature of fuzziness refers to the underlying knowledge problem related to innovation and includes *uncertainty*, *complexity*, and *ambiguity* as discussed in Section 2.

In the following, subjects of fuzziness and the nature of fuzziness are illustrated and discussed with examples from the ongoing Virtu channel project.

### 4.1 Fuzziness about technology

... Due to uncertainty

In the Virtu channel project, technological uncertainty arises due to the fact that municipalities suffer from a lack of knowledge concerning the usefulness and feasibility of technology in elderly care. The usefulness of technology remains uncertain because municipal decision-makers have no reliable knowledge related to the costs and benefits of technology in elderly care. It is not known, for example, what the costs and benefits of remote care based on technology are when compared to traditional care provided by visiting care workers. Thus, there are, for example, only approximate calculations that focus on savings of time without clear linkage to the possible positive effects on work processes or customer services. In addition to decision-makers, municipal care workers also face uncertainty due to the unknown feasibility of the technology for care of the elderly. One of the main reasons for that is that there is a shortage of best practices regarding virtual services

which could give new insights into different uses of the technology. The early findings of the project suggest that a lack of knowledge may be leading to a situation where the decisions that are needed to implement the Virtu channel as a part of a municipality's service offering are being delayed.

... Due to complexity

The technological complexity of innovation refers to difficulties in understanding and using technology. In the Virtu channel the roots of technological complexity can be found in the intricacy and connectivity of the different elements, and that pertains to the functional and organizational requirements of the technology. As mentioned in Section 3, the Virtu channel includes a touch screen and a small camera that are connected to televisions in people's homes via a broadband connection. Together they function as a link between elderly people, the Virtu channel experts and municipal care workers. In other words, the Virtu channel is composed of various elements which are connected to each other. Hence, although the 'hardware part' of the Virtu channel, i.e. the touch screen and small camera, is relatively easy to use – even for very old people, the question is how to ensure that municipalities' functional and organizational arrangements meet the requirements and use the possibilities of the new technology. Based on the findings of the Virtu project, this paper argues that technological complexity arises from a diverse collection of processes, techniques and knowledge – all of which are needed to use technology in remote elderly care. It can be said that the technology has resulted in increased complexity with respect to the skills and knowledge required to succeed in using this new technology. This is because they are directed not only at one municipality but towards the whole welfare service system.

... Due to ambiguity

Given that virtual services in elderly care are relatively unfamiliar for elderly people, care workers and municipal decision-makers, it is not a surprise that they trigger multiple interpretations by different actors. This also holds true for the Virtu channel. There exists ambiguity related to the definition of the Virtu channel. Some deem it to be primarily a technology project with fairly small implications for welfare service provision, while some others address it as a new kind of service model which changes the ways services are produced and delivered to the customers. The underlying concern pertaining to the possibilities of the technology is a trade-off between technology-enabled remote services and human care. Unsurprisingly, the early findings of the Virtu project suggest that ambiguity – understood as confusion created by a variety of the frames of reference – may, at worst, yield to conflicting interpretations of the objectives and functions of the Virtu channel. Differences in interpretations are probably strengthened due to the widening gap between public services and commercially motivated digital services. In consequence a digital divide could develop – a situation in which those who are in charge of developing and providing virtual services (i.e. the personnel of municipalities and technology firms) are more and more familiar with the new devices and applications, while, at the same time, their customers (i.e. elderly people) have feelings of insecurity or incompetence regarding the new technology. The result can be ambiguity, which develops from the fundamental question of whether everything that is technologically possible is humanly desirable.

## **4.2 Fuzziness about the market**

... Due to uncertainty

Market uncertainty in the Virtu channel project reflects the fact that developers of virtual services suffer from a lack of factual knowledge about the behavior of potential customers and their needs. Given that the Virtu channel is primarily motivated by the need to improve the productivity of public service provision – instead of the well-articulated needs of elderly people – it can be argued that municipalities face the problem of 'known uncertainty'. Although the market uncertainty can be defined as 'known' because it is a situation where

the market and potential customers of the Virtu channel can be recognized, the true needs of elderly people remain partly unknown. The early findings of the Virtu project support previous studies which argued that when developing virtual services, it is important to understand the nature of growing old. Hence, this indicates that market uncertainty around the Virtu channel can be reduced by increasing knowledge about elderly peoples' preferences and needs.

... Due to complexity

Although uncertainty can be reduced by increasing knowledge related to the need for virtual services, it should be noted that virtual services constitute only a minor part of the total service offering for elderly people. In other words, there exists market complexity, which arises from the connectivity of the service delivery system. Due to market complexity, the true customer value of the Virtu channel requires that it is configured with the service's totality in a way that fulfils the expected needs of elderly people. In addition to services provided by municipalities, complexity arises from the strong role of customers in the welfare services. Elderly people are not only recipients of different services but also 'co-producers' of services. The effectiveness of services, e.g. well-being, is therefore the result of the relationship between elderly people and the service providers. The developers of the Virtu channel face market complexity when they must decide what services should be included in it, how virtual services support the 'co-production' of services and how virtual services are related to more traditional ones.

... Due to ambiguity

In addition to uncertainty and complexity, there also exists market ambiguity around the Virtu channel. This is due to two main reasons: the market for virtual services is just emerging and the comprehension of old people as users of new technology is evolving. Due to the emerging nature of the market, the developers, particularly municipal actors, perceive virtual services as so unfamiliar that they cannot make reasonable judgments about what is important and about what may happen. Combining technological ambiguity with market ambiguity, it seems that different interpretations exist within municipalities. Different interpretations pertain, for example, to whether the efforts in developing virtual services increase the productivity of the services or whether they eventually lead to a loss of human care. Market ambiguity may also arise because of different interpretations concerning old people as users of new technology. Interpretations differ on whether the virtual services really help old people to embrace the changes that come with aging. The variety of interpretations is based on different interpretive knowledge about old people's abilities to meet the requirements of using the new technology. Pointedly, there is a view which presupposes that elderly people are able to make intentional and smart choices and that they have the necessary abilities to use new technology. On the other hand, a view exists which argues that there are elderly people who are not used to new technology due to disability or lack of experience. Due to the immature market for virtual welfare services and due to the heterogeneous clientele, developers face 'deep ambiguity' which cannot be reduced by increasing available information.

#### **4.3 Fuzziness about the institutional environment**

... Due to uncertainty

Elderly care is becoming an increasingly regulated area. Therefore, it is not surprising that municipal actors face institutional uncertainty which arises from a lack of knowledge concerning the legal and regulatory terms of reference for virtual welfare service provision. In addition to acts, decrees and lower-level statutes that oblige municipalities to act in a certain way, the central government – particularly the Ministry of Social Affairs and Health (MSAH) – attempts to influence the behavior of municipalities by means of information. MSAH provides, for example, guidelines concerning the number of employees in municipal **personnel vis-à-vis** their customers in elderly care. Furthermore, for virtual welfare services there is also

another central government body – the Ministry of Transport and Communications (MTC) – which also influences how the services can be organized and delivered. The MTC guides and governs the use of the personal details of citizens. Despite their good intentions, the resulting legislation, regulation, and diverse information steering provided by the central government bodies is seemingly leading municipal actors to feel institutional uncertainty. One example is uncertainty regarding whether and how virtual services can be used as substitutes for traditional welfare services, or how customers' personal details can be shared and used in developing new kinds of services.

... Due to complexity

Given that the ultimate goal of the Virtu channel is to become a new kind of service system, it implicitly challenges existing working practices within the interface between the public and private sectors. Hence, institutional arrangements and regulations are needed in order to support co-operation in service development between municipalities, technology companies, educational organizations and voluntary organizations. However, the problem identified relating to the institutional environment around the Virtu channel is its complexity. Institutional complexity arises because the development of virtual services is influenced (enabled or constrained) by diverse sets of regulations and policies which are interrelated with each other in a way that may surprise developers. For example, because the MTC governs the use of customers' personal details and the operations of telecommunication companies it simultaneously moulds the knowledge and technological infrastructure for virtual services. The MTC has set the objective that broadband connections are provided to more than 99 % of the population of Finland by the year 2015. However, the situation nowadays is that in sparsely populated areas in the archipelago of South-West Finland broadband connections are inadequate for services developed in the Virtu channel project. Furthermore, a fear is that the approximately 1 % of the population who are not even included in 'project 2015' will live in the very areas that the Virtu channel should operate. As mentioned, the MTC (in co-operation with other central government bodies) also ensures that the principles of the use of personal details are respected and that the citizens' rights to know and to participate in public policy are protected. This is helped by several Acts including the Personal Data Act, the Protection of Privacy in Electronic Communications and the Act on the Openness of Government Activities. However, instead of easing the development of virtual services, the result is a bulky and complex mix of legislation. Hence, despite good intentions, these two issues can be depicted as examples which increase the institutional complexity faced by the developers of the Virtu channel, especially from the point of view of the municipalities involved.

... Due to ambiguity

Since the Virtu channel is in its early development phase and no clear markets exist yet, it is understandable that its institutional environment is full of informational cues that need to be interpreted. For example, the technology developing firms may be reluctant to 'put their cards on the table' if they are uncertain about whether their innovation efforts will be secured by regulation. In other words, the regulations may fail to guarantee that firms' innovation efforts are rewarded. Due to the newness of the market for virtual welfare services in elderly care and due to general technological development, the legislation and regulations in the domain are only just beginning to evolve, which, in turn, increases the amount of different interpretations made by municipalities. Perhaps, the result is the emergence of 'systemic ambiguity' in which the institutional structure is neither able to facilitate nor constrain innovation efforts. In systemic ambiguity, the developers of the Virtu channel face so many information cues related to their institutional environment that they are not able to see what is possible and permitted and what is not.

#### ***4.4 Fuzziness about the welfare service system***

... Due to uncertainty

The Virtu channel is developed within the system which is composed of municipalities, technological companies, educational organizations, voluntary organizations and customers and their family members. The attractiveness of the system perspective is the result of a logic that argues that the innovation challenges in welfare services are solved by combining the complementary and substitutive capabilities possessed by different organizations. Interaction within the welfare service system is required for both developing new ideas and implementing them as new practices. However, given that innovation refers to both developing new ideas and implementing them as new practices – and that the system includes not just different actors but also enacted social relations – it is reasonable to expect that innovation has the potential to disrupt power structures and work routines within the welfare service system. In municipalities the Virtu channel can be seen as a threat, leading to long-running and traditional care services – that have mainly been provided by municipal care workers – being replaced (at least partly) by technology-enabled remote care services. This may create uncertainty which has its roots in a lack of knowledge about the management practices that can be used to support the development and implementation of new services in the context of the welfare system.

... Due to complexity

Interaction within the welfare service system can be characterized as complex in the sense that it produces emergent patterns and behavior, which cannot be reduced to the properties of the actors. Complexity on a system level emerges from the connectivity of various actors and elements. Co-operation between the public, private and voluntary sectors has created a complex service bundle that includes the perpetual novelty arising from the interaction and connectivity of elements. Applied to innovation, it means, for example, that no one, including the most powerful actor of the system, can control or plan the responsive interplay of ideas presented by others. In the Virtu channel project, system complexity has become evident in several forms. One typical example is the treatment of the proposals put forwards during the project. Regardless of the proposals' contents or by whom they are presented, proposals are subjected to responsive interplay in the way they are judged and evaluated on the basis of the actors' own interests, which may end up as emergent patterns that no one actually chose or wanted. The result is system complexity, which arises because the connectivity of elements and simultaneously their perpetual novelty makes them too large to process with ease.

... Due to ambiguity

While the definition of innovation as an information-processing activity implies that decisions around innovation can be improved with better information, it should be noted that innovation also induces issues which go beyond information and which may increase the ambiguity of the system. This definitely holds true in innovations similar to the Virtu channel, which take place in mixed-sector co-operation. This results because, although co-operation increases a system's innovation potential, it also creates complicated organizational interlacings with conflicting values, interests and political judgments, which may, in turn, lead to a situation where the potential of the innovation remains unrealized. The findings of the Virtu channel project suggest that there exists system ambiguity around the project, which results from multiple interpretations of the same information cue due to different values, interests and political judgments. From the care workers' point of view, the Virtu channel can be seen as a facilitator of work processes in elderly care or as a technology that is difficult to use as it requires new skills. On the other hand, municipal decision-makers may conceptualize the Virtu channel as means for improving the productivity of services for the care of the elderly, whereas the old people themselves may fear the Virtu channel as a step towards a more technologically oriented system of care. In other words, the Virtu channel has many faces, i.e. it represents different things to different actors.

## 5. Conclusions

Since the course of development of innovation theories has moved away from the rational and linear stage-gate models [e.g. 54] to the dynamic, social and complex nature of innovation processes [e.g. 55, 56], researchers have also become more interested in the ‘fuzziness’ of innovation [e.g. 5, 6, 7, 8]). As this paper has shown, fuzziness can manifest itself in different forms. Based on the findings from the ongoing innovation project – the Virtu channel – this paper concludes that fuzziness in systemic innovation can be classified along two dimensions: the subjects of fuzziness and the nature of fuzziness. The subjects of fuzziness include *technology*, *market*, *institutional environment* and *the welfare service system*, whereas the nature of fuzziness refers to underlying knowledge problem related to innovation and includes *uncertainty*, *complexity*, and *ambiguity* (see Table 1).

**Table 1** Nature and subjects of fuzziness in systemic welfare service innovation (adapted from Brun et al., 2009; Brun 2011)

NATURE OF FUZZINESS	SUBJECTS OF FUZZINESS			
	Technology	Market	Institutional environment	The welfare service system
Uncertainty	Uncertainty arising due the lack of information or factual knowledge regarding technology. Uncertainty pertains especially to the usefulness of the Virtu channel <b>measured in cost-benefit terms</b> .	Uncertainty arising due the lack of information or factual knowledge regarding customers. Uncertainty condenses the question of whether the Virtu channel is adequate for the true needs of elderly people.	Uncertainty arising due to the lack of information or factual knowledge regarding the institutional environment. Uncertainty pertains to the institutional terms of reference of the Virtu channel and raises questions such as whether and how virtual services can be used as substitutes for traditional services.	Uncertainty arising due to a lack of information or factual knowledge regarding the workings of the welfare service system. Uncertainty especially pertains to management practices that are needed for the development and implementation of virtual services in the welfare system.
Complexity	Complexity arising due the intricacy and connectivity of the elements of the technology. Complexity arises especially from the Virtu channel's functional and organizational requirements.	Complexity arising due the intricacy and connectivity of elements of the market. Complexity pertains to the relationship between the Virtu channel and more traditional services.	Complexity arising due to the intricacy and connectivity of elements of the institutional environment. Developers of the Virtu channel face a complex mix of various institutional settings, which may restrict the development of virtual services.	Complexity arising due the intricacy and connectivity of elements of the welfare service system. Complexity manifests itself as emergent behavior in which no individual actor of the Virtu channel project can control the development processes.
Ambiguity	Ambiguity arising	Ambiguity arising	Ambiguity arising	Ambiguity arising



	from multiple interpretations of the technology. Ambiguity results from questions such as: is everything that the Virtu channel enables desirable for people.	from multiple interpretations of the market. Market ambiguity results from the multiple interpretations concerning elderly people as users of the Virtu channel.	from multiple interpretations of the institutional environment. The developers of the Virtu channel face such varied interpretative knowledge related to their institutional environment that they find it difficult to make sense of what is allowed and what is not.	from multiple interpretations of the welfare service system. System ambiguity around the Virtu channel exists because there are multiple interpretations due to different values, interests and political judgments.
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Whilst the focus of this paper has not been to explore the relationship between knowledge problems and managerial practices, the finding of the ongoing Virtu channel project can be used as a catalyst in setting avenues for further research focusing on managing fuzziness in systemic innovation. A good starting point may be Zack's [12] notes concerning the differences between uncertainty, complexity and ambiguity. Zack [12] writes that "if uncertainty represents not having answers, and complexity represents difficulty in finding them, then ambiguity represents not even being able to formulate the questions".

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# Impacts of the Organizational Change on Employees' Productivity

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One of the burning issues for the companies competing on today's markets is increased competition, the constant battle for market share and aims for improvement of the revenue generation capacity. A handful of different measures can be undertaken in this direction, but one of the most important and the highest yielding is to adapt the organization to the changing environment. This paper presents the findings of a research conducted in a telecom company coping with challenges of the organizational change. The reasons for the change are the altered market condition and increased competition. The organizational change is accomplished by reduction of the number of employees and introduction of new organizational structure. Such a revolutionary transformations have strong influence on each individual in the organization which has "survived" the process of change. In the circumstances of the new organizational setup, including new processes, loss of colleagues due to downsizing, extended workload, fear from new round of downsizing, the employees are additionally challenged to maintain, even more, to improve the level of their productivity. The objective of the research is to assess the impact of the organizational change on employees' productivity. Job satisfaction, job relates stress, job security, and trust in management are evidenced as very important factors in employees' professional life that are influenced by the organizational change. Therefore the researcher has examined: (i) the relation between the above mentioned factors and productivity, (ii) their level of impact on productivity. Quantitative method is applied on the bases of questionnaire used for data collection. The questionnaire is specially tailored to collect all required data for quality answer to the defined objective. Correlation and regression analysis are applied as statistical operation needed to answer the set objective. Productivity is being strongly related with job satisfaction, job related stress and trust in management, but not significantly correlated with job security. Job related stress is found to have the strongest negative impact on productivity.

## Keywords

Organizational change, Productivity, Job Satisfaction, Job Relates Stress, Trust in Management

## 1. Introduction

We live in times of market liberalization and increasing competition where everyone is trying to find a way to increase the market share and improve the revenue generation ability. In order to reach these goals the companies need to increase their competitiveness and efficiency, to increase customers' satisfaction, to improve the quality of the services and products, to apply continuous improvement related to the employees, services, products as well as operations, to act proactively in the search of the latent needs of the customers and last, but not least, to be flexible.

Aiming to keep the pace with these developments the companies are continuously forced to adjust to changing market conditions. One of the prerequisites for the companies to survive in this environment is to reach and keep high level of productivity.

On the other hand, the companies, especially the large enterprises apply organizational changes that often include downsizing as well as organizational restructuring, as a measure for improvement of the company's market position and increased profitability. But, do the organizational changes, which become a way of living in the large enterprises worldwide yield the desired result? Are the invested effort, energy, money and time worth?

In order to answer to these questions, the researcher set an objective to explore the influence of the organizational changes on productivity. Job satisfaction, job relates stress, job security, and trust in management are evidenced as very important factors in employees' professional life that are influenced by the organizational change. Therefore the researcher has examined: (i) the relation between the above mentioned factors and productivity, (ii) their level of impact on productivity.

The research was focused in a national telecom operator providing public telecommunication services, living the introduction of new organizational structure. In the process of adoption of the new organizational structure, the company was downsized for 30%.

## **2. Impact of the organizational change (literature findings)**

When discussing organizational change, the human aspect requires great consideration and focus, in order the process to be successful. Organizational change has different impact on employees' professional and private life. Korunka et al. [1] advises careful monitoring of the employees' reactions to the organizational change in order to assess the quality of their working life. It could both be used as an indicator of successfulness of the organizational change as well as early caution signs for potential organizational failure.

### ***Job satisfaction***

Job satisfaction is defined as an extension to which the employees feel positive or negative towards their job [2]. Different authors examined the influence of different factors on employees' job satisfaction. Yousef [3] founds a positive relation between job satisfaction and willingness to accept change. Nelson et al. [4] evidenced decreased employees' job satisfaction during the process of the organizational change, independently of their affiliation to different hierarchical levels. They further report that when the new structure is established, job satisfaction starts to increase. Even though the literature evidences the positive impact of change on the job satisfaction, Griffin [5] founds that the increased job satisfaction after the change has short duration, going back to the before the change level.

Contrary, Lee and Teo [6] found negative correlation between job satisfaction and the intensity of the change affecting specific employee in researches conducted immediately after organizational restructuring.

The literature evidences increased workload as a result of the organizational change [7,8,9]. Brown [10 p13] says: "People are working harder and longer these days – and enjoying it less". He further advises to respect employees' need for the individual respect, challenge, growth, enthusiasm, ethics, balance and rewards, in order to make them more satisfied with their work and to enable a benefit for the organization. Ferguson and Cheyne [11] have analyzed the relation between the job satisfaction and the workload as well. They found that the employees that were not loaded or had boring work before the organizational change considered the change as benefit. It generated more tasks making their working hours more interesting thus raising their job satisfaction. Contrary, the employees being already loaded at their positions before the change reported decreased job satisfaction.

### ***Job related stress***

Doherty et al. [9] have found that many organizations enter the process of organizational change without thoroughly considering the intensity of its impact on the individuals. This alone can further increase the process' chances of failure. One of the consequences of the organizational change is the increased stress affecting the survivors [12,13]. One of the reasons for this increased stress is the overload of the employees with too many tasks. Vakola and Nikolaou [14] stress that the period immediately after the organizational restructuring is very sensitive, since one employee may have to cover his previous job post and the new one. Therefore, they explain, the company should have well prepared change plan providing well balanced work schedule, if it really and honestly wants to limit additional workload and reduce stress. Consequently, it is advisable to the companies entering the organizational change, to develop effective stress management procedures [15] and practice appropriate stress management techniques [16].

Having in mind that change is a stressful experience [17] and that the organization's effectiveness and efficacy strongly depend on its staff, it is crucial that the employees are well prepared to cope with increasing stress during and after the process of change. Badly managed stress will create negative attitude towards the change, raising the stress as a powerful inhibitor of the process [14].

The literature emphasizes the importance of support by co-workers or superior officers in coping with the increased work related stress [7]. The reduction of its negative impact on the individuals will limit its later reflection on the whole process of organizational change. They further present two aspect of support: (i) support form family and (ii) support from colleagues and managers. Even though family and friends are not included in the work life of the individual, their support is very important and can strongly decrease the level of stress.

### ***Job security***

Witnessing that the change (downsizing, redundancy and restructuring) becomes a constant part of the organizational life "employees' perceptions of the organization as a source of long-term security has been radically changed" [18 p59].

Doherty et al. [9] present the above mentioned turbulences (downsizing, redundancy and restructuring) in the business life, as one of the reasons for increased fear about the job security. They further explain that the survivors of downsizing have to recover from the following shocks: (i) loss of colleagues, (ii) possible job loss for themselves in one of the next rounds of downsizing and (iii) increased stress that they should cover the work of the colleagues that left the company. Similarly, Greenhalgh and Rosenblatt [19] point to the restructuring, mergers and downsizing as originators of employees' job insecurity. Once when job insecurity occurs, it can cause negative impact on organization's effectiveness as well as Swanson and Power (2001) on employees' physical and mental health [7]. Worrall et al. [20] report the negative impact of redundancy, delayering and restructuring programs on the employees' sense for job security.

It is obvious that contemporary companies cannot offer job security as stimulus to attract high qualified employees. Therefore, Anon [21] suggests that the companies must offer challenge, responsibility and opportunity for carrier growth otherwise there is high treat of losing the best ones.

### ***Trust in management***

Organizational change, especially downsizing and restructuring have great impact on employees' trust in an organization. Wide literature treats the trust as key factor in successful

organizational change presenting the concerning negative impact of downsizing on the trust of the remaining employees [22,23,24]. High level of trust inside an organization is a crucial factor for successful completion of downsizing, since “lack of trust can lead to increased absenteeism, tardiness, theft, and sabotage which can result in decreased workforce cooperation, innovation, productivity and quality performance” [25 p547]. Similarly, Tierney [26] presents high level of trust among organization’s members as precondition for positive climate that will lead to successful change.

Even though the literature evidences the benefits from high level of trust in any stage of the organization and especially during and after the process of change, it is evidenced that the level of trust declined in the post restructuring period. The research conducted by Morgan and Zeffane [23] results in significant negative effects of change on trust. Similarly, Farrell [22] found that downsizing produces lower level of trust and consequently he suggest that the organizations should very carefully consider all possible impacts of downsizing both on the employees as well as on the organization’s performance.

Mone [27] presents that high level of employees’ trust in management will produce their supportive attitude against an organizational change (downsizing), leading to greater cooperation and positive outcomes, as higher productivity. Contrary, he further explains, low trust in management, leads to non-supportive attitudes towards downsizing. Such attitudes generate lower productivity that has negative impact on the individuals and the organization and even worse it produces a need for further downsizing.

### ***Productivity***

One of the major reasons for organizational change is reaching higher productivity in the changing business environment. Therefore, the exploration of the impact of organizational change on the productivity is worth, or even more required, as a measure of successfulness of the process of change.

Many researchers have reported decreased productivity as a result of downsizing. Even though the expectation of the organizational change is the increased productivity, Sadri [28] presents research results, where 71% of examined companies expected increased productivity, where 22% have reach it.

Many authors have researched the issue of decreased productivity after downsizing. Sadri [28] presents the decreased effort after downsizing as one reason for decreased productivity, explaining effort and ability as determinants of worker’s productivity. Since ability is not changed after downsizing, the change (decrease) in work effort will result in lower productivity. Contrary, Littler et al. [29] present that increased workload, does not always mean increased productivity. They explain that in post restructured organization, increased effort does not always produce increased performance, since lack of work redesign can generate unproductive activities. Brockner [30] reports overlooked impact of downsizing on the survivors, as a main reason for their decreased productivity. Even more, Rickey [13] perception of survivors about how laid off employees have been treated by the company have major impact on how they (survivors) perform.

Brockner [30] relates high job insecurity with decreased productivity. However, he further explains, moderate job insecurity can have positive impact for greater productivity. Babin and Boles [31] present positive relationship between job satisfaction and productivity.

## **3. Methodology**

In order to collect sufficient quantity of data the researcher had to examine as many employees as possible. The participants in the study were required to demonstrate their attitudes, believes and behavior about certain company related issues. Consequently, aiming

to achieve the research objective, the researcher used the quantitative method. The research was conducted inside one company in telecom industry and is based on the application of a case study as the most appropriate research strategy.

Self-administered questionnaire was used for collection of complex data in a cross-sectional research as a basis for the analysis of certain contemporary issues. The 5-option Likert scale was used offering the participants of the research to answer with 1 if they strongly disagree with the statement and 5 if they strongly agree.

In order to measure the relations of job satisfaction, job relates stress, job security, and trust in management with productivity correlation analysis was perform, while their impact on productivity was tested by regression analysis.

## 4. Research findings and discussion

The process of organizational change has strong impact on the organization and its employees. Job satisfaction, job related stress, job security and trust in management are often presented in the literature as very important factors in employees' life that are influenced by the organizational change. The correlations of the productivity with these factors are presented in the table below.

**Table 1** Correlations of Productivity, Job Satisfaction, Job Related Stress, Job Security and Trust in Management

		Job Satisfaction	Job Related Stress	Job Security	Trust in Management
Productivity	PCC	.421**	-.595**	-0.006	.281**
	Sig. (2-tailed)	0	0	0.914	0
	N	305	305	305	305

PCC-Pearson Correlation Coefficient

\*\*Correlation is significant at the 0.01 level (2-tailed).

The productivity is in strong positive correlation with job satisfaction, significant at the 0.01 level meaning that the employees that are more satisfied with their job, would be more productive. This finding is in relation with the literature since Babin and Babin [31] present positive relationship between job satisfaction and productivity. The literature evidences relation between job satisfaction and change. Yousef [3] presents positive correlation between job satisfaction and willingness to accept change, while Lee and Teo [6] identify negative correlation between job satisfaction and intensity of the change. These findings combined with the presented strong relation between productivity and job satisfaction should produce a worthy direction for the management of the company. Many companies enter the process of organizational change without being aware of the intensity of the impact that the change process has on individuals [9]. Thus the recommendation to the managers would be deeply to consider this impact, including the individuals' job satisfaction, and to try to manage it on a higher possible level. The higher job satisfaction, based on the results presented above, would generate higher productivity, which in turn will improve the company's efficiency.

The correlation between productivity and job related stress is strongly negative. With PCC =-0.595 and significance valued 0, it is significant at 0.01 level. This significant correlation means that the management of the company should seriously take proper steps in order to manage the stress of the employees caused by the organizational change. Especially since the stress is expected to increase. The literature suggests development of effective stress management procedures [15] and following the appropriate stress management techniques [16]. The ultimate aim of this activity would be to give proper attention to such sensitive issue as the job related stress in order to directly protect the employees and indirectly create benefit for the company.

There was no significant correlation found between the productivity and job security. This is not in line with Brockner [30] who relates high job insecurity with decreased productivity,



while moderate job insecurity can have positive impact on greater productivity. Even though there is statistically no significant correlation, the following data will raise additional question. The mean of job security is 2.97, where the frequency of value 3 is more than 35%. This shows that the participants of the research are reserved to discuss about their job security, raising the question whether the data draws the real picture. Thus, further analysis would be needed in order to explore whether and how the productivity and job satisfaction are correlated.

The productivity is significantly positively correlated with trust in management at the 0.01 level. It means that higher trust in management would result in higher productivity. If the management wants to increase the productivity of its employees, it should work on trust that the employees feel towards them and not only in periods of change. The trust in management is very important in any stage of organization's life. Mone [27] presents that the low trust in management in pre-reorganization phase results in higher resistance to the change, leading to lower productivity. Similarly, Morgan and Zeffane [23] found significant impact of trust on the productivity, whereas Farrel [22] found that downsizing decreases the trust in management. Therefore, the management should be aware that high level of trust in company is important if high standards of performance are to be achieved.

Finally, regression analysis was performed in order to measure the level of the impact of the employees' outcome on productivity. The model summary of the whole sample is presented in the following table.

**Table 2** Regression analysis model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.595 <sup>a</sup>	.354	.351	.61678	.354	165.731	1	303	.000
2	.625 <sup>b</sup>	.391	.386	.59890	.037	18.312	1	302	.000

Dependent variable: Productivity

a. Predictors: (Constant), Job Related Stress

b. Predictors: (Constant), Job Related Stress, Job Satisfaction

The outcome presents participation of 35.4% of job related stress and 3.7% of job satisfaction in the change of the productivity. The high percentage of influence of job related stress shows that, the productivity can be most successfully managed by proper management of the job related stress within the process of organizational change.

## 5. Conclusion

There is a vast array of multidimensional factors that influence all subjects affected by the change, a lot of them being complexly correlated. Investigation of the impact of organizational change on productivity results in very strong positive relation to the job satisfaction and trust in management, very strong negative relation to the job related stress and no significant relation to the job security. Having analytical approach in the development of the change strategy, considering all external and internal factors that influence change, together with all possible impacts and consequences, will make the process of organizational change easier for implementation, and will greatly increase its stakes for success for benefit of the organizations and individuals.

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# Science Communicators and Their Role Today

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The communication between the scientific organizations and the business environment, between scientists and society is not yet seriously studied in Romania, though it is an important element for research, development, innovation etc. Our paper is an awareness on the necessity, role and positioning of the science communicators. There are presented the advantages of the placement of science communicators into the entities of The National Network for Innovation and Technological Transfer from Romania in order to improve the technological transfer & innovation activities. There are exposed some possibilities for their training and education now and in the near future. In the context, there is presented also The Science Communicators Network from Romania and we underline the benefits of the possible collaborations between the two networks in national or international consortiums with other similar organizations in the Balkan region, European Union and whole world.

## Keywords

Science communication, technological transfer & innovation, ReNITT, RCSR

## 1. Introduction

Up to the middle of the twentieth century, the scientism - as dominant ideology - empowered all the scientific explanations, solutions and accomplishments with an absolute authority beyond any doubt or questioning. The costs and consequences didn't alarm the society. The scholars used to communicate in general *ad intra* – on occasion of different meetings in the field. A number of factors outcome following the Second World War. The world political configuration changes, mass-media diversification and the globalizing process in progress have generated a communicational explosion. Concurrently, some undesired effects of the technical-scientific revolution such as nuclear weapons appearance and use, pollution etc. beside the increase of funds allocated to the research activity had forced the scientific community to present the accomplishments, opinions, demands and options more frequent *ad extra*. The communication and its means had to diversify depending on the message, aims and addressees.

The increased interest attracted by the scientific knowledge, economic and business requirements emphasized the necessity of communication fluidization, on one hand, between specialists with different professional background and on the other hand, between those first ones and unqualified people, encouraging the appearance of new interdisciplinary specializations generically denominated science communicators.

## 2. The Romanian Situation

After the Second World War, Romania and most of the Balkan countries have been integrated within the Communist area. The scientism and positivism have been kept integrated within the totalitarian regime ideology. Officially, the only viable truths and

solutions, permanently perfectible, answering to the society problems might be obtained using the scientific research. That respect was in the same key with the declared atheism of the regime. Science has been used to back up the political directives especially through the different vision on the development of different scientific fields of activity and the controlled communication of results. The central leadership considered the economic development as a fundamental imperative, within the industrialization represented an essential objective. Therefore, the engineering sciences development was favored to the detriment of humanities. The economy and society as assembly took over unconditionally the results delivered by the research-design entities. The science communication was unilateral because the totalitarian regime didn't predict any feed-back on the behalf of the economic units (state-owned), local authorities, even less a public reaction. National promotion of the results aimed to present the justification and efficiency of the political decisions that determined them. On international scale the Romanian participation at different events and meetings was extremely limited, being parts of propagandistic efforts of the totalitarian system, sustaining the Communist vision superiority against the Capitalist one.

The events occurred on 1989 have caused radical transformations in Romanian science as well. The transition towards the market economy, the economic situation and the political options imprinted the research coordination and funding. The new context dictated to science community the communication necessity on both of national and international plan because:

1) people without scientific knowledge have nowadays the possibility of influencing the research & development activities. The offer/results as well as the demand/requirements must be presented, sustained and argued in front of politicians, economic agents and business investors, central and local authorities, mass-media and – sometimes - the entire population. Therefore, it became necessary for them to get easily and correctly the messages of the scientific community.

2) world-wide scientists communicate between them more fluently, within the same field of activity as well as between the different research areas, due to the continuous evolution of interdisciplinary researches, being obliged to get up to date permanently with the development of communication means.

The lack of ability to present the results and the own problems of the research & development organizations damaged their public image as well as their field of activity, hindering the communication efficiency and thus, favoring under-funding tendencies and minimizing the role played by sciences in Romanian society and economy.

Moreover the Romanian mass-media (with very few exceptions) don't have qualified science journalists in order to present objectively the current situation in the field choosing the cheap sensational instead of professional inquiries, reports and interviews.

The latest developments have showed off implicitly or explicitly necessity of the science communicators' presence in the area of research services in Romania, in mass-media respectively.

### **3. Technology Transfer & Innovation Activities & the Science Communication**

In the Romanian economic context and under the actual global conditions but also on perspective, the getting out of crisis demands a more fluent and accessible communication between the scientific community, the economic and business environments and the society.

In full accordance with the current orientations of world and European research, development & innovation policies, Romania's Government recognizes the strategic importance of the scientific research and technological development domains for obtaining and maintaining a sustainable competitive advantage for our country, at both european and global level. In this respect, one of the strategic objectives for the policies in the field of research, technological development and innovation is a more close correlation of research & development activities

with the industrial policy of Romania and the reinforcement of long term connections between the research & development sector and the economic environment, achieved by the development of mechanisms that ensure technology transfer to economy and encouraging the participation of the private sector in research, development and innovation activities.

In Romania, The National Authority for Scientific Research is the Government's specialized body with the mission to formulate, apply, coordinate, monitor and evaluate and innovation policies, in accordance with the Government Strategy and Programs. It fulfills the responsibilities and undertakes the attributes of the Ministry of Education, Research, Youth and Sports in the field of research, technological development and innovation.

### **3.1 The National Technology Transfer & Innovation Network – ReNITT**

The National Authority for Scientific Research promoted the infrastructure development at national scale in the fields of services for innovation and technology transfer by implementing the program „INFRATECH” (2004 – 2008), launched and coordinated by the Direction for Innovation & Infrastructures of the the National Authority for Scientific Research, approved by the Government Decision 128 / 2004. The projects were aiming to settle technology and business incubators, technology transfer centers, technology information centers, science & technology parks, technology & business incubators as well as offices matching the industry demand with the technological research supply. While the Government Decision 406 / 2003 provides the legal basis for methodology that enforces the assessment, evaluation and operation of the innovation and technology transfer institutions, the Government Ordinance 14 / 2002 (approved by the Law 50 / 2003) enforces the existence of science & technology parks.

The National Technology Transfer & Innovation Network is an initiative of Ministry of Education, Research, Youth and Sports – The National Authority for Scientific Research as a result of the application of the program „INFRATECH”. The providers of services in the area of innovation and technology transfer are grouped in the specialized network containing 54 accredited entities: 14 technology transfer centers, 20 technology information centers, 16 technology & business incubators and 4 science & technology parks. All these 54 entities are operating under the Government Decision 406 / 2003. Besides, there are more science & technology parks under development, set-up on the basis of Government Ordinance 14 / 2002 approved by Law 50 / 2003. The National Technology Transfer & Innovation Network is evenly covering the national area with important nodes in Bucharest, Craiova, Arad, Cluj-Napoca, Deva, Iași, Râmnicu-Vâlcea, Timisoara, Tulcea, Brasov and Sf. Gheorghe.

The National Technology Transfer & Innovation Network is a national reference point for the principal stakeholders in the transfer of knowledge and technology in order to:

- support the socioeconomic development, stimulating the innovation and the technological transfer, attracting investments in order to turn to advantage the research, development & innovation activities and the human resources in the field;
- increase the visibility of the research, development & innovation units and the exploitation of the research, development & innovation results;
- improve the competitiveness of the small & medium enterprises and their innovation processes through the development of supply services for transfer of knowledge and technology;
- promote a market for the research, development & innovation results in all sectors of the Romanian economy;
- promote the national exchange of information, expertise, methodologies and best practice;
- stimulate partnerships and networking.

The beneficiaries of The National Technology Transfer & Innovation Network are economic agents, research, development & innovation units and innovative small & medium enterprises.

The entities of the National Technology Transfer & Innovation Network Romanian also are members of the Association for Technology Transfer and Innovation – ARoTT – a professional, non-governmental and non-profit organization of technological transfer and innovation profile units. Its first purpose is promoting and protecting business environment of technological transfer entities and innovative business from Romania in order to improve the activity of the members.

### ***3.1.1. The Role of the National Technology Transfer & Innovation Network in the Improvement of the Communication, Visibility and Valorization of the Results of the Romanian Science***

Besides the activities concerning scientific research and technological development, international research, development & innovation collaboration and development of institutions, human resources and infrastructures, the area of responsibilities of The National Authority for Scientific Research includes several activities that are achieved by the entities of The National Technology Transfer & Innovation Network: innovation and technology transfer; diffusion and dissemination of research, development & innovation results; public promotion and awareness of research, development & innovation activities.

As far as you can notice, among these objectives there are science communication activities which can help to:

- increase the visibility of the research, development & innovation units;
- increase the capitalization of the research, development & innovation results;
- improve the relationships between the research, development & innovation organizations, economic agents and society,

In correlation with the attendance and/or organizing of exhibitions and dissemination actions, both internally and internationally.

In our country, the National Authority for Scientific Research has initiated different events on national and regional scale in order to improve visibility of the results of the Romanian research, to multiply the contacts between the entities involved in the technological transfer and innovation activities- Romanian and foreign organizations.

Yearly, during the International Technical Fair from Bucharest, The Romanian Research Salon and The International Salon of Inventions, Research and New Technologies INVENTIKA have been organized ever since 2007.

The National Technology Transfer & Innovation Network entities attend to these events by:

- specific presentations;
- presentations concerning the organizations that include them;
- accomplishment of: technological brokerage events, symposia, round tables, workshops, partnerships enhancing etc.

The technological brokerage events organized by IPA CIFATT Craiova and the workshops titled „Social-economical interferences on the edge of innovation” accomplished by CIT IRECSO Bucharest have become known and awaited. For some years, technological brokerage sessions became transnational due to the organizers’ efforts to promote the trans-boundary and European collaborations. The seminars became turning points for the debating of problems of the entities involved in technological transfer and innovation on national scale, for their professional development.

On regional scale, yearly, the Regional Research Salons are held in order to promote the local specific connections and they are included by wider actions favoring the meeting

between the technological transfer and innovation entities, the stakeholders of the local economic & business media, the local authorities and the scientific community.

Another event (since 2003) – with international attendance - is the annual Open Forum for Innovation and Technological Transfer, as an instrument meant to link the actors on the research, development & innovation scene, the offer and the demand, the strategies and the ministerial policy to the concrete needs of the small & medium enterprises, meanwhile trying to facilitate contacts to foreign partners, of the European Union in particular. The Open Forum combines both a virtual internet platform and a real space for communication and interaction (conferences and events).

Also the National Authority for Scientific Research organize Romanian research, development & innovation results promotion activities especially in the European Union. Every time, in the last few years, Romania was one of the first three countries rewarded as far as the receiving prizes were concerned. Romania has also been internationally appreciated and the participants' number and their consistency has constantly been increasing.

The contribution of the science communicators to the success of these events may consist in:

- The appropriate promotion of the image of the research, development & innovation organizations and their activities to the interested parts' demands;
- The improvement of the presentation means of the research, development & innovation activities results in order to enhance partnerships and new connections;
- The communication, knowledge and technologies transfer enhancement in order to inform the economic agents and society on the research, development & innovation activities.

Also science communicators' activity feedback may be an extremely important source of information for both research, development & innovation units and the technological transfer and innovation entities aiming for a more consistent, accurate and rapid correlation of their activities with the immediate and actual problems of the economy and society. Therefore the entities of The National Technology Transfer & Innovation Network provide the optimal conditions for science communicators activity in the benefit of the scientific community, economy and society.

### **3.2 Romanian Science Communicators Network - RCSR**

Communication has always been the most effective way to get to the people's minds and hearts. Today, into the "Internet Era", when the Facebook, Twitter, Skype, Yahoo Messenger accounts are compulsory to penetrate the world hidden behind them, communication gains a new meaning. In the same time the business world also needs effective tools to develop and implement the most daring ideas. Communication represents the fastest and most effective tool to promote and to develop markets for new products. In case the research and development projects and/or results are the goods that need promotion, communication will have to face high difficulties. Those result from different educational and cultural backgrounds of people involved in dialogue. On one hand there are the Scientists with a highly abstract and specialized language and on the other one there are the funding organizations, the economic environment, the public authorities etc who don't own the necessary knowledge to understand the first ones. Under those circumstances it is required to develop a common language on common grounds. That involves less abstract notions and more common words. If during a scientific meeting between people, who share the same field of expertise highly academic language is an ace, it will turn into a serious obstacle for unaware public.

Romanian Science Communicators Network is a group of specialists including beside scientists, other professional categories such as stakeholders and academics, who are not



only preoccupied by the science communication but also by the connected problems, about their profession and not only. Informally they communicate on their fields of interests and share news regarding the progresses recorded in order to make more effective and productive the communication. Romanian Science Communicators Network was founded in 2009 by Mr. Cătălin Mosoia and a group of enthusiastic people and has grown up to nearly 100 members due to some special specific events organized lately. The attendance has been consistent and the communications' quality increased at the last three events namely "Scientific journalism and communication" within the symposium "Romanian Diaspora in Scientific Research and High Academic Education", "Communication science for Science Communication – SC4CS" (both on 2010) and "Crisis communication" (2011).

Romanian Science Communicators Network aims to:

- highlight communication's key role;
- present the importance of science communication in society;
- facilitate personal and professional relationships as they do configure in counselling, training, science communication and technological information;
- help in formation of the science communicators in scientific and mass-media areas.

#### **4. Science communicators training**

In Romania, nowadays, the science communicators formation and training could be achieved in two ways, depending the requirements:

1. for immediate aims, interdisciplinary consortia between the entities of The National Technology Transfer & Innovation Network and high education or life-learning training units, certified in the field, can run training tasks so that in short time the required skills will be acquired by the scientific community.
2. for long term perspectives, high education units certified in the communication field may develop master and doctoral programs in order to initiate future specialists in the science communication.

By the same means, science journalists (due to their lack in Romanian mass-media) should be trained in order to be an important, responsible and professional communication link with the society.

Recently, Romanian and foreign specialists from abroad present to the "Scientific journalism and communication" within the symposium "Romanian Diaspora in Scientific Research and High Academic Education" have expressed their collaboration availability within some transnational projects in the field.

#### **5. About Us - The Technological Information Centre for Mineral Resources CIT CENTIREM**

The Technological Information Centre for Mineral Resources CIT CENTIREM is:

- an autonomous entity without juridical personality, constituted inside the National Research and Development Institute for Metals and Radioactive Resources INCDMRRR – ICPMRR Bucharest – Romania (since 2001) and
- a member of The National Network for Innovation and Technological Transfer - ReNITT, The Romanian Association for Technological Transfer - ARoTT and World Trade Point Federation.

CIT CENTIREM acts for the sustainable economic and social development of the Romanian mineral resources sector by carrying out activities that involve science communication and technological information.

Our mission is to develop technological information activities for economic agents, knowledge transfer and quality management in order to increase the competitiveness of the enterprises working in our field.

## **6. Conclusions**

- Considering the incipient development state of this new activity we think it is necessary an international collaboration (Balkan, European, worldwide) for achieving professional training of the science communicators.
- The experience acquired by the Balkan states determine us to propose the establishing of a regional forum/organization in order to stimulate the development of science communication according to the EU and worldwide standards building the right relationship between all the stakeholders interested in science communication .
- The Romanian praxis in order to enforce – through the entities of The National Technology Transfer & Innovation Network - the relationships between research, development & innovation units and economic & business agents - recommend the participation of the science communicators in technology transfer & innovation activities and entities.

# Market Strategies Supported by Information Technology

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Given the fact that after global economic crisis the enterprises still feels the consequences, best for them is to transform organization structure in order to adapt to new conditions at domestic and the international market. Scientific paper gives special emphasis to the development of new market strategies supported by information technology infrastructure, highlighting the function of information technologies as a key driver of competitive strength of enterprises participating in international trade and its impact on organizational adaptation and the demands of international market.

## Keywords

Information technology, strategic management, international market

## 1. Introduction

The companies operate in a competitive environment, the rule for many years in almost all facets of the exchange of products and services. Market products, services and labor are already tight for both companies and for individuals, whereas the process of globalization draws more market participants. Competition is intensifying, so from that aspect there is a need of analysis of the environment, managers can predict the future events, trends and changes like base for adjusting its operations. The purpose of implementation of the information technology (IT) is to prepare the company for the future. Therefore, the main task is to enable the organization and its people (from that organization) to think and act long term and prescient<sup>28</sup>.

## 2. IT and marketing strategies

In order to achieve sustainable competitive advantage in the international market, companies apply one of the following marketing strategies with application of information technologies:

- Cost leadership & Differentiation;
- Focus (in terms of permanent leadership or differentiation);
- Links, information management, corporate management and leadership.

For choosing the strategy of operations undertaken the following steps:

- Analyze the environment (market trends, competition, strengths and weaknesses of organization);
- Assess needs for future products & future needs of the market;
- Develop strategies for market performance that brings competitive advantage.

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<sup>28</sup> Sirka V, Inventivni Menadzer, Croman I Mer Consult, 1995

### **2.1. Strategy cost of leadership**

The key of this strategy is the development of very low fiscal structure that provides high return on assets and income, even when competition in the international market is strong. This strategy is supported by information technologies and in all processes that make the value chain and increase efficiency in the operation of the international market by accelerating the implementation of certain processes and eliminating or replacing the so-called routine operations. Reducing costs, however, be realized by reducing the price of products and services, while retaining the quality and profit international trade plan. We emphasize that this strategy contains a paradox, reducing prices and increasing the quality. So, free to say that success is determined by the Japanese (just-in-time) concept and good relationships of customers and suppliers maintained with IT and internet technologies. However, this strategy many companies combine it with other strategies or it's a segment of the selected strategy for achieving the objectives of the current international market. But the superior fiscal structure hides certain risks. It could be endangered by sudden disturbances, such as the emergence of new technologies that the company can quickly adapt or copy the superior cost structure by another company in the international market, thus jeopardizing the strategic or competitive advantage.

### **2.2. The strategy of differentiation**

When the company aims to create a specific product or service on the international market that differs from competing products or services under any of the basic features (design, superb quality, performance, and additional IT services and esc.) States that it applies strategy of differentiation. So, differentiation does not necessarily relate specifically to the product which offers the international market. It may involve increased collaboration with customers, performing various services through IT sales (Caterpillar, a manufacturer of top construction machinery has recognized for achieving service defects within 24 hours, no matter which part of the world are located). Information technologies are suitable for adding additional products in the service or additional services in the product. However, this strategy is part of a series of international trade hiding dangers and risks. Higher cost due to the uniqueness, you can create a barrier for certain mass buyers who do not use or do not know to use information technologies. On the other hand, are always having superior products target counterfeiters that, with low cost of imitation products can attract buyers, which threaten the competitive advantage of companies who use the strategy of differentiation.

### **2.3. The strategy of focusing**

If the company produces special products or products with low fiscal structure of the narrow international market segments, in this case they have implemented the strategy of focusing. Such a strategy usually applied companies are limited in terms of resources and therefore choose more specialized production and products which would mean a kind of elitism. This strategy comes to the fore the application of e-marketing using the database, where information technologies rely on the database for customers in a particular geographic region, in order to detect potential buyers or users of services. Because it hides in the high risks. In fact, companies that apply this strategy, the competitive onslaught, hard develop alternative routes.

## 2.4. Strategy of information guidance

When the product or service attributable to information or knowledge means that companies apply the strategy of information leadership. By adding information on products or services or the monitoring of the information (Meta tag-s) using information technologies, thus creating knowledge. Thus increasing the value of the product and these companies (is hybrid using the traditional modes of trade in combination with information technologies) become competitive in the market<sup>29</sup>. The following table presents the support of various international trade strategies with information technology<sup>30</sup>:

**Table 1** Impact of information technology on strategies

<b>Strategy for competitive advantage in commerce through the IT</b>	<b>-impact of Information technology</b>
<i>Cost leadership</i>	- reducing costs of operation - better quality goods and services & just in time output
Differentiation	- quality differentiation - better level of service to customers
Focus	- focusing on the present and e-market - creating new products and services
Relationship	- the influence of competition - interorganizational cooperation - adding value based on partnership
Information economics & technology	- products and services to add information (metatags) and are transmitted and monitored by applying IT.

## 2.5. Strategy of linkage

This strategy comes to the fore in the new global operating environment and is therefore referred to as a new strategy for companies to achieve competitive advantage in the international market. The association acts as the co-operation with customers, suppliers, partners even the competitors, and internal cooperation, primarily through the influence of some of these strategies. Namely, today, companies in order to open to the environment and to respect their environment factors to this partial IT strategy, which means that its own forces can respond to new market challenges. Today is no longer a problem to produce and most complex product, but the problem is how and to whom he sold. The companies have one common goal: to learn the needs of customers. Therefore, they collaborate with other participants of e-markets. In other words, competitive forces can be considered as an opportunity for cooperation. The implementation of this strategy, information systems play a key role, and information technology becomes standard in the operation of companies.

## 3. The role of IT to competitive forces in the development of international market

Specific actions to be undertaken in order to successful implementation of strategies depends on both activity and the dynamics of international market place, in which rule following five forces of competition with the implementation of information technologies:

- Competitive forces of suppliers;
- Competitive forces customers;

<sup>29</sup>Bresnahan J, Speed – CIO Magasin, Nov. 15, 1997 – [www.cio.com/achieve/enterprise](http://www.cio.com/achieve/enterprise)

<sup>30</sup>Srika V. Spremnik M, Inf. tehnologiom do poslovnog uspeha, Sinergija 2000

- Threatened by the emergence of new competitors (strength of potential competitors);
- Emergence of new threats such products or services (strength of potential products or services that can replace existing);
- Forces of existing competitors.

Presented competitive forces are equally important in different industries. The activities in which the five listed forces have an impact (production of juices and beverages, computer industry, pharmaceutical industry, automobile industry, etc...) Likely to provide a larger number of competitors, while in some basic industries (the oil, steel, aluminium) only some of the five forces influence, so it said that in that area has very few competitors and therefore require greater use of information technologies.

### ***3.1. Competitive strength of suppliers***

This competitive strength is manifested when the existing supplier enters the market for its customers by using information technologies. So I says to buyers that a threat. In this case you need to develop alternative ways to retain existing customers and acquiring new ones with the use of information technology (regarding quality, price, distribution, date of delivery). From that point the need arises, and the necessity for iinformation technology cooperation between the customer (the company that manufactures finished products) and suppliers. Thus they become strategic partners to achieve synergy of their goals on the international market.

### ***3.2. The competitive strength of customers***

This force is identical to the previous. Companies may buy from other companies, after entering in their market. The most common ways is when companies purchases goods from others, using information technologies after that they are competitors.

### ***3.3. Threat of developing new competitors***

This competitive force actually contains the aforementioned competitive forces, and refers to the emergence of new manufacturers of this type and the existing Internet (IT) markets. Those companies wishing to penetrate a foreign market, though faced with a series of obstacles (hazards), have the option of a double action:

- For them it is a chance to succeed,
- For companies already in that market, they are a threat because they seek to take away part of the market where the main role is the application of information technologies.
- It is therefore necessary to raise barriers to their entry into the market (and as obstacles arise, especially investments in IT sector or use its services), in which join and governments, that policy<sup>31</sup>. Threat of developing alternative products are often advertised and offered online via the Internet. As a consequence of this competitive force in the existing company risk arises from the feedback of investment, lowering the prices of its products and services at all, jeopardizing the position of e-marketers. In order to defend against this force, companies need to take some of the following activities:
- Improving relationships with customers;
- Differentiation of production;
- Increased quality and so on;

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<sup>31</sup>Krlev T, Osnovi na menadzment, Centar za internacional. menadzment, Skopje 1996

- The application of information technologies and use the global Internet network.

### **3.4. Strength of existing competitors**

For each international market among companies of the same business there is competition, in terms of price, products, services and distribution. In this case, in order to defend against the competitive force, it is necessary to change the basis for the struggle of that market, or to change the attitude towards:

- Reducing costs & Market access;
- Differentiation, either in terms of product;
- Service or company itself & Restructuring the company's in hybrid model;
- Implementation of information technologies in everyday work and communication with suppliers/customers.

For defence against these competitive forces companies into its operations in the international market often apply information systems, Internet and information technologies.

They have an impact, mainly in the:

- Reducing costs & Product differentiation;
- Checking customers & Selection of suppliers;
- Improving relations with strategic partners or in a word, to raise obstacles in terms of the five competitive forces and strategic performance advantage over competitors.

In order to realize chosen strategy, the company used one of the following tactics:

- Own innovations mainly in the sphere of information technologies
- Association and joining of traditional and IT market;
- Own growth and strategic IT connectivity.

The above connections with customers, suppliers, consultants or rival companies may be stronger or weaker, ranging from agreements about marketing, production or distribution until the acquisitions. In any case where time and money are critical such associations in the international market and have an advantage over potential innovation in their company.

## **4. Impact of IT on the international market**

International markets are an important component of the environment that affects the structure and behaviour of all forms of trafficking. Interaction of the company and the market stems from the nature of the exchange of identities when it comes to constantly confront the many buyers and suppliers. Interdependence and the impact they made on the enterprise market can best be seen through the differentiation of functions, as a result of changed business orientation and the changes that occur in organizational structure and implementation of information technologies in these two basic factors.

### **4.1. Differentiation of functions in the implementation of IT**

Orientation of production companies have found adequate differentiation in which the production function, with its accompanying activities and services, had a decisive role in increasing the efficiency of labour and market expansion of companies primarily in the conquest of foreign markets. In addition, enterprises have had precisely defined functions and appropriate lines of authority and function integration was awarded the highest organizational level and leadership that certainly puts a major emphasis on the application of

information technologies both in production and in distribution of goods and services abroad<sup>32</sup>.

The business orientation of the company to sales by means of IT brings new elements of organizational differentiation of functions, which takes place towards the constitution of complex commercial segment (which is of electronic nature), which is able to perform complex tasks of sales that is of hybrid character. Practically, the sales-oriented enterprises, especially when market conditions are unstable, it comes to new ways of organizing the functions and new ways of coordinating and directing them where certainly play a role imminent implementation of IT. Namely, this phase comes to the creation of organizational goals whose only task is to focus on certain problems of the electronic marketplace and internet environment. It is such a differentiation of organizational features in coming to the redistribution of work and creation functions with specific tasks. The so-called e-marketing phase is coming to completion and further organizational strengthening of certain secondary functions of the executive IT function, related to research and development, analysis, monitoring and studying the information environment itself is unknown and international borders. Firms in relatively stable conditions used with the mechanisms of coordination are provided through the hierarchical system of management. However, in the so-called unstable conditions the role of coordinator and integrator has been entrusted to a separate organizational unit that is IT department, which is forced to omit instruments aimed at traditional ways of management and coordination.

#### ***4.2. Organizational adaptation to the demands of inter. market***

Changes that occur in the organizational structure of enterprises are the result of adjustments to the demands of international market or use of information technology in improving competitiveness and marketing of products. These are changes that occur as a result of the expansion of the company in the manufacture of a product and implementation of information technologies in the marketing of goods and services abroad. Namely, the increasing volume of production of the same product is possible in two ways: with intensification and better use of existing production factors and capacities to a certain level, is to a specified limit and introducing new production factors and resources that are of information nature. Both ways, however, require adjustment of the organization of production, supply and use of machinery and equipment by fully computerized operations. The other way, however, requires significant changes in the organization of enterprises, primarily changes in technical and technological procedures (IT-automatic computerized output), then changes in the organization of the preparation, planning (using Unified Modeling Language - UML) and the launch of the documentation (introduce Document Management System - DMS), changes in system maintenance, transport (Forwarding sector coordination, cooperation and logistics IT), and finally changes in sales (presentation of purely electronic and hybrid markets). Another change in organizational structure international trade as a result of expansion of the broader enterprise market areas, to other locations (including the internet). In this case it is a further differentiation of existing IT structure, but a process of multiplication (proliferation) of dislocated areas and places that are most easily contacted and is using information technologies and their implementation in international trade. A third change, particularly evident in recent years is the introduction of horizontal or lateral IT diversification that is driven by the need to analyze the placement of a particular product in the international market using IT. This is done with mathematical - statistical methods for advanced linear not linear modelling of data from foreign trade, whose extensive calculations and tests would not be practically feasible if applied information technology. Then, the need to eliminate certain seasonal fluctuations and supply to

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<sup>32</sup>Bainbridge I. D, Information Technology Law, Pearson Education, England 2005



accommodate the needs and demands of customers<sup>33</sup>. It is characteristic that in terms of horizontal diversification form new commercial structures with IT systems that differ from existing ones, because they have completely different tasks that do not contribute to better perform the tasks of marketing and supply of goods and services in international market. Simply, here it comes to introducing new information technologies, although belonging to the same activity, do not affect the realization of the internationally selling old program. This path of diversification are illustrates the example when the trade in cars are refers to trade of electrical devices. Also, significant changes occur in international trade and ensuring the lateral or side with the diversification that we have introduced new products that do not belong to the core business of commercial enterprise and it is the fourth change. The company with the introduction of products that do not belong to the core business strives to achieve adequate expansion of the various (traditional and electronic) markets with different products. And here, as well as horizontal diversification, it comes to international trade logistics in IT that do not come to strong economic ties. Rather, structures are constructed of loose relationships. The end should say that the manner and volume changes in international trade must be on the possibilities for synergistic effects. But to achieve this need, of diversification of the trade program, to perform integration or connectivity. Here it is worth the general rule: an increase in uncertainty environment, to increase and reinforce the application of appropriate diversification and integration with IT. Practice has shown that all effective organizations in an insecure environment conditions are differentiated and highly integrated IT structure.

## 5. Conclusions

Market products, services and labour are already tight for both companies and for individuals, whereas the process of globalization draws more "players" in the game. Competition is intensifying, so from that aspect there is a need of analysis of the environment, managers can predict the future events, trends and changes like base for adjusting its operations. International markets are an important component of the environment that affects the structure and behaviour of all organizational forms. Interaction of the company and the market stems from the nature of the exchange of identities when it comes to constantly confront the many buyers and suppliers using information technologies. Changes that occur in the organizational structure of enterprises are the result of adjustments to the demands of international market or use of information technology in improving competitiveness. These are changes that occur as a result of the expansion of the company in the manufacture of a product and implementation of information technologies in the production and marketing of goods and services abroad.

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# Serbian SMEs Contemporary non-credit Sources of financing

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Lack of funding sources is often mentioned as a one of the biggest obstacles in the process of establishment and development of SMEs in the transition countries. Support in the area of financing is very important part of stimulating policy in development of an enterprise. In the purpose of the SMEs financing as a generator of economic development, there is a very important task to be settled in front of the economic policy creators. It is more expressed in the countries in which economic development funding assets come exclusively in the form of banking sector credits. National economies contemporary conditions of functioning point to necessity for development of new sources of funding, with an aim in securing assets for establishment and growth of SMEs. Changes that have been brought to all business banks by the globalization process, deregulation process and more developed competition have caused the need for development of non-credit activities as an answer for stated processes. These changes occurred in Serbia after the year of 2000. The most important contemporary non-credit activities which could successfully supplement credit assets in support to SMEs are factoring, forfeiting, leasing and venture capital. In Serbia, non-credit activities are in the beginning of development although perspectives for their development are large. Leasing business in Serbia currently represent the most dynamic part of non-credit activities. A share of non-credit activities in developed countries of EU is almost two times bigger than the share of traditional credit sources of funding: in non-developed countries situation is opposite. Limiting factor of development of modern non-credit activities in Serbia is in non-developed legal ambient and non-existing legal regulative. The second reason is in the lack of habits of enterprises that their sources of funding search out of traditional banking services. The purpose of work is an insight into contemporary forms of funding as well as creation of institutional assumption for their development in Serbia. In order to understand a significance, in the work shall be shown a comparative analysis of current and possible sources of financing of significance for the further growth and development. From the other side, including non-credit activities into regular activities of the banks in Serbia gives a possibility to the banks to improve their business, to get to more stable sources of financing, decreasing prices of financing services, followed by using human resources and with that, to benefit the growth of total profitability.

## Keywords

Factoring, Forfeiting, Leasing, Non-credit sources of financing, Venture capital

## **1. Introduction**

Regardless of the recession influencing a number of industries with different intensity, a financial services sector grows further and has the most important influence to other areas of economy. Market deregulation, turnarounds in the industry, technological advantages and more and more dynamic and demanding markets bring a possibility for new financial services' development.

Regardless of the fact that a good business idea always finds some money, the first problem which every small or middle enterprise faces is a capital. If some business will make some success or fail at the very beginning, depends on the availability of capital. In majority of transition countries, so in Serbia as well, one of the main obstacles to the entrepreneurship development is the lack of financial capital needed. Personal savings are not sufficient, and markets in those countries operate poorly or do not operate at all. On the other side, banks have serious institutional problems, which means that only resource for these enterprises still is the credit; it is unlikely that they could be, in near future, some significant resources for modern non-credit resources of financing. The main lack of the credit financial sources is in the fact that obtaining the funds from external resources entails increasing of the business cost. Equally, reproduction flows financing from external resources decreases the enterprise's creditworthiness and brings it into subordinate position in relation to the creditor. Simultaneously, with the growth of external resources, the risk of insolvency of the companies grows too. Because of stated reasons, non-credit business should have an increasing importance, such as factoring, forfeiting, leasing and funds of the risk capital which have big advantages, both for SMEs and for the banks. Further directions of transition of serbian banking lead to the fact that the banks, apart of classic credit affairs, should also offer some new forms of business, which shall be complement to traditional banking affairs.

## **2. Contemporary non-credit sources for SME's financing**

### **2.1 Leasing**

Leasing is not a new phenomenon, but in the developing countries, initiatives for development of leasing for SME's are still very rare occurrence. It surprises because leasing has many advantages in comparison with the loan. The sense of leasing is seen in Aristotle's state which reads that the true wealth is not in having property but in the right to use it. This shape of financing is based on the idea that the object of leasing is better to be used i.e. rented than to be bought.

In conditions when the investment goods have become technically extremely complicated, leasing becomes more and more significant. Any delay of decision means lagging in relation to competition while investment with loan suggests finding the creditor, and as a rule-very expensive one [1].

Leasing is an important source for medium and long-term financing because it shows economically effective solution for procurement of assets needed for work, especially for small enterprises or the entrepreneurs. Especially is suitable for SMEs as well as for new, just established enterprises which very often can't count on other sources of financing. Just because of that, in developing countries leasing is supported by variety of measures, as an important method of investments abetment and entrepreneurship in general, and there is an evident tendency of an increasing involvement of banks into leasing works through specialized leasing firms or through forming their own leasing companies.

The subject of leasing is usually new equipment, but it also may be second-hand or used equipment which must be usable. The lessor, upon the previous agreement with lessee, buys the equipment from the supplier and gives it to him/her for usage. The lessee uses this equipment in doing business and, according to this, acquires incomes which, as a rule,

provide him/her to pay off contracted obligations which has under the lessor. It means, in most cases that leasing is financed by itself.

During the pay off period, the equipment owner is the lessor. Upon termination of the contract, the lessee has two options: to return the equipment to the seller or to buy it under the price, significantly lower of expected equipment market value. In practice, it most often occurs that the contract is drawn up in the way where, by paying off the last leasing installment, the lessee automatically becomes a legal owner of the leasing subject.

The leasing arrangement main advantage is that the lessee can, in short period of time, with no engagement of any own capital, obtain the equipment needed for business, work with it as it is his/her, as well as get some income in that way. There is also an advantage when there is a need for leasing in part-time principle, which is especially to be noticed nowadays, when technology obsoletes i.e. prospers rapidly. In any case, financing leasing can be more competitive in relation to other financial transactions; therefore, it may influence positively all financial and economic trends in the country.

In relation to bank loans, financial leasing has more advantages, in the first place for the lessee:

- Leasing is mostly offered with no additional collateral. If the last is required, as a rule, it is lower than in bank lending.
- Precisely, from the reason it is usually not necessary to have an additional collateral, leasing is contracted in much faster and simpler way than classic bank loans;
- Creditworthiness with leasing, unlike of loans, liquidity and indebtedness financial indicators are improved.
- Leasing gives an opportunity to start or develop business with minimal initial investments i.e. participation. Leasing installment repayment plan may be adjusted to match specific needs of the leasing user who, in that way, improves his/her cash flow:
- Through the lessor, it is very often possible to provide additional services, such as favorable maintenance of the equipment, which can't be expected in the case of taking the bank loan.

The main disadvantage of leasing is in the fact that effective interest rate is usually higher in comparison with bank loans because it covers decreasing of values, maintenance, insurance and inflation. One more disadvantage of leasing is the fact that, with leasing, it is possible to finance only fixed assets procurement. Leasing can't satisfy the client's need for working capital, even we may conclude that adjusted leasing repayments fix cash flows and indirectly release working assets for the client.

Leasing makes an interesting source of assets, especially for SMEs and for enterprises with low returns of investments, but with its high possibilities for development, it must be encouraged in the way of solving all difficulties related to obtaining needed assets for small enterprises business.

In the USA, approximately 16% of total capital equipment is financed through more than 300 leasing companies. According to the report of Leaseurope in 2009., total value of the equipment taken on leasing, amounted 185 billion EUR. According to this report, it is to conclude that passenger cars are the goods taken on leasing mostly; on the second place there are industrial equipment and commercial vehicles. In 2009., Germany had the biggest leasing European market, valuable 40 billion EUR; after Germany, there were France and Great Britain with total value of 33.4 and 33.2 billion EUR respectively, of total approved leasing in 2009. Approximately 75% of new equipment, including the cars is related to the private sector, and 17% is related to the customers and individuals, and 3% is related to the public bodies. Like in the previous period, majority of new contracts (71%) is contracted for the period of time between 2-5 years [2].

While in 1980s leasing was a favorite financial instrument for companies which had financial problems, current procedures of loan guarantees and requests of the leasing companies are

such that leasing can't be obtained if an enterprise is not able to provide safe financial coverage.

Slowly but surely, leasing grows and develops in the countries of East Europe. In many countries, there are developed special leasing companies which deal with leasing of industrial equipment (Russia, Czech Republic, Slovakia, Hungary, Bulgaria, Poland and Romania). Perspective for leasing business is very good in all countries of the world.

## **2.2 Factoring**

Factoring may be very important source of SMEs financing, and in some countries such as Italy, it represents the basic way of working assets financing.

Transfer of the exporter's receivables to the company's factoring, which pays in advance up to 90% of the value while exporting the goods, through factoring has its purpose in decreasing the range of needed working assets and to enable planning of available assets. In business practice factoring provides successful solving of financial nature problems, as well as problems of selling i.e. placement. Although this is quite expensive way of providing financial assets, it ensures for many companies a certain realization of expansion.

This is a complicated method which unites a mix of finance, credit insurance and services of financial management. This is the service from business to business, thus it is not suitable for all kinds of them. On average, financial costs vary approximately 2-3% over the interest rate of the bank.

Advantages of factoring are the following:

- The enterprise, within available working assets comes to realization and payment of its claims, which has a special interest in sales on credit in export business and with deferred payment deadline.
- The enterprise transfers the care and risk of payment to the factoring organization, accelerating the flow of funds needed for continued flow of reproduction.
- The enterprise maintains current liquidity without additional loans because it got an advance payment from the factor for its receivables [1].

The difference between factoring and classic loan for financing working assets is in the fact that factoring is based on the quality of receivables while loan is to be granted depending on loan capability of the enterprise. The second important difference is that the factor of companies, except of financing, offers to its client the receivables collection full service (recording, booking, balancing).

This method becomes more and more important in Europe. From 1000 companies which currently offer such services around the world, 435 of them has their headquarters in Europe [3].

This kind of lending makes the turnover of capital to be more accelerated, and supports a penetration in new markets, especially penetration of smaller enterprises which do not have any approach to bank loans. If the enterprise waits too long for the payment of its receivables, finances its buyers and has the problem with liquidity, factoring may be a solution for it. The bank overtakes payment for these claims, and the enterprise gets the assets and deals its business more effectively.

Advantages of factoring in comparison to the classic loans especially become more manifested in conditions of limited lending and difficult access of small enterprises to short-time loans in banks.

A number of small enterprises do not have a long loan history; even when they do, it often doesn't go to the favor of an estimation of their creditworthiness and very often they can't reach any loan from banks. Although this way of lending is very developed in Anglo-Saxon countries, it is not represented in greater extent in Serbia.

## **2.3 Forfeiting**

Forfeiting is a modern non-loan business serving for the redemption of long-term, undue claims with no-recourse. Here is in charge the redemption of long-term receivables i.e. loans of the manufacturers-exporters of investment equipment, done by banks or special financial institution which deals with forfeiting. The last is mostly used as a mechanism for the export abetment, although it is possible also in cases when the sale of equipment is performed in the domestic market or combined. A strong competition in the market of equipment and hard conditions of placement are the main reasons which motivate the exporters to lend to the buyers-importers. Advantages of forfeiting for the exporter's enterprise are [4]:

- Payment of receivables is performed immediately after delivery;
- Liquidity of the exporter is getting improved;
- Potential of the exporter for lending decreases;
- Possible losses because of insolvency are eliminated;
- Risk of interest rate growing and of exchange rate change (and similar) are eliminated.

Forfeiting improves cash flow and other bank instruments remain unchanged. Converting the loan transaction into the cash, balance sheet is released of claims, banking loans or uncertain obligations.

The main difference between factoring and forfeiting is in the fact that in forfeiting we talk about long-term receivables, with the deadline of payment of several years; in factoring, there are short-term claims to be in charge. For the exporter by forfeiting, the credit business turns into cash business. For the exporter, a procurement of the goods is provided, with loan conditions in simpler and more efficient way than with traditional banking instruments.

## **2.4 Venture capital**

Upon initial phase of the enterprise development, needs for capital grow. Then, in developed countries funds of risk capital or venture capital come to the scene.

Private investments are the most important permanent capital for new, but also for growing SMEs. Venture capital is intended for strengthening the enterprise's capital and it benefits the enterprise to become qualified for banking loans. Risk capital strengthens the enterprise in its early phases, usually when a new product has already been launched. Some data show that more than 30% of capital in small enterprises in developed countries has its origin in this source.

Risk capital may replace and complement the bank capital, owner's permanent capital, as well as a state support in new products emerging, in new technologies involving, increasing the employment, and especially in growing business. Venture capital has its four main properties:

Risk capital is a permanent capital which considers that the owner of the risk capital doesn't expect the entrepreneur to return him/her the principal which he/she has invested into the enterprise. From the entrepreneur, he/she expects only an adequate income, while the principal stays in the enterprise. The second property is that the risk capital helps in management because the owners very often do not have sufficient knowledge for growing enterprises managing. The third property of the risk capital is that the investors require a higher income in relation to other shapes of the capital. The reason is in their overtaking of a high risk. The last property of risk capital is a high level of patience. One of the problems of the risk capital investors, especially in early years of the enterprise's existence, is low liquidity. Incomes are generated after few years and extremely depend on development of the financial market. In developed countries the risk capital stakes sale comes in the period of time from 5-7 years after the enterprise has been established. Such long-term relation with the enterprise requires a suitable political stability in the state and, more largely, stable economic policy.

In west countries, such investments are seen very often in smaller companies, because of financing the initial concept of business, development of production, expansion or preparation of company for public offer, usually in innovative technologies or in areas of high technology.

In developing countries, risk capital still plays a supporting role as the enterprise financing source. Most of the risk capital owners won't risk in small enterprises, since possibilities of return are relatively low, the risk is high, and "the entrance" is very complicated. The risk capital, as the source of financing, may be an important alternative to current lack of bank loans and other sources of financing (government loans, savings, lending from family and friends etc.). As a mean of long-term financing, the risk capital could often be an optimal solution for covering the financial need of one developing enterprise [5].

### **3. State and tendencies of development in Serbia**

In the Republic of Serbia, there are 17 registered leasing companies with good experiences and with the purpose in extension of their business [6]. The Law on Financial Leasing is one of the most important new laws, fulfilling a big gap in financing the SMEs sector in Serbia. This law provides to natural and legal persons to get the equipment much easier, without engagement of own capital or bank loans.

Leasing in Serbia currently represents the most dynamic para-banking segment, with a perspective of high interest rates and with involving some new operative shapes, such as the real state leasing. In Serbia, these businesses, like in the most other countries, are developed within business banks.

In Serbia, leasing got its legal base in 2003. by accepting the Law on Financial Leasing of the Republic of Serbia. This is a modern law which has created a legal base for stimulated development of the leasing market. An essence of this Law is the fact that it has determined the subject of the financial leasing to the movable things (equipment, plants, vehicles and similar), it defined that the lessee may be legal or natural person and that minimal deadline for concluding the contract on leasing can't be shorter than 2 years from the day of concluding the contract.

Fast growth of leasing activity in Serbia may be explained with a big market need for financing the renewal of obsolete rolling stock, machines and equipment, on one side and needlessness for having the guarantors and mortgage, on another side, which gives an advantage to the leasing over cheaper classic credit arrangements.

Although is at the beginning of its development in Serbia, factoring has a huge potential, shown, before all in the fact that it is based on quality of receivables and not on creditworthiness.

A number of SMEs do not have a long credit history and even when they do, financial indicators of business, rather being made to decrease the tax base than to show the real financial picture of the enterprise, do not go to the favor of their creditworthiness mark and often can't reach the loan from banks. Hence, because of already mentioned reasons SMEs will more and more be turned to factoring, as a production financing source.

Despite of obvious advantages, there are many obstacles which could slow development of factoring in Serbia. Delay in payment and longer payment terms, required by the buyers, especially those ones with monopolistic position in the market, on one side financially exhaust manufacturers of the goods, but, on the other side, the risk of payment make difficult to be estimated. When export is in charge, the most easier will be with export in the EU countries. The story on factoring in Serbia may be concluded by a statement that potentials are large, but in what extend they will be used, depends primarily on all participants in the market.

An importance of forfeiting may be big, but in Serbia it isn't known well enough and is unjustly neglected. In order to provide an opportunity to our exporters for counting on

deferred payment and to make that this shape of financing is present in their offers, it is necessary to have a strong support of total financial infrastructure. Under the last, we consider the financial market, participants in the market, financial instruments as well as legislation. Together with setting the concept through the legislation, it is necessary to develop organizational and technical aspects of these financial shapes application, physiognomy of new participants in the market and their relationships with the banks and the clients.

Because of the Serbian export structure in which the sale of equipment with longer payment date is little presented, this instrument may be sporadically used in this segment.

Because of the lack of investment capital, development of SMEs in Serbia, as well as in the world, isn't simple neither is easy. Just established enterprises usually do not have any approach to big funds of venture capital, neither significant bank loans. Because the investment capital market practically doesn't exist in Serbia, many enterprises go off already in the beginning, despite their potential to develop some profitable and innovative technology, service or product [7].

In the Republic of Serbia, still there is no general law which regulates establishment of investment funds and therefore neither financial instruments, such as venture capital, business angles or similar. Like in the rest of transition countries, in Serbia is necessary to encourage the investor's confidence through the change of legislation.

## 4. Conclusions

Modern non-credit transactions in Serbia are in the very beginning of their development, although perspectives for their development are significant. From stated non-credit transactions, leasing exists the longest time, while factoring, forfeiting and venture capital still haven't become very actual in these areas. These affairs are not so significant just only for SMEs but also for business banks, in terms of the risk and quality of financing resources. The biggest positive effects for banking are in an expansion of banks offers assortment and in strengthening the conclusion between the enterprise and financial institution, increasing in that way the level of loyalty and satisfaction.

In Serbia, leasing represents the most dynamic para-banking segment with the perspective of high growth rates. For SME, factoring and forfeiting may have a significant potential because of the fact that they are based on the quality of demand, not on creditworthiness.

Because of the lack of long-term capital, development of SME in Serbia is very difficult.

As the long-term financing assets, venture capital could be an additional solution for covering all financial needs of one developing enterprise.

Limiting factors of non-credit transactions in Serbia are in lack of legal ambient, especiallz in lack of legislation for prforming factoring and forfeiting, although the need for involving is reallz great, both from the atitude of financial institution and SMEs.

For the banks in Serbia is very important timely to perceive all world trends and to be adjusted to new demands. In the future period, it is expected not to be strict divisions to credit and non-credit transactions; credit transactions will become usual transactions of one financial institution.

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# **A Model for Stimulating the Entrepreneurship among the Students of Sofia University 'St. Kliment Ohridski'**

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**The main purpose of this model is to create better conditions for the development of youth innovative ideas and to bring the best of them to realization by helping the students to start their own business. The financial mechanism necessary for this model is the establishment of a 'Youth Innovations and Entrepreneurship' fund based on public-private partnership that will provide scholarships and resources for the needs of the different projects. The participants will be universities, representatives of the private business sector and state institutions. The positive results for the students will be new opportunities for starting a business or finding a suitable job in the private sector as well as personal professional development. The participants will gain mainly from the establishment of new connections between the business and the universities on one hand, and the creation of new jobs on the other.**

## **Keywords**

Development, Entrepreneurship promotion, Jobs, Youth Innovations

For the achievement of this main purpose a Centre for Entrepreneurship will be created.

Since the early 1990s, several international donors such as the European Union (through pre-accession instruments - PHARE), the United Nations Development Programme in Bulgaria (UNDP) with support from the International Labour Organisation (ILO) (between 1994-2000) and the Bulgarian government through the Ministry of Labour and Social Policy (MLSP) - Project JOBS (between 2000-2009), have supported entrepreneurship development, micro and small businesses. On the other side, Sofia University St. Kliment Ohridski has great interest in the experience of some European countries like Germany and Ireland in the promotion of entrepreneurship and innovation among young students in higher education, and especially the experience of American universities like Berkeley, Stanford, Purdue, Princeton, Washington University in St. Louis, State University of Wisconsin, Massachusetts Institute of Technology (MIT), Carnegie Mellon University and others.

The strategic plan of this model is to provide the project team of Sofia University's Transfer Technology Office (TTO) with the opportunity to create a remote online research methodology. It will be used to promote entrepreneurship among the best performing Bulgarian organizations which support entrepreneurship, business centres and business incubators, for the sharing of best practices. Taking studies on the experience of other organizations as a starting point and using the help of the consulting team, a program will be developed that will include training modules and consultancy support packages to promote entrepreneurship. The program will not duplicate the existing courses at the University, as it will have a more practical focus. The preliminary studies are planned to take about 100 hours and will be conducted within 2 semesters. The training module will cover all steps of generating a business idea through market research for specific products and testing business models for booting the business to finance and sustainable growth. It will also provide the opportunity to acquire knowledge and skills in Business English. It is envisaged

that this training should be interdisciplinary selecting students from the University through the Technology Transfer Office. This activity also provides training for the trainers through visits and trainings conducted by international guest speakers.

The package of consultancy support to promote entrepreneurship among students will be directed to the most motivated students after the successful completion of the training modules and will provide access to advisory services for developing and testing their specific business ideas.

The support packages will cover four levels:

- Selection / Approval of the business idea;
- Selection / Approval of a detailed business plan;
- Reference to possible sources of funding;

Consulting start-up and development activities. For the assessment of business ideas and the development of business projects evaluation, committees will be formed. They will attract local and foreign business representatives and academics. The duration of the package of consultancy support for feasibility studies is intended to be at least 4 months as it will depend on the specifics of each particular business idea. The consulting project team and the Centre for Promotion of Entrepreneurship will develop educational materials, development plans and business models to be used by students in the learning process. The materials will be available online through the server of the laboratory for entrepreneurship or the TTO of SU "St. Kliment Ohridski". This online training will consist in the virtual participation of students in specialized trainings through video and audio platforms for communication and real-time monitoring. A training forum for specific topics, moderated by the team of the TTO of SU "St. Kliment Ohridski" in the form of discussions will be organised within the online training. All the students taking entrepreneurship courses will have access to this online platform. Training materials and recordings of lectures and discussions will be uploaded to the laboratory and discs will be recorded for distance learning, which will be offered as a tutorial.

Promotion and TTO will contain the main activities included in this model. They are to provide information for the students under the form of lectures and workshops, attract motivated students and give them different business tasks in order to improve their skills and motivate them to start their own businesses based on their own ideas. TTO will encourage and support the development of enterprises in the design and implementation of innovation - innovative products, approaches, management systems, new developments in the implementation to optimize production and others. TTO will seek to attract businesses and entrepreneurs looking for opportunities for business development in the field of high technology, which is a precondition for the achievement of rapid growth and market competitiveness of enterprises. Crucial in this respect is the participation of Sofia University, the largest university in the country with 16 faculties, 5 of which are in sciences. The close physical proximity of the TTO to three of the faculties leading in research and development - Chemistry, Physics and Mathematics and Informatics, with which TTO works closely - is a major advantage for achieving this goal. Expectations are that at least 25% of businesses supported by the TTO will derive from Sofia University - owned by students, teachers and other staff of the university. TTO will attract entrepreneurs and students from other universities in Sofia and other departments and institutions in the field of research and development for its training and internship programmes.

A preference will be given to start-ups and young people aged up to 35 years. Youth entrepreneurship has a high potential for development, but it needs highly specialized support due to poor or missing training for and knowledge of business development in the educational system and the limited experience.

TTO will offer a program to assist student entrepreneurs. The program will assist young entrepreneurs among students, professors and researchers with specific ideas for the commercialization of research results, who are not confident about the sustainability and competitiveness of their business ideas, by offering them trainings to prepare them for

starting a business. The program will provide services for the development of business ideas and anticipated products/services, and will test them to evaluate their potential for marketing. After the successful completion of the program student entrepreneurs will have direct access to the database of TTO in order to have a better chance for the commercialization of their research results.

Services that TTO will offer to businesses and entrepreneurs are consistent with the basic needs and problems of the target group – young students with good business ideas. The management of the TTO is in continuous contact with research units, student organizations and entrepreneurial associations throughout Sofia University and is well aware of the need to support the pro-innovative business environment. The services included in the programs of the TTO will be periodically updated to reflect any changes and emerging needs of target groups. TTO of Sofia University will meet the needs of graduates and will offer customized services relying on a broad range of experts from the fields of science and business. TTO services include consultations for establishing and maintaining entrepreneurial and consulting companies with innovative capacity and development interests. Along with this, interested partners will be attracted to develop the future scientific advances and their exploitation and commercialization, as well as their future participation in national and international research programs.

The market needs of legal and financial advice on intellectual property and copyright in the innovation process have increased since the country joined the European Union and new funding opportunities emerged. In this regard, the services of the TTO will be available for companies in all sectors of the economy and the wider community of scientists from Sofia University.

TTO will play an active role in promoting entrepreneurship and R&D collaboration between the university and the industry. The promotional policy of the TTO is very important in order to ensure transparency, clarity and accessibility of the activities of TTO for all stakeholders, especially the target groups - graduate students with entrepreneurial ideas, the scientific community and for the creation of conditions for the commercialization of innovative products (meeting and mediation).

TTO will provide two main sets of services: general services and specialized services to meet specific needs for technology transfer. General services include comprehensive consultation; TTO team will assist target groups to find appropriate solutions to get specific answers to their questions. Specialised services will be structured according to specific R&D results, detailed sartorial analysis to identify specific needs for technology transfer relating to different phases of the cycle of technology transfer.

It is planned to be develop specialized integrated packages, which will include a variety of experts and will perform detailed analysis. The TTO team will manage and coordinate the overall process of providing comprehensive services and will invest its efforts in the successful implementation of technology transfer. This activity includes the following tasks:

- Organizing forums for the presentation of scientific results achieved by the research community - type meetings of science and business. The participants can discuss their views and ideas for future cooperation between academia and industry. This is an opportunity for personal meetings between technological providers and representatives of companies interested in the use of these results. During these events, participants will complete questionnaires to provide feedback on the usefulness of the event, the problems they are interested in and the overall quality of the information;
- Holding expert meetings to discuss and select designs for commercialization;
- Pilot implementation of the model for promoting entrepreneurship to young researchers/students on the basis of sustainable and effective cooperation between Sofia University "St. Kliment Ohridski and businesses, including mentoring, evaluation and selection of development, developing business and marketing strategy, competition

for innovative student development and description of the model and its presentation at an international forum.

The implementation of the model consists of the creation of suitable conditions for the development of youth innovative ideas (projects) and their transformation into real products. The package of consultancy support to promote entrepreneurship among students will be directed to the most motivated students after the successful completion of the training modules and will provide access to advisory services for developing and testing their specific business ideas. The team of TTO provides support packages to cover four levels:

- Selection / Approval of the business idea;
- Selection / Approval of a detailed business plan;
- Referral to possible sources of funding;
- Consulting start-up and development activities.

Within the framework of this strategic plan, running for one academic year (October-July), students can get full support for starting a business by getting involved in entrepreneurship training and receive the package of consultancy support to start their own business. The strategic plan includes the project cycle (2009 -2012) and covers three groups of students, one for each project year. TTO services will be based on a preliminary study among students trained in various programs related to entrepreneurship and measuring expected interest. It is envisaged that at least 100 students from other universities in the South West will gain access to the remote modular package of training and consultancy support for a total of three years.

Operation of the model:

- Organize a competition for the innovative student development, which has presented the best business plan;
- Conduct meetings with business structures;
- Participate in the autumn edition of the International Plovdiv Fair in the fall of 2012;
- Organize the 10th edition of the European Day of the Entrepreneur in 2012. ;
- Participation in business forums for the commercialization of research results;
- Support for technology development for at least 2 of the three applied research areas for technology transfer;
- Adaptation of the software for processing database, building on the existing database of TTO (defining the requirements for reporting necessary information to the database, programming and testing);
- Maintain information on potential partners of "St. Kliment Ohridski" through existing links between the research community and the business;
- Establish a communication platform for online access to the database of NIS (Scientific Research Centre) projects;
- Create a register of proposed transfers of innovation and proposals for innovation and technology on a special hub for use by people with disabilities;
- Participation in international forums on technology transfer and commercialization of research results;
- Create a strategy for partnership and exchange information with international organizations.

The most important impact of such a project will be the formation of a common understanding of the importance of supporting new start-up companies and the realization that student entrepreneurship is one of the highest priorities of universities. Meanwhile, the students will participate actively in the development of the educational system and will gain better understanding of the real business environment.

# An Entrepreneurial Educational Model for Knowledge-Based Regional Development through Innovative Learning Practices

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Universities have to rethink their role within the context of economic crisis and globalisation. Especially entrepreneurial Universities can act as regional development boosters, as long as they are committed to a strategic vision with flexibility and prompt action with entrepreneurial spirit and goals for internationalisation. Economies in transition are seeking ways to transform themselves into knowledge-based economies and are in need of a knowledge-rich workforce. Therefore, provision of quality higher education becomes a necessity. Higher education in South-East European countries has several idiosyncratic characteristics. Such characteristics are crucial and provide opportunities for the development and application of aggressive strategies and actions towards entrepreneurship, innovation and internationalisation of quality education. We present the case of CITY College, the University of Sheffield International Faculty, based in Greece and its enterprise-oriented educational model. The so called “flying faculty” model possesses a significant advantage, that is, it guarantees equivalent learning experience and effective education to students in different geographical locations. We analyse the standard process that is followed in the education provision as well as the criteria for selecting local partners. We also demonstrate best practices on engaging students before and after course delivery, by extensively using innovative Learning Technologies that provide powerful tools to complement physical presence and traditional teaching. The work is aimed towards knowledge and experience transfer. Colleagues who might be interested to exploit opportunities for their Universities to develop similar operations will mostly benefit.

## Keywords

Knowledge Based Regional Development, Internationalisation, Education, Learning Technologies, Innovation, South East Europe

## 1. Introduction

The new financial climate, economic crisis and globalisation have led universities to reconsider their traditional economic and educational models and to exploit opportunities in their wider regions. The key criteria for success remain the core business of teaching and research even though the routes by which they are achieved may have changed. Such

entrepreneurial activities promote knowledge and creativity towards regional development. Especially in South-East Europe (SEE), economies are seeking ways to transform themselves into knowledge-based economies. Such transformation can be driven by knowledge intensive factors such as education and research & development. Especially universities, in their entrepreneurial form, can act as regional development boosters, as long as they are committed to flexible, fast moving strategic plans with entrepreneurial spirit and goals for internationalisation.

The University of Sheffield International Faculty is based in Thessaloniki, Greece. It has a long standing experience in reaching out and delivering programmes far from its base. Today, the International Faculty departments have postgraduate and undergraduate programmes delivered in Belgrade, Bucharest, Kiev, Istanbul, Tirana and Sofia. All programmes are facilitated by local partners who were chosen through a formal approval process for collaborative arrangements of the university. All postgraduate programmes are part-time, and taught entirely by International Faculty staff that travel to different locations during long weekends to meet local students and have face to face contact block teaching hours. The full-time undergraduate programme is taught by International Faculty staff and local staff on a 30%-70% share of teaching hours, but with the responsibility entirely on the former. The above is an outcome of an aggressive strategic plan which resulted in an entirely new educational model of delivery, namely the “flying faculty” model. The strategic plan aims at internationalisation by widening and expanding the portfolio of programme and academic influence in neighbouring states of South-East Europe.

This paper provides an opportunity to present all the above in a systematic way and will initiate discussion among colleagues on how similar ventures can be organised by other entrepreneurial universities. The work is aimed at knowledge and experience transfer. Colleagues who might be interested to exploit opportunities for their Universities to develop similar operations will mostly benefit. The educational model and practices of the International Faculty will be presented to fit similar entrepreneurial ventures.

This paper is structured as follows: The next section presents the background of the problem where we discuss the role of entrepreneurial universities in the knowledge-based regional development process. In Section 3, we focus on the South-East European region which possesses several idiosyncratic characteristics as far as higher education is concerned. An elaboration on the CITY College case study, the International Faculty of the University of Sheffield, will follow in Section 4, by analysing the standard process that is followed in the education provision through a “flying faculty” model and the criteria for selecting local partners. In Section 5, we demonstrate best practices on engaging students before and after unit delivery, by extensively using innovative Learning Technologies that provide powerful tools to complement physical presence and traditional teaching. Finally, the key conclusions from the paper are summarised in the last section.

## **2. Knowledge-based regional development**

Economies in transition are seeking ways to transform into knowledge-based economies, that is, to focus on the production and management of knowledge. According to [30], it was discovered that creativity and freedom of innovations need to be supported by learning related to regional development; the author also states that added value is produced when local or global innovation systems are incorporated into the learning process.

The fact that several knowledge intensive sectors, as for instance education, research and development, communication, are growing very fast assigns to regional development a crucial part in such a transition process. Post-communist transition countries are confronting challenges well-known to wealthy OECD countries. These are related, for example, to globalisation, expansion, market forces, financial austerity, public sector reforms, accountability pressures, and new quality assurance mechanisms [26]. Transition economies

are in need of a “knowledge-rich” workforce, and the systems are currently expanding into such direction.

## **2.1 Higher Education in regional development**

Innovation, as the use of new technological or market knowledge to offer a new product or service, is playing a catalytic role in regional development [15]. The promotion of innovation and entrepreneurship among the new generations together with learning intensive activities are vital for a smooth regional development – thus growth in the knowledge-based economy [14]. Regional development also benefits from technological progress and dissemination and thus, investing in human capital development proves to be sustainable [2].

During the last few years, public resources became scarce, unemployment rates have risen and debt level also has led to a social crisis. The normal flow of regional development has been adversely affected. The transformation of regional policies to global ones, the transition to a knowledge-based society and the provision of sufficient incentives for innovation are critical issues [16].

In this respect, provision of quality higher education becomes a necessity. Universities have emerged as central actors in the knowledge-based economy by playing an active role in technological change and innovation [7]. However, their role in regional economic development seems intuitively important but it is still less understood. The economic crisis has led universities to reconsider their economic models and regional development theories. Their approaches to date were far from encouraging competitiveness of European regions. The European Commission took a position of how to modernise Europe’s universities pointing out three broad areas in higher education in which change could help [13]:

- Curricula: bachelor, master, doctorate, competence based learning, flexible learning paths, recognition, mobility.
- Governance: autonomy, strategic partnerships including enterprises, quality assurance.
- Funding: diversified sources of university income better linked to performance, promoting equity, access and efficiency, including the possible role of tuition fees, grants and loans.

A key issue would be the capitalisation of universities strengths in research and knowledge creativity as well as identification of new ventures that will impact regional policies.

## **2.2 A regional development booster: Entrepreneurial Universities**

The enhanced role of universities for regional development dictates the transformation of the “traditional university” towards the “new” one. The actions that the universities are called to take are [7]:

- Generation and attraction of talent, stock of tacit knowledge;
- Provision of specialised expertise for research and development, enabling the market to have access to knowledge; and finally
- Support for knowledge exchange among the networks.

The term entrepreneurial university has been adopted by policy makers and academia to describe universities that deliver the “third mission” [41][29]. However, Clark [11] states that entrepreneurial universities do not sacrifice academic excellence for new commercialisation but become entrepreneurial in order to generate funds to enable them to maintain and enhance their academic position.

An entrepreneurial university has the following characteristics [16]:

- it systematically accepts and supports entrepreneurial activities;
- it sustains interface mechanisms with the market, such as a technology transfer office;



- it employs staff who embrace entrepreneurial activities, such as generation of income to support research, teaching and other activities

Bearing such attributes in mind, the university can promote regional development through commercialisation of research, education of human resources and new ideas. There are sufficient examples of entrepreneurial universities that aided regional development both economically and socially: the case of the University of Waterloo [7], NEWUNI [41] and other well known cases such as Harvard and MIT. The role of entrepreneurial universities in regional development is summarised in Table 1.

**Table 1** The role of entrepreneurial universities in regional development.

#	Description	Sources
1	<ul style="list-style-type: none"> <li>▪ Generation and attraction of talent</li> <li>▪ Provision of formal and informal technical support and specialized expertise for R&amp;D besides basic research</li> <li>▪ Enabling of firms to access knowledge from the global research networks</li> <li>▪ Tacit knowledge exchange among the networks of innovative firms</li> </ul>	[7]
2	<ul style="list-style-type: none"> <li>▪ Delivery of the “third mission”</li> </ul>	[41][29]
3	<ul style="list-style-type: none"> <li>▪ Encompass of entrepreneurial attitudes and strategic vision</li> <li>▪ Collaboration with other institutions to assist/support regional innovation</li> <li>▪ Differentiation of approaches towards research and teaching that enable effective technology transfer, firm formation, student education and knowledge advancements.</li> </ul>	[16][17]
4	<ul style="list-style-type: none"> <li>▪ Regional engagement processes done through adjacent technology/science parks, industrial liaison offices, launching new venture programmes for staff &amp; students, development of clearer IP policies, creation of venture and loan fund and through building social networks and trust development capabilities within the region.</li> </ul>	[20][6]
5	<ul style="list-style-type: none"> <li>▪ Active involvement of students in regional economic development through participating in research projects and cooperative educational placements</li> </ul>	[38]
6	<ul style="list-style-type: none"> <li>▪ Increase of regional income and wealth</li> </ul>	[19][42]
7	<ul style="list-style-type: none"> <li>▪ Internationalization</li> </ul>	[27]
8	<ul style="list-style-type: none"> <li>▪ Networking</li> <li>▪ Institutional capacity building</li> <li>▪ Regional focus on teaching and research.</li> <li>▪ Regional focus on student recruitment and retention</li> </ul>	[21]
9	<ul style="list-style-type: none"> <li>▪ Construction of social architectures “nourishing particular collective social orders and micro constitutional regulation mechanisms”</li> </ul>	[28]
10	<ul style="list-style-type: none"> <li>▪ Commercialisation of knowledge</li> <li>▪ Contribution to the knowledge economy that enables knowledge intensive business services that adds value to creating a regional business hub</li> </ul>	[40]
11	<ul style="list-style-type: none"> <li>▪ Entrepreneurial universities can create a social capital that can sustain and develop intellectual capital in their regions.</li> <li>▪ Entrepreneurial universities are becoming involved in local-global interactions.</li> </ul>	[25]
12	<ul style="list-style-type: none"> <li>▪ The role of universities may help redefine the regional economic and social experience.</li> <li>▪ “Universities influence what is possible in their regions and vice-versa”.</li> </ul>	[12]
13	<ul style="list-style-type: none"> <li>▪ In the past 15 years, the operation of private Higher Education has led to regional success.</li> <li>▪ In Central and Eastern Europe educational business is increasingly private and market oriented.</li> </ul>	[26]
14	<ul style="list-style-type: none"> <li>▪ Entrepreneurial universities are linked to the regional dimension and contribution of higher education to regional development.</li> </ul>	[33]

	<ul style="list-style-type: none"> <li>University entrepreneurialism is an example of the changing roles of higher education to include wider societal issues.</li> </ul>	
15	<ul style="list-style-type: none"> <li>Universities' roles in regional development are social, economic and technological, enabling regional cooperation and knowledge integration.</li> </ul>	[34]

Many old universities are currently undergoing a cultural transformation in this knowledge-based society and attempt to become entrepreneurial and promote regional development. In principle, an entrepreneurial university should be infused with entrepreneurial attitudes and strategic vision and should collaborate with other institutions to facilitate regional innovation. That would imply different approaches towards research and teaching, which enable effective technology transfer, firm formation, student education and knowledge advancements [16].

It is evident that entrepreneurial universities can be a regional development booster through knowledge transfer and through building professional capacity [18]. However, taking into consideration the lack of equally distributed strong research universities in a wider area, regional development cannot be fully assured through a single institution that has regional development capabilities only on a limited geographical space. It is inevitable that collaborations should be sought. Thus, internationalisation provides great opportunities for distribution of the professional capacity in the region [3]. This is achieved through broadening the cultural awareness, responding to the educational market demands enhancement of curricula and achievement of higher profitability.

### 3. Higher Education in South-East Europe

The term “entrepreneurial university” causes debates and for some is even contradictory. Although entrepreneurialism concerns mostly developed economies, there is little being said on transitional economies, such as the ones in SEE. Even more, strategies towards internationalisation based on service delivery models are well established in western higher educational institutions. The impact of internationalisation at regional level is not much investigated and this includes models of internationalisation in SEE as well.

The case of CITY College has its base and operations in South East Europe. In this section we are going to elaborate on the characteristics of higher education in this region. Such characteristics are crucial and provide opportunities for the development and application of aggressive strategies and actions towards entrepreneurship, innovation and internationalisation of quality education.

The universities of the SEE countries are traditional universities and most of them are state and public funded. Before 1990, the majority of SEE countries public funding was due to the communist regime policies but these were far from being innovative or supportive towards regional development. Over the last decades, such policies created a culture within the universities and among academia which is far from allowing new innovative ideas to flourish. Universities relied mostly on public, and in some cases abundant research funding, without contemplating their “third mission”. The current recession worsened the situation and universities are trying to look to other sources of income without, however, much success.

Most likely, the reasons for being unsuccessful have to do with the rigidities of the past. Traditional SEE universities are too resistant to a bottom-up approach, which means that they are not flexible and agile enough to be able to rapidly change their focus and market orientation. Old universities in the region have grown large enough to be able to deal with change in an efficient way. Governance structures remain inflexible and weak in steering and academia is showing great resistance to change. Under such circumstances, the institutions that have proved more flexible in producing and disseminating knowledge targeted towards economic development are private ones. Private higher education institutions are market driven and work in an entrepreneurial way. Although these are still

early days for private universities in SEE (they started to come into existence a decade ago), and while results, especially in the production of knowledge, are not yet considerable, there is a great potential for the future to provide wider choice or diversity.

State funded universities in SEE did not have to be competitive, as they were operating in a kind of monopoly environment. This secure environment may have led to compromising the quality of education provision. To date, someone can hardly find SEE universities within the top 500 of the world [1][31]. Although there are franchised agreements with western universities, these are very few and again most of them are below the top 500 league. Such hysteresis, led towards a drain of students to countries with more developed and better quality higher educational systems. There were many candidates who preferred western European or US universities to start or to continue their studies. This implied a brain drain as well, since a good percentage of those people preferred a safer and more developed environment to exercise their profession, and never returned home after graduation.

Finally, SEE have a number of states who are characterised as economies under development. It is true that the change of regime and the closer relations with the European Union, allowed companies to develop and to seek highly qualified professionals. Such professionals are not found in abundance. The reason behind this is that most graduates inherit a lot of negative attributes from which SEE universities suffer.

#### **4. An entrepreneurial educational model: the case of CITY College**

CITY College is a private college of higher education founded in 1989, in Thessaloniki, Northern Greece [10]. The case of CITY College truly incorporates regional and cultural dimensions taking into account the economic context of SEE. Since its establishment, CITY has demonstrated that it plays the role and has characteristics of an entrepreneurial higher education provider as described in the previous sections [7][16][29][41].

##### **4.1 Brief Historical Notes on Evolution of Partnership**

In 1993, following a formal academic evaluation, the University of Sheffield, UK [37], and CITY College signed a formal agreement for collaboration, according to which the College assumed the responsibility of running a series of the University's programmes in Thessaloniki. The high academic standards and the establishment of mutual trust which have characterised the collaboration of the two institutions over the years led to the official recognition of CITY College as an Affiliated College of the University of Sheffield in 1997. The recognition represented a concrete manifestation of the existing conditions and prospects of the CITY-Sheffield partnership, since it was the first time that the University of Sheffield awarded Affiliation status to an academic institution outside the UK.

In 2008, the College and the University of Sheffield agreed to cement the future of this collaboration and their relationship. Thus, since 2009, as approved by the Senate of the University, CITY College has become an International Faculty of the University of Sheffield, its 6th Faculty with the other five located at Sheffield. This means that CITY College is academically merged to the University and its organisational structure, but it keeps its own independent financial autonomy and governance. As a process of academic merging, this is a unique model of academic collaboration evolution, allowing cementing the academic relationship but at the same time maintaining financial autonomy and governance independence. The College has been audited numerous times as a collaborative provision by the UK Quality Assurance Agency (QAA) [32] and awarded a number of accreditations from the British Computer Society (BCS) [36], Association of MBAs (AMBA) [4], British Accreditation Council (BAC) [35], Chartered Managers Institute (CMI) [9] and others.

## 4.2 Mission and Strategic Plan

The mission of the College since its establishment is "...to maintain the highest standards of quality as a Higher Education Institution employing staff who work at the frontiers of academic enquiry and follow the developments of the real world in order to educate students to become experts in their disciplines and at the same time become all-around well cultured personalities who will contribute to the creation of a civilised society". This mission is accomplished by the development and monitoring of quinquennial strategic plans. These plans include, apart from the usual strategic goals related to teaching, learning, assessment, support and research, goals directly focused to internationalisation, entrepreneurialism and innovation [24].

The main objective of the strategic roadmap is to promote and encourage a collective culture of innovation, risk taking, market-orientation and constant change across all members of staff. The organisational structure is such that allows spreading of the entrepreneurial spirit all across the College. Every member of staff is motivated and gradually involved in the brainstorming and decision making processes on issues at college or departmental level. Ideas may fall outside the normal teaching and learning task, for example staff is encouraged to discuss how to reach the public, how to increase student recruitment, and more. Research and technology transfer are positioned high in the agenda. This is not common for a private institution. The establishment of a dedicated research centre, the South East European Research Centre (SEERC) proved catalytic in leading the promotion of an entrepreneurial culture across the South East European region in collaboration with the industry, research institutes/universities, government as well as other organisations. Finally, students are infused with the entrepreneurial spirit, irrespectively of the discipline they follow. Specialised courses are designed and delivered, students are encouraged to participate in idea generation business competitions and extra-curricula activities are designed around an entrepreneurial dimension.

Alongside entrepreneurialism, internationalisation stands on top of the strategic plan. Internationalisation is related to mobility of staff and students, institution collaborations, research etc. The College's strategic plan identifies a number of these principles and lists actions with which they can be addressed. For example, a good number of activities, research projects, and presence in regional workshops, conferences and symposia, networking and strategic alliances in SEE region are carried out. In addition, the growth and diversification of the College's international student and staff body is a key objective. Programme curricula, syllabi and extra-curricular activities have a wider international "flavour". Finally, goals are developed in order to strengthen the relations with academia in the SEE region and through this to expand the provision of the flexible mode programmes to more countries. More details on the International Faculty's strategic plan are found at [24].

## 4.3 Logistics and Operations

Table 2 shows the student numbers and diversification along with the expansion of programme portfolio. Table 3 summarises the academic Departments and Centres as well as their 16 different programmes and locations of delivery shown in Figure 1.

The College academic staff consists of 70 members, most of them full-time staff, few flexible contract adjunct staff and a number of visiting professors from British Universities. Another 40 people constitute the administration and support staff.

**Table 2** Student body statistics in academic session 2011-12.

Total number of students	900
Students of Greek Nationality	33%
Students studying in Thessaloniki	65%

Students studying at other locations	35%
Students enrolled as undergraduates	40%
Students enrolled as postgraduates	60%

**Table 3** Academic Departments, Centres programmes and operations.

Academic Department/Centers	Programmes (#number)	Locations (#programmes)
Business Administration & Economics	Bachelors (3) Masters (6)	Thessaloniki (7) Sofia (3) Tirana (2)
Computer Science	Bachelors (2) Masters (2)	Thessaloniki (3) Sofia (2) Tirana (1)
Psychology	Bachelors (1) Masters (1)	Thessaloniki (2)
Humanities & Social Sciences Division	Liberal Arts programme	Thessaloniki (1) Sofia (1)
Executive Education Centre	Executive MBA (1)	Thessaloniki (1) Belgrade (1) Bucharest (1) Kiev (1) Istanbul (1)
South-East European Research Centre (SEERC)	Doctorate Programme and Funded Research	Thessaloniki and partners for projects in all SEE

## 5. Innovative Teaching & Learning Practices

The main concern of this paper is how provision of quality higher education can be achieved as an entrepreneurial cross-boundary operation. A top 1% world university is operating in the SEE region with strong commitment to contribute to the development of a knowledge-based society and maintain its standards in all different locations. Providing an equivalent learning experience to all students, irrespectively of the location where they are studying, is a great challenge from an educational point of view. In this section, we will elaborate on the practices followed towards this goal.

The main location for provision of educational services is considered to be Thessaloniki. Provision in other locations should maintain the same standards and an equivalent learning experience for students should be secured in comparison to students located in Thessaloniki. There exist a number of issues that are crucial for achieving this goal; the most important of those are broadly classified under the following categories:

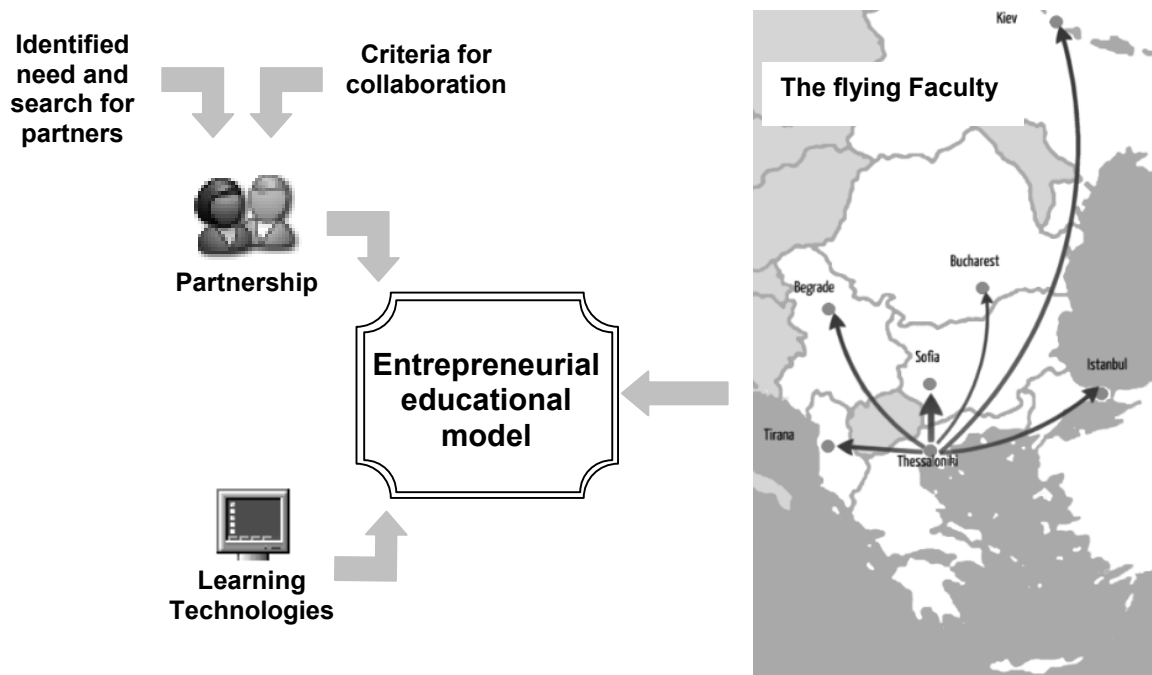
- Programme curricula and regulations;
- Academic staff;
- Teaching, learning and assessment;
- Administration and operations management;
- Infrastructure; and
- Student mixed-mode learning support and extra-curricular activities.

### 5.1 Maintaining high quality standards: The “flying faculty” model

The first item from the aforementioned list is the most straightforward one; programme curricula and regulations are the same everywhere. The next items are slightly more complicated. First of all, the programmes are delivered in other cities than Thessaloniki

employing a “flying faculty” model [23]. That means that staff is the same everywhere since staff from Thessaloniki or UK travel over long weekends to deliver courses elsewhere. This also has the consequence that the same methods for teaching, learning and assessment are maintained throughout.

The “flying faculty” model resembles the twinning programmes where degrees of one university are delivered in more than one location) [5][8]. In the case of the International Faculty, the staff that delivers the courses in all locations is the same. Figure 1 shows the activity radius of CITY’s “flying faculty”. The “flying Faculty” model has the advantage that students do not move from their home cities, do not suspend their employment and can study in a rather flexible mode.



**Figure 1** The entrepreneurial educational model followed at the University of Sheffield International Faculty, showing the SEE locations where programmes are delivered.

The model works well with part-time postgraduate students who need to attend classes over a long weekend and staff spend their weekend abroad without affecting their obligations at base. However, the logistics on schedules, teaching and attendance become increasingly complex. Since such operations do not fall within the range of everyday operations of the faculty, it is required that dedicated administration staff monitors the logistics. For example, the MBA is administered by a specialised unit for its operations in five cities, namely the Executive Education Centre.

In 2011, a full-time four years Bachelor’s programme was launched in Sofia in collaboration with a local partner, VUZF [39]. The first three years will be taught in Bulgaria while, during the last year, students will move to in Thessaloniki in order to graduate. This employs partly the same “flying faculty” model which delivers 30% of the course but also involves a number of selected academics who teach 70% on the programme’s contact hours in Bulgaria. The operation is fairly new and it is too early to report on the outcomes. Still the full responsibility lies with the staff of the College.

## 5.2 Collaborative provision: learning infrastructure

Normally it is not financially viable to develop infrastructure and other support in all locations. It is, therefore, evident that the choice of the partners who facilitate the operations is crucial. Local higher education institutions are audited and selected on the basis of specific *collaborative criteria* established by the University. Such criteria are listed in Table 4.

**Table 4** Core criteria for partner selection.

<b>Criteria for potential collaborative provision</b>
Legal status of the potential partner in its country
Areas of specialisation and programmes offered
Academic and administrative structure, organisation and leadership
Academic and administrative staff experience and qualifications
Support infrastructure, library, labs, premises, safety.
Market penetration
Accreditations acquired
Regulatory issues related to the award and recognition of the degrees
Opportunities for personal student support and extra curricular activities

Some of these criteria directly influence the delivery of the programme, whereas others have a significant but indirect impact. In any case, the quality of the partner is crucial, but the potential to be developed further is what matters most. Flexibility, less resistance to change, fast moving steering of small institutions allowing for such collaborative provisions and disengagement from rigidities of the past, can be key factors for a successful partnership.

Under the specific characteristics of this case, an interesting issue to be addressed is whether a well-established public university or a fairly newly established private university with similar mentality and culture could make a better choice for establishing a partnership. In CITY's case preference was given to the latter over the former option.

## 5.3 Student Support: Innovative practices through Learning Technologies

The use of *Learning Technologies* as complementary to face to face contact proved to be absolutely essential [22]. Staff and students were trained and became familiar with learning technologies that facilitate everyday contact between teachers and learners. On-line or off-line communication through teleconferencing collaboration or wikis and fora respectively are comfortably employed as best practice. Table 5 shows a summary of some of the Learning Technologies employed and their associated learning activities.

There are, however, other ways to enhance the overall learning experience. For example, all students from all cities meet twice during their studies, once for a week in Sheffield and once for a week in Thessaloniki. These meetings provide excellent opportunities for networking as well as common extra-curricular activities, such as professional seminars and company visits.

**Table 5** Learning Technologies to enhance student learning experience.

<b>Learning Technology</b>	<b>Activities used</b>
Virtual Learning Environment	All learning material is in electronic form and is accessible through the structures of a VLE.
Screencasts	Presentations are created off line, with or without the lecturer's video image in order to be used for delivering introductory material, giving how-to guidelines and/or feedback or any other off-line activity.
Podcasts	Presentations where video seems unnecessary, guidelines, individual or

	mass feedback or any other off-line related activity.
Virtual Classrooms	Synchronous live presentation and collaboration in a virtual classroom that allows direct on-line interaction through video, audio, text and a shared blackboard, e.g. classes, tutorials, presentations, committees and project supervision.
Teleconferencing	As in virtual classrooms but aimed mainly for discussions without the need of heavy collaboration facilities, e.g. supervision, advising and focus groups.
Instant Messaging	As in teleconferencing without the video, mostly aimed towards informal everyday collaboration between staff and students or among students.
Video streaming	Synchronous live presentations that take place elsewhere in a form of an invited speaker or workshop presentations.
Wikis	Asynchronous collaboration using shared documents that lead to an emergent result, mainly for collaboration between students or supervision of projects.
Social Networks	Off-line interaction between students with other students or tutors.

## 6. Conclusions

We have outlined the role of entrepreneurial universities in the knowledge-based regional development. We have presented an entrepreneurial educational model for regional development through innovative learning practices. The case of CITY College, an International Faculty of the University of Sheffield, is an enterprise oriented model, but it also possesses a significant advantage, that is, guaranteeing high quality of education and equivalent learning experience to students in different geographical locations. This is because the “flying faculty” has the full responsibility for teaching, learning and assessment while the local partners provide only the necessary infrastructure and support.

We argued that the choice of partners, the criteria they should meet and the collaborative arrangements, the complex administrative as well as education logistics required and the various methods for teaching and learning employed are crucial to the success of the venture. Entrepreneurial culture within the home institution facilitates the implementation of a fast moving, profitable, cross boundary strategy. Entrepreneurial culture among partners is also important in order to overcome resistance to change and implementation of strategies. The case study meets all the characteristics set for entrepreneurial universities and abides to most of the roles towards knowledge-based regional development.

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# Innovation capital and firm's market value

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Innovation capital is the concept that draws attention of scholars and practitioners, because the ability to innovate is a source of a firm's value and growth in the changing markets. But surprisingly, in the intellectual capital - IC - literature, only a few theoretical and research papers have focused on the issue how firms can capture value from the innovation capital. The aim of this study is twofold. Firstly, an attempt is made to give a concise review of the concept of the innovation capital and its measures in selected IC models and to analyze the process of the stock market valuation of a firm's innovation capabilities in theoretical framework. Secondly, an investigation of the relationship between the firms' innovation capital and their market value is conducted, using the latest micro data from the 2011 "EU Industrial R&D Investment Scoreboard". The set of companies it covers comprises the top 1000 R&D investors whose registered offices are in the EU. This study utilizes R&D investments as an accurate proxy of the innovation capital and tries to find its impact on the firms' market capitalization separately for technologically progressive and technologically unprogressive industries. The main findings of the study are as follows: firstly, the innovation capital has a positive effect on the firms' market value, which is consistent with prior IC literature, secondly, the relationship between R&D investments and market capitalization is sensitive to inter industry differences in technological opportunity. In technologically progressive industries, this relationship is weaker in comparison to technologically unprogressive industries. The latter conclusion suggests that firms from medium and low tech sectors may experience a latecomer advantage and be affected by increasing returns to R&D investments.

## **Keywords**

Financial market, Innovation capital, Intellectual capital, Market value

## **1. Introduction**

The innovation capital is the primary source of a firm's value [1]. Relations between the firm's capability to introduce changes and its value can be analyzed based on the intellectual capital theory [2-5] and market valuation models of the firm's assets [6]. Intellectual capital models form the analytical framework for categorization and measurement of the innovation capital elements. Subsequently, the use of the market value approach allows to determine the present value of future cash flows generated by innovation (intangible) assets [7].

The aim of this article is to conduct a theoretical analysis of the relation between the innovation capital and the firm's market value and to empirically verify this dependency. The structure of the article is as follows. Section 2 presents the innovation capital elements and contains characterization of the innovation capital's basic measures. Section 3 focuses on issues related to market valuation of intangible assets, referring to the results of selected empirical studies. Section 4 and 5 contain presentation of the methodology and the results of regression analysis of a sample of 784 top European R&D investors. Section 6 briefly concludes.

## 2. Innovation Capital: Concept and Measurement

The concept of the innovation capital was first defined under the theory of the firm determined by the intellectual capital [4,8,9]. Elements of this theory are components of the intellectual capital, which is considered as the sum of an organization's intellectual property, process, employee's skills, information and experience, that can be used to generate wealth [5]. Under categorization of the intellectual capital, proposed by Edvinsson and Malone [4], the innovation capital together with the process capital is considered an element of the organizational capital. As such, the innovation capital is the sum of two kinds of intangible assets - the intellectual property (e.g. patents, industrial designs) and the remaining immaterial assets (e.g. strategy, innovation culture), used to quickly create new products and services and bring them to market.

According to Chen, Zhu and Xie [10], viewing the innovation capital as an element of the organizational capital causes depreciation of this most dynamic component of the intellectual capital. The quoted authors call for treating the innovation capital as the key element which connects the human capital, the structural capital and the customer capital, and propose its division into the following elements: innovation achievements, innovation mechanism and innovation culture. The innovation capital is thus directly determined by the organizational culture and the firm's capability to create new knowledge based on the existing resources [11].

Also Wagner and Hauss [12] point to dynamic interactions between the innovation capital and other types of intangible assets. According to the approach proposed by them, the innovation capital manifests itself in the organization's ability to use and develop its capabilities in the area of products, processes, technologies and management. Effective implementation of innovations depends on the use of the human capital, the organizational capital and the market capital in the firm's innovative activity. In McElroy's assessment [13], the interdisciplinary nature of innovation processes means that the most desired form of the innovation capital is the social innovation capital, manifesting itself in cooperation of market entities in the field of production and integration of new knowledge – innovation. Moreover, the social innovation capital affects the rate of innovation diffusion in the market [14].

In order to manage the innovation capital rationally it must be measured and reported upon. The issue of evaluating efficiency of the firm's innovative activity is important as much as it is used to develop innovation assets and estimate their effect on the firm's performance [8]. Measurement of the innovation capital treated as a component of the intellectual capital can be performed using direct methods - DIC - and score cards - SC [15]. Financial indicators are used as part of the direct methods to assess the value of the intellectual capital's elements, whereas in case of the score card methods non - financial indicators and indices are generated and reported. Table 1, adapted from Chen, Wu, Chen [16] and Chen, Zhu, Xie [10], presents typical innovation capital indicators both in the qualitative-quantitative approach and the financial approach.

**Table 1** Innovation capital indicators

<b>Approach</b>	<b>Indicators</b>
Qualitative/ quantitative	Number of new products/processes in the last three years Average time of new product/process development Number and quality of patents or patent claims Number and quality of R&D employees Cooperation between R&D, production and marketing departments Management's support of the innovation culture
Financial	R&D expenditures Sale of new products Income from the licensing fees

Among the listed innovation capital indicators the most frequently used approximator are the expenditures on R&D [17]. As part of the research and development activity experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience, that is directed to producing new materials, products, devices, processes, systems and services.

### 3. Innovation Capital's Effect on Market Value

The firm can be viewed as a set of assets that are tangible and intangible in nature [18-20]. Under efficient-market hypothesis [21], the pool of assets at the firm's disposal, is priced by the financial markets on the level of the present discounted value of the future cash flows generated by those assets. In this approach, the firm's market value -  $V$  is presented by the formula [22]:

$$V = q(A + \gamma K)^{\sigma}$$

where:  $A$  is the current value of tangible assets (i.e. physical and financial capital),  $K$  is the current value of intangible assets, including the innovation capital approximated by different past measures of R&D,  $q$  is the asset pricing market coefficient reflecting the monopolistic position and the varied risk of the firm,  $\sigma$  allows for the possibility of non constant returns to scale,  $\gamma$  is the ratio of shadow values of intangible assets and tangible assets. In case of a single asset the market value is a multiplication of the asset's book value, whereas the multiplier (the shadow price) is equal to the Tobin's  $q$  index.

The innovation capital enables generating future cash flows related to commercialization of the new knowledge – innovation [1]. In order to effectively utilize the innovation capital the firm must hold complementary assets, including the physical capital and intangible assets, which allow the firm to achieve the resource leverage. The firm's capability to utilize the innovation capital presents itself in: selection of the best - from the market's perspective - research and development projects, adaptation of those projects to the firm's strategy and the owned complementary assets, and their proper execution.

The evidence indicates that investors view R&D investments as a signal of enhancing the value of firms [23], because - according to the theory and empirical research - R&D investments affect the increase of productivity and future profits of the firm [24]. Table 2, adapted from Hall, Grandi and Oriani [25], presents the results of empirical research on the effect of R&D activity, measured as the annual expenditures on R&D (stream) or the stock of R&D capital, on the market value of firms, assessed using the market capitalization indicator or the market to book value ratio. As quoted research results prove, the capital markets priced R&D investments positively, whereas the pricing values varied depending on the employed analytical form of the research model and the characteristics of a sample.

**Table 2** Overview of selected market value – R&D activity relation studies

Author/Authors	Country	Period	No. of companies	Coefficient values estimated on:	
				R&D stream	R&D stock
Griliches (1981)	US	1968-1974	157	1-2	-
Ben-Zion (1984)	US	1969-1978	93	3,4	-
Jaffe (1986)	US	1973, 1979	432		2,9
Hall (1993a)	US	1973-1991	2400	3,1	0,5
Bosworth, Rogers (2001)	Australia	1994-1996	60	2,3	-
Rogers (2001)	Australia	1995-1998	721	3,4	-
Bloch (2008)	Denmark	1989-2001	61	2,3	-
Oriani, Sobrero (2008)	UK	1989-1998	290	-	1,2

The investors' attitude towards the firms' R&D initiatives depends on many factors, among which of special significance are: the industry, the firm's size and the R&D projects' progress. The current research shows that investors price higher those R&D projects which are executed in the advanced technology sectors, in large companies and which are in the final stages of commercialization [26-28].

The contemporary literature on innovation contains some views that low-tech or mid-tech sectors achieve higher productivity of R&D as compared with high-tech sectors [29]. The above thesis finds its grounds in the Veblen's theory of the "latecomer advantage" [30], according to which low-tech sectors invest less in R&D but achieve better productivity of R&D because they utilize experience and knowledge generated in high-tech sectors. Thus, one might expect that investors would price the R&D initiatives conducted in low- and mid-tech sectors higher than in case of the high-tech sectors.

Taking under consideration the presented review of literature, we can formulate two research hypotheses to be verified further on:, i.e.:

H1: Investments in the innovation capital contribute to the growth of the firm's market value.

H2: The market value's growth as a result of investments in the innovation capital is bigger for the firms operating in low- and mid-tech sectors than in case of high-tech sector firms.

## 4. Data and Methodology

The study uses the latest micro data from the 2011 "EU Industrial R&D Investment Scoreboard". The set of companies it covers comprises the top 1000 R&D investors whose registered offices are in the EU. The Scoreboard includes R&D figures along with other economic and financial data from the year 2010. The Scoreboard allocates companies in accordance to the sectoral classification as defined by the Financial Times Stock Exchange Index (ICB classification).

Ultimately, after verification of the data completeness, 784 entities were classified for the study. For the sake of the formulated hypotheses, the study sample was divided into two numerically similar subgroups, i.e. the high-tech sector companies ( $n_1=370$ ) and the low- and mid-tech sector companies ( $n_2=414$ ), pursuant to the classification developed by Ortega-Argilés et al. [31]. The following variables were included in the study:

- Market capitalization (MV): the share price multiplied by the number of shares issued at a given date.
- Research and Development investments (RD): cash investment in original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding and the application of research findings or other knowledge to a plan or design for the production of new or substantially improved materials, devices, products, processes, systems or services before the start of commercial production or use.
- Capital expenditures (CE): the expenditure used by a company to acquire or upgrade physical assets such as equipment, property, industrial buildings.
- Number of employees (L): the average number of employees.

To verify the proposed hypotheses, the linear regression model was employed, taking the following form:

$$MV_i = CE_i + RD_i + L_i + \varepsilon_i, i = 1 \dots 784$$

In the above model, the variables that affect the firm's market value are the investments in R&D approximating the innovation capital and the capital expenditures approximating the physical capital. Both variables are presented as a stream, since - due to data availability - we assumed that the R&D investments and the capital expenditures in a given year are proportional to their stocks. Moreover, a control variable, i.e. the number of employees, was introduced to the model.

## 5. Results

Table 3 contains descriptive statistics of variables included in the model with division into low-, mid- and high-tech sectors. The conclusion to be drawn from the data presented is that the high-tech sector companies invest, on average, more in intangible assets and tangible assets as compared with the low- and mid-tech sector companies.

**Table 3** Descriptive statistics for variables

Variable	All companies		High-tech		Low- and mid-tech	
	Average	Coeff. of variation	Average	Coeff. of variation	Average	Coeff. of variation
MV	6146,30	2,64	3039,10	3,31	8504,40	2,25
CE	1027,90	23,36	478,83	12,94	8,99	5,74
RD	154.19	3,52	226,13	3,32	88,53	2,55
L	23581	2,38	13473	3,04	31786	2,05

Results of estimation of the models' structural parameters confirm a positive relationship between the innovation capital, measured by the R&D investments, and the firm's market value (table 4). The above conclusion complies with the theory and the results of the discussed empirical studies. However, one should note that the value of coefficients in case of the R&D variable, for the three analyzed groups of firms, may not be directly compared with the coefficients presented in table 2, since the latter in most of the cases relate to the models using the log of Tobin's Q as the dependent variable.

**Table 4** Results of regression, the dependent variable: MV

Independent Variables	All companies n=784		High-tech n=370		Low- and mid-tech n=414	
	Coefficient	P value	Coefficient	P value	Coefficient	P value
Constant	2301.010 (521.839)	0,000	409.937 (289.762)	0.158	2849.560 (906.192)	0.002
CE	-0.025 (0.113)	0.828	-0.002 (0.044)	0.962	4.381 (15.242)	0.774
RD	8.094 (0.995)	0,000	10.763 (0.683)	0,000	33.299 (3.704)	0.000
L	0.110 (0.009)	0,000	0.015 (0.012)	0.246	0.084 (0.013)	0.000
Adjusted R <sup>2</sup>	0.313		0.728		0.306	

Note: standard errors in brackets

When analyzing the values of coefficients in case of the R&D variable for the group of low- and mid-tech sector firms and the high-tech sector firms, one may conclude that investors value higher the R&D investments conducted in the first of the listed groups, which confirms the H2 hypothesis formulated in this paper. As for the second independent variable, i.e. the capital expenditures, its effect on the firms' market value was insignificant.

The models' goodness of fit, measured by the adjusted coefficient of determination, is relatively low, which shows that other factors, not included in the study, affect the firms' market value, as well.

## 6. Conclusions

The theoretical discussion presented in the article and the results of the conducted study allow for the following conclusions:

- Firstly, the innovation capital presents the primary source of growth of the firm's value. The prerequisite of effective management of the innovation capital is to create the resource leverage through the use of complementary intangible assets, i.e. the human capital, the market and organizational capital, as well as tangible assets.
- Secondly, the analysis of the innovation capital's role in creation of the firm's value can be performed based on the capital market measures, including the firm's market capitalization indicator. Most of the econometric studies of market value - R&D activity relation unambiguously indicate a positive pricing of R&D initiatives by the capital markets, the open issue remains: how to determine the effect of sectoral technological capabilities on the discussed relation.
- Thirdly, the presented results of conducted study confirm the hypothesis that investments in the innovation capital contribute to the growth of the firm's market value, whereas investments in R&D made by the low- and mid-tech sector companies are priced higher by the capital market than it is the case with the high-tech sector companies. On one hand, this regularity can be explained by existence of the increasing returns to scale of the R&D activity for the low- and mid-tech firms, and on the other hand - we may deal here with the latecomer advantage phenomenon.
- Fourthly, taking under consideration conceptual and methodological limitations of the performed study, any subsequent works on determination of the innovation capital's effect on the firms' value should include a broader set of the innovation capital measures and be based on a larger and more homogeneous research sample.

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# Bulgarian Innovations – Are they the true way to industrial growth in Bulgaria

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Industrial growth is set by variety of endogenous and exogenous factors, and there is no doubt that the innovations are one of most important ones. Thus, the EU growth policy is based on the innovation diffusion. But are they used effectively to guarantee and to support the Bulgarian industrial growth? Our hypothesis is that Bulgarian innovations have moving up and down so fast that they are not sufficient instrument that provide industrial growth. Even more, the innovations are used for populist aims more than the economic growth one. Therefore, Bulgarian innovations have not pushed up the overall industrial production for a long term period.

The paper aims to present and to analyze the exact model of interaction between innovations and industrial production growth. The analysis covers three different periods of industrial development in Bulgarian economy and includes 60-years period (from 1939 – till 2010). The authors claim that the industrial growth has not been affected by the innovations as a dynamic growth factor.

The paper has following structure: section one is Introduction. Section 2 provides a brief methodical explanation of the relation “innovation – industrial growth”. Our expectations are that the economic model just remodel the innovation structure but do not change the innovations model. Analysis of the innovation model and its verification is given in Section 3. The picture shows unstable innovations for a long-term period that could not be used sufficiently for insurance a stable industrial growth. The final remarks and the conclusions of the study, that show the necessary innovation policy in Bulgaria for improving the growth perspectives by true innovations, are presented in Section 4.

## Keywords

Bulgarian innovation model, Industrial growth, Innovation, R&D

## 1. Introduction

The concept of industrial dynamic is based on the neoclassical approach of the growth theory. The general understanding is that the dynamic of economic systems is changed due to the endogenous variables of the system. According to this approach the dynamic growth depends on the production factors changes for a long-term period (like investments, innovations, labour productivity and material intensity).

Looking back, the contemporary growth theory is based on the Schumpeterian entrepreneurial theory, and has been developed by Aghion and Howitt (1992) [1] and Grossman and Helpman (1991) [2] in the 90's. Thus, the economic growth is a result of overall system's development that is run by the technological, human and product

innovations. So, the growth always involves the introduction of new ideas and technologies, and can be regarded as the economy has to adjust to new technologies (Arnold and Bertenrath 2011) [3].

In these terms, the endogenous growth is based on the market competition structure. Respectively, the monopoly does not possess enough stimuli for innovation development and new ideas' diffusion. The perfect market structure requires such vast new technology diffusion vice versa. The connection "growth – competition – R&D" has been developed in the last decade. This relation is shaped by Aghion et al. (2005) [4], and Tishler and Milstein's (2009) [5]. The empirical evidence on the relationship between indicators of competitive pressure and innovation incentives in Spain is given by Beneito et al (2011) [6].

This paper aims to explore the picture of Bulgarian industrial growth and the role of innovations for economic development. This research is based on the analysis of literature preview in this area. We argue that many theoretical and empirical studies give back the straight connectivity between growth and innovations. In contrary, the Bulgarian experience does not allow confirming it.

The analysis is based on the data panel for Bulgarian industry that is published by Bulgarian National Statistic Office (NSI). It covers the period 1939-2011. The panel includes data for: industrial production, innovation costs, number of enterprise, GVA, GVA per employee, number of employees. The study is based on implementation of different research methods as: log-time analysis, regression analysis, correlation analysis, comparative analysis.

An important issue for further economic growth is the national innovation policy. Many researchers report for emerging need of increasing R&D investments. The study collates the Bulgarian innovation state of art with the National Innovation Strategy and analysis the need of amendment and adjustment of the latter in terms of achieving a short-term growth effects, and long-term industrial dynamics' growth.

## **2. The relation "innovation – industrial growth" in the contemporary economy**

### **2.1 State of art**

The economic growth problems are not newer for the economic theory. Even though the recent economic crises rise up the need of change of the economic approach, most researchers based their studies on the Schumpeterian growth study.

Thus, we uphold that the economic growth is a *continuous enlargement or evolution of present and potential markets* (see: Carlsson and Eliasson 2001, [7]; Mattig 2009, [8]). So, the growth is always based on the new idea creation and diffusion (Arnold and Bertenrath 2011,[3]). Therefore, the growth is not a single innovation push up, but the overall competition work up for new technology and product dissemination.

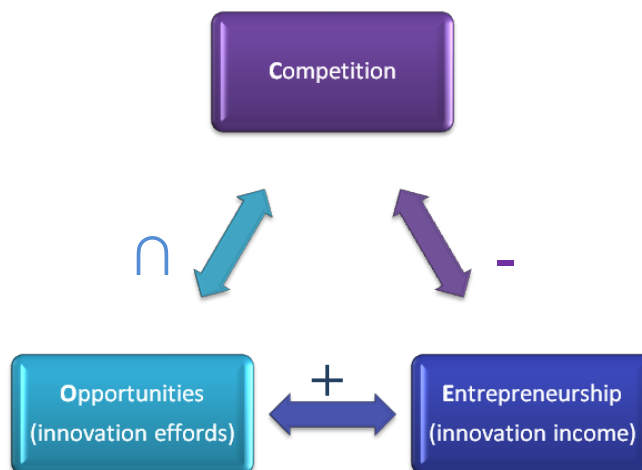
According to this approach, economic growth is dependent of these variables that develop the market and competition structures. Thus, the industrial growth model is based on two basic components: (1) the *receivable accounts* such as: capital, delays, inventions, etc., and (2) the change of *competition accounts* such as: consumption, deliveries, expenses, production, etc. (Blagoev, Shterev and Kopeva 2011, [9]).

Recently studies cover mostly the role of technological spillovers as well as the neglected innovators. The basic reason is that innovations cover as well as labour productivity as products and their production determinants (materials, mechanics and technologies). (see: Aiello and Cardamone 2011, [10]). Furthermore, as Arundel et al. (2008), [11] pointed out,

the neglected innovators are not properly policy supported although that more than half of all innovative firms do not have R&D activities and investment.

Another point of view is given by Beneito P. et al (2011), [6]. The authors observed the change of innovation activities in crisis. They stated that the current crisis may well be a fault line in the transition from an industrial to a knowledge-based society.

According to the mentioned above, the connection “growth – competition – innovation” is further explored by Peneder and Wörter (2011), [12]. Their study covers not just the analysis of the connection “growth – competition – innovation” but explore the type of these sub-connections. As a summary of their literature study they find out the following connection picture (Figure 1):



**Figure 1** Basic causal model

## 2.2 Bulgarian industry growth

The literature review shows that there is a strong relation between industrial growth and innovations at national level. But does it is the same for Bulgarian economy?

The analysis is based on Cobb-Douglas and Solow-Svensen's production function. Production function is represented as a multiplication of all productions' factors (labour, capital and resources):

$$P = f(L, C, R, M) = b_1 \cdot L \cdot C \cdot R \cdot e^M + b_0 + \varepsilon,$$

where

L – labor (expresses the influence of the labor as a production's factor);

C – capital (expresses the influence of the capital as a production's factor);

R – resources (expresses the influence of the resources usage as a production's factor);

M – scientific and technological development (expresses the influence of the R&D as a production's factor);

$b_1$  – function parameter (expresses the degree of influence of variables – productions' factors: labor L, capital C and resources usage R on production function P);

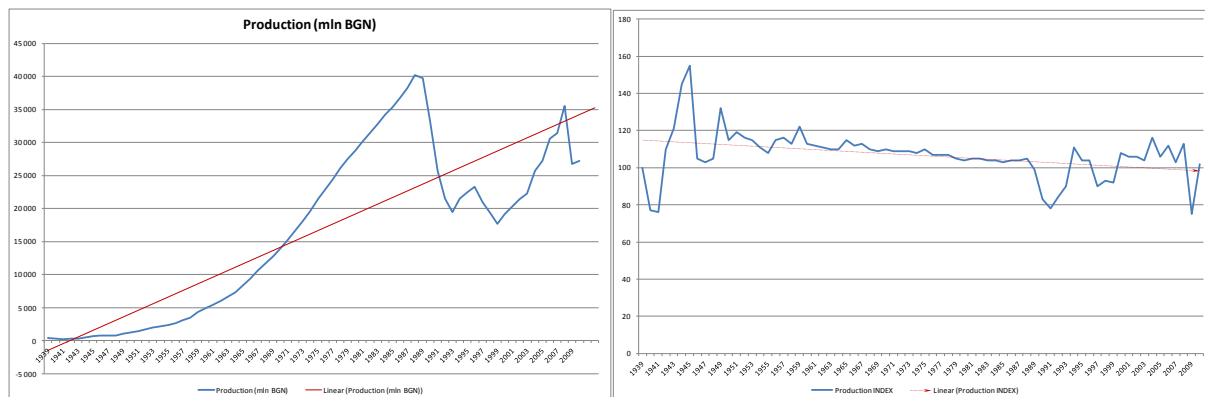
$b_0$  – free article (expresses the influence unreported outside the productions' factors in the model);

$\varepsilon$  – random variable (expresses the influence of changing production conditions over time).

According to this approach we define the production – in value and as growth index (t-1). We use a national statistic dataset that is recalculated and the production is given as a constant price (1952=100).

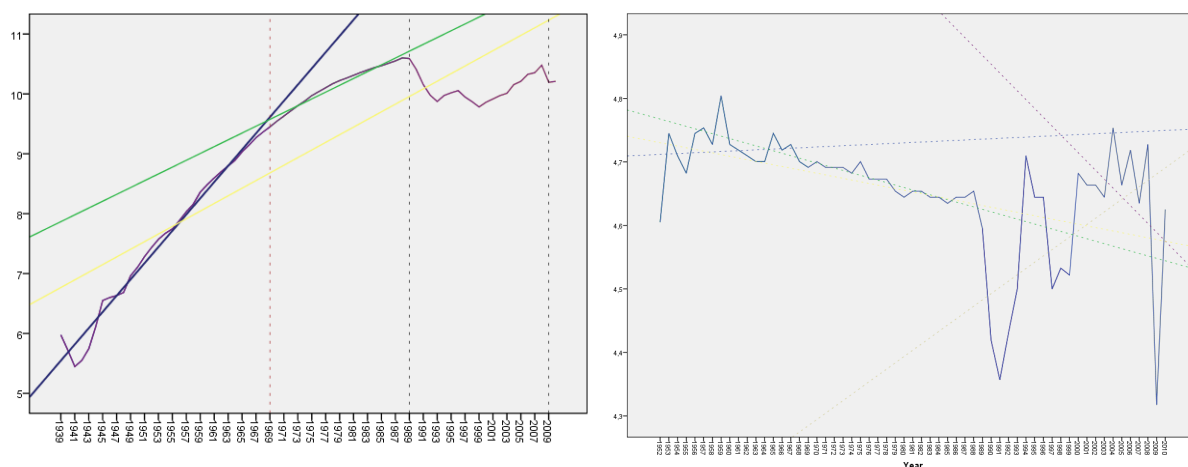
The graph shows that Bulgarian industry had been sustainably growth since 1990's (Figure 2). After a deep recession for a whole decade (1990-2000) the industry had been partially recovered. Thus, the recent value of the industry production is comparable with the value of 1980's.

The analysis of production growth index gives more detailed explanation of the production changes. After the fast industrialisation in the middle of the XX century, the growth had been falling down slowly till 1990. After that it is observed a big fluctuation of the growth rates (down from 75% up to 113%).



**Figure 2** Production growth in value (left) and as growth index (right)

Identification of different stages of industry growth is done by trans-log analysis of production in value and as growth index (Figure 3).



**Figure 3** Trans- log production growth in value (left) and as growth index (right)

Three periods of the industrial growth and its dynamic change are identified, respectively:

- 1<sup>st</sup> period (1939-1969) – 30-years period that is described as industrialization of the national economy. Growth rates of industrial production are impressive - nearly 30 times increase of industrial production over the period. The growth indices sustainably grew for the whole period.
- 2<sup>nd</sup> period (1969-1989) – 20-years period that is characterized by slowdown of the industrial production. It's explained by the saturation of the economy and the reduced absorption of industrial products. The international industry connection are not developed so there is no chance for industrial growth by the mechanism of industrial export. Despite

this slowdown in the production growth rates we find out 4 times increase in production over the observation period.

- 3<sup>rd</sup> period (after 1989) – 20-years period that is characterized by fluctuation of industrial growth dynamic. The beginning of the period is a beginning of economy model change. Therefore we have a rapid drop of production levels even though the growth indices largely grew up during the transition period (1989-1998). After that we find another 10-years production growth with very fast growth indices drop down. Nevertheless, the industry has not covered the production drop yet, and the level of production nowadays is comparable with the level in 1980s. Even more, the industry recession from 2008 has been turn Bulgarian industry back to the end of 1960s.

The next step is to explore the picture of the Bulgarian innovation system and to analyse the relation “growth – innovation”.

### 3. Shaping a Bulgarian innovation model – what is a specific?

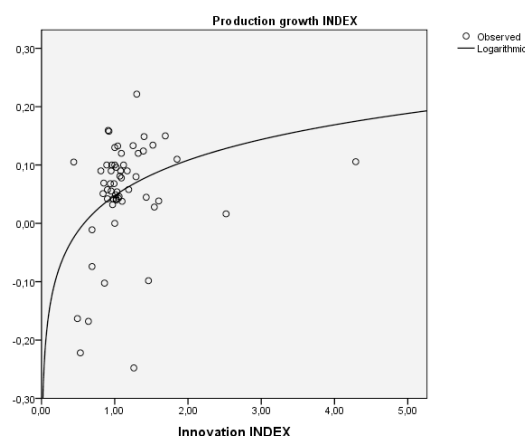
The basic hypothesis in the analysis is that exists a strong positive correlation between innovation and production index. We assumed that innovations are key pushing factor for production growth. Data analysis reveals completely different picture. The correlation coefficient is less than 0.5 (0.268) which in general is described as a weak. A value of 0.268 means that there is a random, nonlinear relationship between two variables - innovation costs and production growth. The coefficient of determination (0.071824) shows that only 7.18 % of the total variation in production growth index can be explained by the linear relationship. The other 92.82 % of the total variation in production growth index remains unexplained. The fluctuations of the costs for innovations are so big and dynamic that they are not sufficient instrument that provide industrial growth.

The innovation model of the Bulgarian Industry reveals the impact of different elements on the production growth (Figure 2 and Figure 3). The negative impact of the scientific outputs is the biggest. The influence of the scientific outputs is spread to 27.22%. It is observed low level of knowledge creation (14.86%), which is 4.7 times lower than the EU average. The knowledge diffusion has also performed in a low quarter of the impact - 22.45%. The knowledge impact (including growth rate of GDP per person engaged, new business density and computer and software spending) is relatively better performed (44.36 %) than the two others, but cannot compensate their too low contribution to the innovation index. Infrastructure for innovations is also among the factors with low positive influence (28.87%). Creative outputs (including creative intangibles and creative goods and services) (38.07%), Human capital and research (education, tertiary education and R&D) (39.21%), market sophistication (credit, investment, trade and competition) (43.01); business sophistication (knowledge workers, knowledge absorption, innovation linkages) (35.42%), have relatively similar contribution to the innovation index and its impact to the production growth. Still there is room for improvement and further development of each of their sub elements, in terms of strengthening the positive effect. The only factor with the highest score is Institutions – 74.51 %.

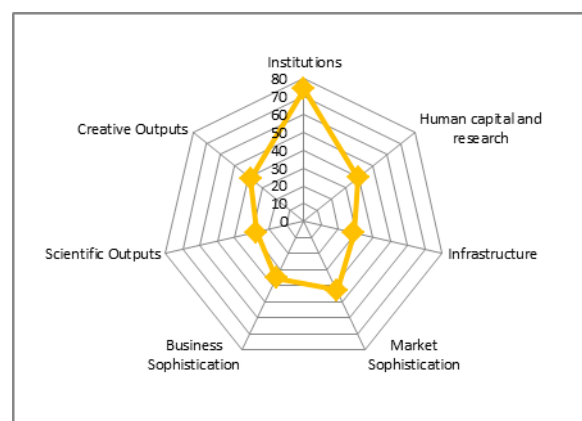
**Table 1.** Correlation between Innovation index and Production index

				Innovation INDEX	Production growth INDEX
Spearman's rho	<b>Innovation INDEX</b>	Correlation Coefficient	1,000		,268 <sup>*</sup>
		Sig. (1-tailed)		.	,022
	<b>Production growth INDEX</b>	Correlation Coefficient	,268 <sup>*</sup>	1,000	
		Sig. (1-tailed)	,022	.	

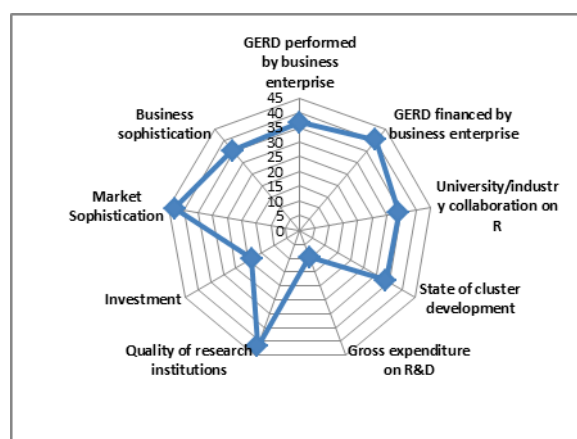
<sup>\*</sup>. Correlation is significant at the 0.05 level (1-tailed).



**Figure 4.** Correlation between Production growth and Innovation index



**Figure 5.** Bulgaria: Factors forming innovation index



**Figure 6.** Bulgaria:

The two critical areas are Investments and Gross expenditures on R&D. The weak areas in innovations are University/industry collaboration on R&D, Foreign direct investment net outflows, State of cluster development, Trade and transport-related infrastructure, Intensity of local competition, GDP per unit of energy use, Share of renewables in energy use, Ecological footprint and bio capacity.

Although, Bulgarian Economy better position in 2011 in the global innovation ranking<sup>34</sup> (The Global Innovation Index 2011, [13]) still there are domains that need improvement to meet the real business needs, and to support the Bulgarian industry in the process of gaining stable position in the global competitive market.

#### 4. Re-modelling Bulgarian innovation policy – is there a real need?

Innovation policy can provide short-term incentives to encourage private R&D activities during a recession. The focus of these measures should be to support companies in continuing their on-going innovation projects which may be at risk otherwise. Ideally, short-

<sup>34</sup> In 2009 Bulgaria was ranked 79 according to its innovation index, while in 2011 it is on the 42 position.

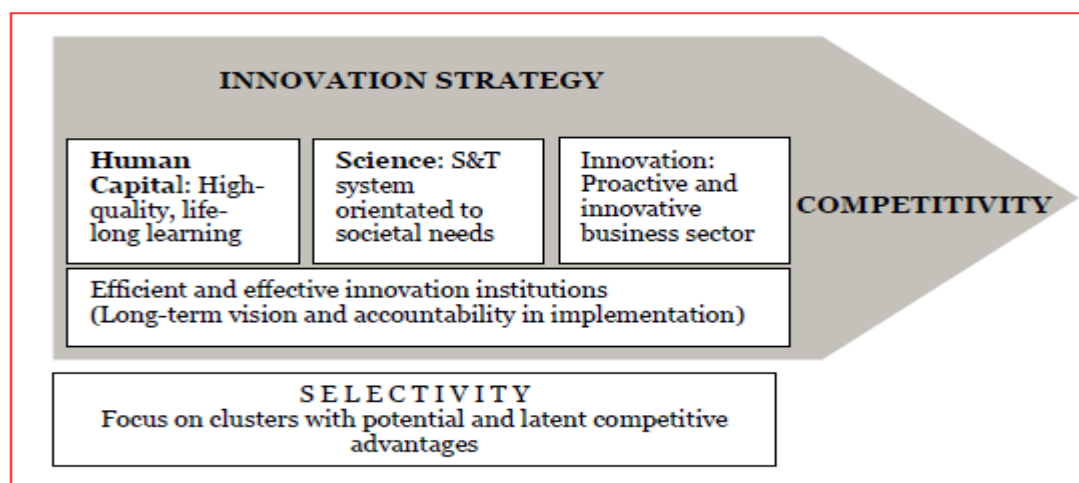
term measures during a crisis can have a two-fold impact. First, they provide a short-term economic stimulus. Second, they help mitigating the risk of negative long-term impacts on the competitiveness due to cancelled or delayed innovation activity.

Although innovation policy is fundamentally long-term in nature, there are some innovation policy instruments and actions which are likely to have short-term effects on private R&D activities thus potentially fostering a quick recovery from an economic downturn. Private sector R&D investments are likely to dry up in an economic and financial crisis. Supply-side measures such as subsidies, loans and venture capital for innovative firms are likely to have a positive impact on R&D activities in the private sector. The focus of these instruments should be on providing sustained funding for promising ongoing projects.

While subsidies and loans provide a quick influx of money into new and current projects, venture capital supports a select group of high-potential start-ups, which can have a disproportionate impact on economic recovery. Three instruments that serve these objectives are (1) subsidies and grants, (2) venture capital, and (3) loans.

Innovation Policy in Bulgaria is carried out by developed and adopted in 2004 Innovation strategy. In it there are a number of underlying measures and financial mechanisms to support applied research in Bulgarian enterprises.

Innovation Strategy of the Republic of Bulgaria is developed in line with European policies in this area and particularly the Lisbon Strategy adopted in 2000 and its subsequent transformation and update to the EU Strategy 2020 (Figure 7).



**Figure 7.** Schematic of the innovation strategy []

Research, technological development and innovation are fundamental to the implementation of this strategy. In it, the European Union set itself the goal first to 2010, and later extending to 2020, becoming the most competitive knowledge-based economy in the world.

The common European and national innovation policy and strategy have the following fundamental objectives:

1. Creation of conditions for sustainable economic growth and development of national economies;
2. Creating more and better jobs and greater social cohesion intensify.
3. Achieve levels of investment in knowledge amounted to 3% of GDP by 2020, the share of private sector to reach two-thirds of these investments.

Proceeding from the assumption that competitive advantage in the industry is achieved through the creation, deployment and diffusion of innovation, national innovation policy and



strategy, aim to implement targeted policies to stimulate innovation and development. Innovation Strategy provides the framework for further action to recover the relations between science and business with a goal of modern research and solutions to the real economy.

Innovation Strategy creates the financial framework and mechanisms by which the funding will be provided by the state budget, local and foreign investors, as well as external financing. Innovation Strategy creates a framework for innovation policy. The mechanisms by which will be implemented innovation strategy and innovation policy is conducted at national level and can be reduced to the following:

**Table 2** Measures in the field of innovation for the conduct of national innovation policy

Measure	Realization	Directions for improvement of measures
(1) Creating a National Innovation Council;	Yes	Greater legislative initiative to support innovation
(2) Creating a National Innovation Fund	Yes	Increasing the effectiveness of the Fund by funding more and more diverse projects.
(3) Encouraging the employment of young specialists in SMEs;	No	Incentives for employers hiring highly qualified young professionals with a high level of pay.
(4) Construction and/or optimization of technology centers;	No	State funding for construction of technology centers. Tax incentives for companies which finance such centers.
(5) Entrepreneurship training;	Yes	Stimulate creative thinking and support the entrepreneurial initiatives of young people through co-financing of business projects.
(6) Creation of Clusters	Yes	Encouraging cluster creation on the initiative of firms, not by legislation.
(7) Adoption of European indicators to assess the innovative potential of industries;	Yes	Implementation of European indicators to assess the potential for innovation by companies and incentives for enhancing it.
(8) Attracting foreign investment in R&D;	Yes/No	Creation of better infrastructure and environment for foreign investors in R&D.
(9) Creation and support of existing technology parks;	No	Construction of high-technology parks and research centers. (those in pure form in Bulgaria is still not built)
(10) Establishment of entrepreneurship centers in universities.	Yes	Support and funding for the creation of entrepreneurship centers in all universities in the country and their relationship to similar universities in Europe.

Finally the overarching goal of the strategy is at least to double Bulgarian GDP per capita over the next years to 2020, repeating the increasing rate in the countries of the EU in previous years. To achieve this volume the strategy states that:

- Total Factor Productivity must rise, driven by greater knowledge-intensity technological change, human capital and innovation;
- R&D investment should rise from 0.5% of GDP in 2009-2011 to some 2-3 % by 2020 and the business share of this R&D investment should rise from to 50% of that total.
- The country's position as measured by European and international innovation and economic indicators should improve.

## 5. Conclusions

Industrial growth is set by variety of endogenous and exogenous factors, and there is no doubt that the innovations are one of most important ones. The EU growth policy is based on the innovation diffusion and increase the role of innovations. In prevailed part of studies and research documents innovations are examined as the most important factor for production growth. In some economies this is valid, but there are economies where such hypothesis is not working.

Bulgarian economy passed through different stages of development in the past fifty years, shifting from one type of socio-economic development to another. Last twenty years were characterized with significant structural and production changes in industry. Observed pace of industrial production is slightly influenced by the innovation inputs in the beginning of the period, while in the last decade it is observed increase of the role of innovations for industrial development and growth. Since 1939 there are identified three periods of industrial growth. Last ten years (2000-2010) although the industry has not covered the production drop yet, and nowadays it is comparable with the level in 1980s. Even more, the industry recession from 2008 has been turn Bulgarian industry back to the end of 1960s.

Identified production growth in industry is expected to be closely linked to new technologies, new markets, new production patterns and organization. On the basis of increased share of expenditures for innovations for last decade, we assume that exists a strong positive correlation between innovation and production index, that innovations are key pushing factor for production growth. Data analysis reveals completely different picture. The correlation among industrial production growth and innovations is weak. Bulgarian innovation model is characterized with very low input and impact of scientific output; moderate input from innovation infrastructure, creative outputs, human capital and research, market and business sophistication. The highest is the impact of institutions that support implementation of innovations. The two critical areas are Investments and Gross expenditures on R&D. The weak areas in innovations are University/industry collaboration on R&D, Foreign direct investment net outflows, State of cluster development, Trade and transport-related infrastructure, Intensity of local competition, GDP per unit of energy use, Share of renewables in energy use, Ecological footprint and bio capacity.

Innovation Strategy in Bulgaria creates a framework for innovation policy. The mechanisms by which will be implemented innovation strategy and innovation policy is conducted at national level. Innovation policy can provide short-term incentives to encourage private R&D activities during a recession. The focus of these measures should be to support companies in continuing their on-going innovation projects which may be at risk otherwise. Ideally, short-term measures during a crisis can have a two-fold impact. First, they provide a short-term economic stimulus. Second, they help mitigating the risk of negative long-term impacts on the competitiveness due to cancelled or delayed innovation activity.

Still there are domains that need improvement to meet the real business needs, and to support the Bulgarian industry in the process of gaining stable position in the global competitive market. Primary goal of policy measures and strategic documents should be to strengthen the role of innovations for the industrial growth, and to create favorable conditions for development of each of categories and elements that are included in innovation index.

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# Building an Expanded Small Firm Growth Model in a Transitional Economy - Evidence on of Fast Growing Firms

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Small firm growth as a research area has attracted has attracted the attention of academics and policy makers in recent years. Despite substantial increase in the number of research studies literature suggests that little is known about the phenomenon because conceptual development has been limited (Wiklund et al., 2009). Moreover, even less is known about small firm growth in transitional environment. This paper contributes to this literature by bringing together a broad spectrum of fragmented pieces of theories on small firm growth, variables, methods, measures of growth and applying them to a small firm analysis in Kosova. This study investigates empirically the impact of four set of factors on growth of small firms such as entrepreneur and human capital, firm related factors, strategy and entrepreneurial orientation, and external environment. Findings show that internal and external factors are both important in explaining small firm growth patterns. Unlike other studies in transition economies that overlooked internal factors compared to external factors (institutional variables), the findings suggest that using an 'integrative model' and a 'mixed approach' in investigating small firm growth provides more clearer picture on factors important for explaining small firm growth. A key finding of this study is that distinguishing feature of the growth of small business is a balanced alignment of the owner-managers' intention, the abilities of the business and the opportunity or constraints from the external environment.

## Keywords

Entrepreneurship, small firm growth, institutions, internal and external factors, ordered logit

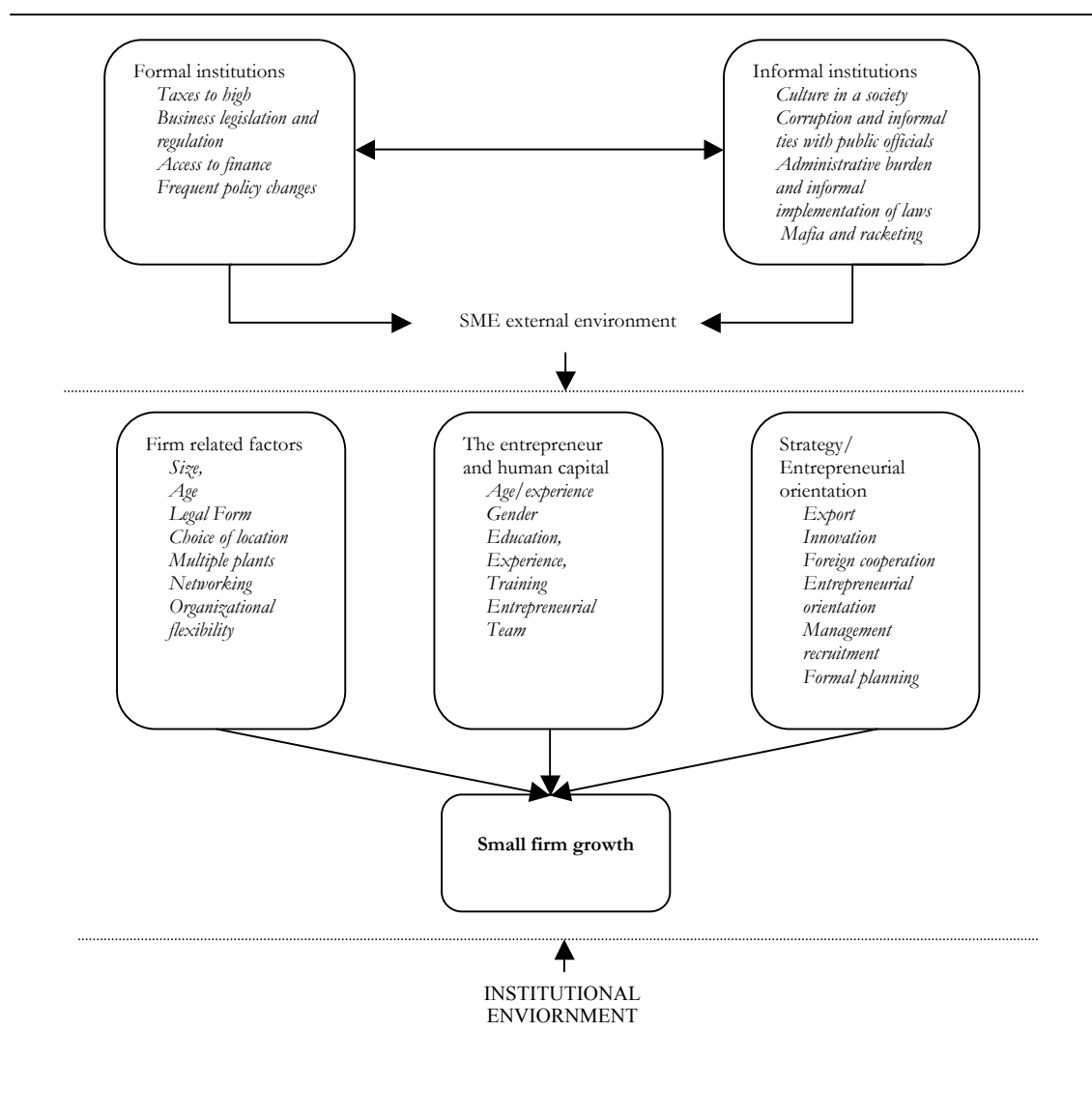
## 1. Introduction

The contribution of small firms to the economy has attracted the attention of academics, policy makers and civil society in all countries in recent years. In particular, researchers and policy makers have been interested in addressing the question of 'what determines the growth of small firms?'. Despite the growing interest on small firm growth recent evidence suggest that little is known about this phenomenon (Wiklund et al. 2009). The theoretical examination in the paper show that a more thorough empirical analysis of this subject is needed in order to guide the theory. The review of the literature revealed that the choice of variables in the existing empirical models on small firm growth is rather limited. Moreover, the determinants of small firm growth in a transition context are not well researched with the majority of studies concentrated on the external determinants of firm growth rather than the internal context (i.e. the firm and the entrepreneur characteristics) and even less on the combination or linkage between the two. In transition environments, the discussion of the determinants of small firm growth cannot be considered complete without the incorporation of

the impact of the institutional environment and the attributes of the firm and the entrepreneur. In particular, very little is known about the characteristics of fast growing firms (FGF) which are considered to be drivers of employment growth (Hölzl, 2009). In order to overcome these shortcomings, these theories should be integrated in order to provide a more comprehensive research framework for the analysis of small firm growth. The main reason for these shortcomings is that this literature is highly fragmented and, as a result, a variety of theoretical perspectives have been put forward, although there is little 'conversation' between these perspectives (Wiklund et al., 2009). They note that a 'striking feature of reviews of studies of firm growth is that each study only covers a fraction of the variables considered important in other studies' (p. 351). In the transition context, it is important to note that researcher's focus on external institutional environment is overestimated and sometimes, at the expense of the internal factors such as firm and management and strategy factors. This is particularly true for transition economies context. Therefore, this paper aims to fill this gap in the literature by providing empirical evidence which controls for a more comprehensive set of factors paying special attention to the FGF. It is highly relevant to gain better insights into the characteristics and stimulating factors of high growth companies for less developed business/firms and TEs. This paper brings together different perspectives or alternative approaches to small firm growth, trying to build an integrated approach which will inform the empirical investigation of small firm growth in a post-socialist economy of Kosovo. The aim of this paper is to integrate fragmented pieces of small firms growth theoretical perspectives and based on that develop an empirical model that tests these theories in transitional economy of Kosovo using a rich SME database. The remainder of the paper is structured as follows. The next section focuses on approaches to studying small firm growth, also trying to incorporate some of the dimensions which are important for developing a broader framework for small firm growth research. Section 3, discusses the data and model. Section 4 presents findings. Section 5 provides some concluding remarks and policy and practical implications.

## **2. Theoretical framework**

There is no unique theoretical model that explains the growth of firms. Although it is one of the most widely studied subjects in the fields of business and economics, the framework for studying small firm growth is not based on any single theory (Rodríguez et al., 2003). The review of literature suggests that studies in developing and TEs are largely concerned with the external environment based on an institutional perspective. Moreover, there is a diversity of results regarding the impact of these external factors on small firm growth (for example, Pissarides et al. 2003; Hashi and Krasniqi, 2011). There are also some inconclusive or sometimes contradictory empirical findings depending on which of the large number of factors, ranging from country specific factors and sample characteristics or methods that have been used. Notwithstanding these differences, there is at least absolute agreement in the literature that institutions matter for small firm growth, though there is more room for discussion on how these institutions interact with each other and more importantly how they are related to other internal factors (the entrepreneur and the firm) in shaping entrepreneurial behaviour. Having considered the general features of small firms and also the features of TEs, the following research framework is proposed.



**Figure 1** Integrated research framework for the analysis of small firm growth

This framework includes firm related factors, the entrepreneur and human capital factors, strategy and the external business environment which has a substantial impact on the former three sets of factors. In particular, it should be recognized that the interaction of formal and informal institutions and their joint impact in shaping the external business environment may act as a disincentive or incentive for entrepreneurs (Smallbone and Welter, 2009). The interaction of formal and informal institutions, extremely important for small firm growth research in TEs as it provides a better solution in the search for a more useful interpretative framework. At the same time it is important to recognize that the interrelatedness of all other factors should be included in the framework and investigated further as there is no clear cut evidence of these interactions in the literature. The following section will discuss determinants of small firm growth based on the proposed research framework.

## 2.1 Firm Related Factors

This section discusses the main factors related to firm characteristics. It begins with the relevance of size (usually in the context of Gibrat's Law) and age (in the context of

Jovanovic's learning theory), then moving to the role of location, sector of activity, legal form of organisation, clustering and other forms of networking and flexibility.

### ***Size and age***

The size-age-growth relationship has now become one of the most disputed issues related to the patterns of firm growth and industrial dynamics. One strand of the literature, based on the so-called Gibrat's Law, or the Law of Proportionate Effect (formulated by Robert Gibrat in 1931), maintains that a firm's growth is independent of its size – a view that became a common wisdom in theoretical and empirical literature (Heshemati, 2001). Another strand of the literature, known as the 'noisy selection' model developed by Jovanovic (1982), argues that firms learn about their real efficiency over time (thus the relevance of age) and that small firms grow faster than large firms. In the post-entry period, firms learn about their real cost efficiency gradually and grow while in their mature period, because of the diminishing return to experience, their ability to learn from experience diminishes. Firms enter the market under the minimum efficient scale and over time grow to reach this level. In markets with only negligible scale economies the likelihood of survival is greater for new entrants but the opportunity to grow in post-entry period is limited by the gap between the minimum efficient scale and size of the firm (Acs and Audretsch, 2001, Krasniqi, 2007). The recent empirical evidence on the validity of Gibrat's Law is rather mixed. Numerous studies, using a variety of samples in terms of time, region, sector of activity and size, have contradicted this Law by finding a negative relationship between size, age and growth (Evans, 1987a, 1987b; Davidsson et al., 2002; Almus, 2002; Yasuda, 2005). A number of other studies have found evidence which fully or partially support the Law of Proportionate Effect (Johnson, et al. 1999; Piergiovanni, et al. 2002; Diaz-Hermelo and Vassolo, 2008).

### ***Location***

In the literature on small business growth it is shown that location is a factor which influences the growth of firms. Studies of agglomeration economies focusing on the role of positive externalities in developed and dynamic urban areas have highlighted the important role of location for economic growth in general and for the growth of firms in particular (Black and Henderson, 1999; Alcacer and Chung 2007). They claim that externalities are particularly associated with knowledge spill-over and the role of urban institutions which could lead to efficient growth. Maine et al. (2010) argues that firms may have access to some specialized resources which may not be able to develop internally, but more able to be found in more urban areas. Recent theories suggest that there are increasing returns to scale for firms in production that can be realised most effectively if production is concentrated in agglomerations (see, Krugman, 1991, Fujita and Thisse, 2002). Some other studies have focused on finding differences in the growth rates between rural and urban areas. Some of them are difficult to compare as they use different definitions of what is 'rural' and what is 'urban' (Storey, 1994a). Sleuwaegen and Goedhuys' (2002) study of firm growth in Nigeria noted that firms located in the commercial capital of the country, were more likely to engage in networking and subcontracting, which provided greater opportunity for growth, than firms located in other parts of the country. It seems that better supplied regions are conducive to the development of firms in developing countries.

### ***Sector***

Several studies have attempted to link the firms' sector of activity and their growth. The study of a sample of German firms conducted by Almus and Nerlinger (1999) showed that broad sectors dividing industries into high-tech or medium tech do not have a positive or negative

impact on firm growth. Using a longitudinal database for manufacturing firms in Lower Saxony in the period of 1979-1989, Wagner (1995) shows that the sector of activity to which a particular firm belongs to is an important factor explaining the growth of the firm. He finds that the start-up of new firms tends to be greater in those industries experiencing high growth rates and which are highly concentrated. Contrary, Rodríguez et al. (2003) found that there were not significant differences among these sectors regarding firm growth, except for the hotel industry, commerce and hotel trade having a positive impact on the growth of the firms. Other authors argue that firms in industries characterised by larger economies of scale are likely to exhibit higher rates of growth than firms in other industries or sectors where the scale economies are not very important (Audretsch, 1995). A recent study based on panel data from 139,922 Spanish firms in manufacturing and service industries, covering the period 1994-2002, supports the view that the market structure affects the ability of firms to grow and suggest that services firms do not grow as fast as manufacturing firms (Teruel-Carrizosa, 2010). This is because in services there is a low medium efficient size as compared to manufacturing industries. On the whole it would be misleading to conclude that there is a total unanimity amongst researchers concerning urban and rural differences in firm growth and the sector of activity, as well.

### ***Legal form***

Various studies have attempted to link the legal form of the firm with its growth. One of the main propositions is that firms operating as limited liability companies have shown higher rates of growth. There are theoretical arguments that owners of firms founded as a limited liability have greater incentives to peruse relatively riskier projects compared to other counterparts and therefore they are more likely to have higher profits and growth rates than other firms (Stiglitz and Weiss, 1981). Limited liability firms have more credibility with both customers and banks compared to other legal types (e.g. Storey, 1994b; Freedman and Godwin, 1994). Limited liability firms benefit from an increased reputation which plays a key role in accessing external finance, but on the other hand indicates the involvement in a higher risk than usual and signals high expected return but also high expected risk (e.g. Storey, 1994b; Harhoff et al., 1998; Brixy and Kohaut, 1999; Mohnen, 2009). To conclude, the legal form seems to have an influence on the firm's growth with firms operating as limited liability experiencing higher growth rates.

### ***Networking***

Firms can also improve their performance through networking activities – which facilitate their gaining from external economies. Knowledge flows are amongst the key factors in explaining firm growth in today's knowledge-based economy, both, international and national. At the national level, networking seems to play a role in technological and innovation spill-over. Evidence suggests that firms that belong to formal networks are more likely to report innovation activities and, in addition, the growth paths of firms in a cluster lies above that for isolated firms, that do not belong to any networks (Harris et al., 2003; Beaudry and Swann, 2009; Maine et al., 2010). Firms can also benefit from other forms of networking such as membership in business associations. These benefits, among others, include the improved information flow, training, facilitating foreign cooperation and others (Brown et al., 2005).

## ***2.2 The entrepreneur and human capital factors***

The recognition of the role of human capital dates back at least to the influential work of Becker (1964). The basic proposition of this theory is that individuals endowed with more or higher quality of human capital achieve a better performance in executing relevant tasks



contributing to efficiency and growth of the firms. Here, human capital (of both entrepreneur and employees) refers to the range of skills, knowledge and experience that facilitate growth.

### ***Education***

The impact of human capital on a firm's growth has been acknowledged by many researchers in both developed and developing countries, showing that education of the workforce and managers contributes to better firm performance (Kangasharju and Pekkala, 2002; Macpherson and Holt, 2007; see van der Sluis et al., 2005 for an overview of earlier studies). However, very little research has been conducted to measure the influence of human capital on entrepreneurial performance and motivation in transition countries (Aidis and Praag, 2007).

The existing studies have shown that human capital affects the likelihood of start-up, survival, growth and successful performance in the market (Bates, 1990; Brown et al., 2005). Bates's (1990) study, using a sample of 4,429 people in the US who entered self-employment in the period 1976-1982, shows that educated entrepreneurs are more likely to establish a firm and more likely to remain in business and experience higher rates of growth. The study also indicates that the owner's education level is a significant factor in obtaining loans for small businesses. Haber and Reichel (2007) find that human capital of the entrepreneur especially in the form of managerial skills, were the greatest contributing factor to performance.

### ***Training***

Some authors stress the role of training as an alternative mechanism to enhancing employees' and managers' skills (Kirby, 1990; Cosh, et al., 2000). They find a positive relationship between training and employment growth, especially if the training is embodied in the wider range of management training and human relations practices in the firm (Cosh et al., 2000). Training is expected to be directly associated with performance, in particular if the firm is involved in innovation activities (in both product and process), which create the need for training or furthermore, if firms are increasingly competing on the basis of quality or time rather than simply price (Bryan, 2006). Skilled workers are more productive because they have higher problem-solving abilities, leading to greater efficiency within the firm. Although important, the majority of small firms are not involved in the trainings, which may suggest that small firm owners are reluctant to expose their educational level in a training environment (Kirby, 1990). Also, unlike larger firms, small firms also have limited access to resources, and uncertainty about future prospects might prohibit the small firms to invest in the training of their employees. To sum up, firms what are strongly motivated to grow, train their workforce to facilitate the growth process, as failure to train may restrict the firm's growth (Johnson and Gubbins, 1992; Hallier and Butts, 1999).

### ***Entrepreneur's age – experience***

The founder's age is one of the personal attributes which can influence the survival and growth of the firm. According to Storey (1994a) the relationship between age and the SMEs' survival and growth is often U-shaped. Young individuals lacking experience and capital are less likely to survive and grow. Businesses of individuals over 55 are less likely to grow as their founders have less motivation and energy. As founders of small firms approach retirement, they may have more modest growth objectives than their younger counterparts. Older individuals are more likely to have reached their aspirations earlier in the life, thus, the need for radical changes and dynamism required for firm growth may diminish. Several studies reported a positive relationship between entrepreneurial experience and growth of

the firm (Capelleras and Rabetino, 2008; Lee and Tsang; 2001). On the other hand, in summarising the literature, Macpherson and Holt (2007) argue that although empirical studies report that experience by entrepreneurs is crucial for growth, how that experience develops and is influenced by the overall context or interactions remains unclear. In the context of TEs, pre-existing knowledge in the form of experience might not have expected positive effects because as experience develops it interacts with the rapidly changing environment, therefore past experience might not be a very useful guide for the entrepreneur's future actions. Thus, from the studies above it is shown that the middle age owner/managers seem to experience a higher rate of growth as they have the necessary experience as well as the motivation for growth.

## ***Gender***

Until recently, most studies were concerned with the investigation of gender differences in the pre-start up stage influenced by the fact that start-up rates for females are considerably smaller than that of their male counterparts (e.g., Riding and Swift, 1990; Hoxha and Krasniqi, 2007). In the more recent literature, the impact of gender on firm performance and growth in the post entry period has received much attention (e.g., Dodd, et al., 2004; Westhead 2003; Watson, 2002). The empirical work on gender as a determining factor has yielded contradictory results. Chell and Baines (1998) found no significant difference between the performance of female and male-owned small businesses. Other studies have shown a difference between male and female owned businesses. For example, in the study which is based on a representative sample of 6,000 SMEs, Mukhtar (1998) found that females are less growth-oriented than males. This means that female entrepreneurs choose to manage their business differently from their male counterparts because of their different motivation at the start-up stage which continues to persist in the post-entry period. Among the compelling reasons why female-owned businesses are said to be underperforming compared to male-owned businesses are those related to limited access to external finance of female entrepreneurs (Riding and Swift, 1990; Muravyev et al., 2008) or those because females are more family-oriented, work fewer hours and are less keen in pursuing expansion related goals (Brush, 1992; Fairlie and Robb, 2009). In the light of the conflicting evidence we may conclude that gender should be included as a variable for the investigation of firm growth, especially in samples controlling for regions and sectors.

## ***Entrepreneurial team***

An entrepreneurial team is fundamental to firm growth. The ownership structure varies across small businesses as they may have been founded by a single founder or a group of individuals. It may be hypothesised that businesses owned by more than a single individual are more likely to grow since the management of a business requires a range of skills (Storey, 1994a). This is because of the synergy effect of the knowledge of founders especially in teams with that members have complementary skills (Corbett, 2007). In addition to the knowledge synergy, the presence of partners may act as a signal to potential creditors and lenders of the seriousness and economic strength of the business (Pasanen and Laukkanen, 2006). They argue that the synergy effect expands knowledge of founders and increases managerial capabilities and in addition to the knowledge synergy the partners may act as a signalling for potential creditors and lenders of the seriousness and economic strength of the business. The evidence suggests that firms funded by an entrepreneurial team are more likely to grow faster compared to those founded by an individual (Schutjens and Wever, 2000; Birley and Stockley, 2000). However, team work may generate problems between members.

### ***2.3 Management strategy and entrepreneurial orientation***

The bulk of the literature takes entrepreneur's desire for growth for granted assuming that people behave in ways to maximize their long-run profits. The studies adopting a psychological perspective, however, have a broader view of motives and attitudes underlying economic behaviour (Wiklund et al., 2009). This literature suggests that people start and run their businesses for a number of reasons rather than just for profit maximizing. In addition, different firms follow different growth strategies and management practices with some of them preferring to remain small and some of them aiming at continuous growth and operating internationally.

#### ***Export orientation and foreign cooperation***

Firms involved in exporting activities may experience higher growth rates for at least two reasons (i) their orientation towards new markets and market niches and (ii) their ability to learn from their competitors in the areas of technology and quality. The recent survey of a large number of studies by Tybout (2003) suggests that exporting activities have a positive effect on firm performance. The spill-over effects of knowledge transfer (both in terms of technology and management know-how) are deemed to be the main reasons for their positive influence of foreign ownership on firm performance. In addition to exporting, foreign ownership is also expected to have a positive impact on firm performance. The recent evidence from Russia (e.g., supports the view that the foreign ownership has generally positively affected the performance of firms in Russia (Djankov and Murrell, 2002; Yudaeva et al., 2003). Domestic firms can benefit from cooperation with foreign firms too. By bringing new advanced technologies, firms can benefit from imitating, labour training, and vertical technology transfers through the diffusion of technology, and more importantly, for developing countries inflow of capital investment (Taymaz and Özler, 2007). All these interrelations between firms, both nationally and internationally, can increase productive opportunities and increase the knowledge base of the firm as postulated by the resource-based view.

#### ***Entrepreneurial/Growth orientation***

The ability versus the intention to grow has been the subject of a great deal of debate as not all small firms are growth-oriented or have an aspiration to grow (Morrison et al., 2003; Doern, 2009). While growth can be achieved by firms with a variety of characteristics, it is the entrepreneur's commitment to grow which is the most important factor (Wiklund et al., 2003; Mochrie et al., 2006). It has been argued that other goals rather than economic or wealth related goals, are pursued by entrepreneurs such as independence or developing new ideas (Douglas and Shepherd, 2000). This is because growth implies radical changes in the business and these changes may counteract the owner's initial goals such as independence or 'life style' (Wiklund et al., 2009). As a firm grows it faces the managerial challenges such as the need for more professional managers. Owners of the majority of small firms deal with day-to-day management operations. As firms start to grow and face the need for professional managers, the owners' desire to maintain control over the firm and their hesitation to delegate decision-making to employed managers (reluctance to bring professional managers) may inhibit the growth of the firm. Small business owners are sometimes reluctant to grow even though they may face opportunities for expansion (Hart, 2000). Serrasqueiro and Nunes (2008) in their study found that in firms where management was separated from ownership, the non-owners' objectives were more likely to be growth-oriented, suggesting that the separation of management and ownership has a positive impact on firm growth. Therefore, any investigation of the determinants of small firm growth should control for growth orientation of the firm.

## **2.4 Institutional environment**

The entrepreneurship development in particular country is heavily influenced from the institutional environment.<sup>35</sup> In fact, environmental considerations may be thought to be particularly important in countries characterized by fundamental transformation of institutional settings, such as transitional post socialist economies (Smallbone and Welter, 2009). In addition there is a growing body of empirical evidence coming from transition countries, suggesting that the development of entrepreneurship and small business is of crucial importance in these economies, but the conditions for this are less than optimal, and this can be attributed to underdeveloped market institutions, weak legal system, and hostile business environment (e.g. Smallbone and Welter, 2006; Estrin et al, 2006).

Indeed, Institutional Theory offers the highest degree of novelty, in this highly unusual and novel context of transitional environment (Peng, 2003). Since the 1980s, institutional theory has become a major perspective in the social sciences. Institutional theory (North, 1990) has been employed frequently for explaining the economic development. Indeed, institutions are important dimensions in explaining economic development problems (Prasad, 2003, p. 742). Moreover the institutional perspective has been considered as a useful theoretical framework for analyzing the impact of external barriers on new venture development in emerging and transition economies (Aidis et al., 2008; Meyer and Peng, 2005).

Institutions consist on formal constraints, such as laws and regulation, and informal constraints, such as conventions, codes of behavior, norms and culture. Both formal and informal elements strongly influence the goals and beliefs of individuals and organizations. In this context, institutional factors have been used to explore new venture growth and performance in transition economies (Krasniqi et al., 2008; Aidis and Mickiewicz, 2006; Bartlett and Bukvič, 2001)

Particular nuances of the transition (both its means and ends) varied across countries because of their different histories and economic conditions (Meyer and Peng, 2005). While some countries started out their transition with more traditional socialist regimes, others had already completed waves of reforms that, among other outcomes, cleared the stage for the emergence of entrepreneurial culture (Ireland, et al. 2008). Furthermore, it has been shown that the slow, and uneven, development of the institutional framework in different transition economies has been one of the major factors explaining the divergent paths of development, particularly the development of SMEs and entrepreneurship, in these countries (see Hay and Shleifer, 1998 and Frye and Zhuravskaya, 2000, Hashi and Krasniqi, 2011).

The complicated and excessively regulated environment creates the incentive for entrepreneurs to evade regulations by moving partially or fully to the informal sector (Johnson, et al., 2000; Shleifer and Wishny, 1994). It also encourages rent seeking behaviour by public officials and facilitates the growth of corruption. Combined together, informal activities and corruption contribute to an anti-competitive environment in which the market fails to allocate resources efficiently because some market players operate outside the law while those operating within the legal system face the increased cost of 'doing business' legally.

Bohata and Mladek (1999) found that for Czech SME sector especially new entrants the biggest obstacle to doing business is court registration and obtaining activity-specific license. Same study emphasizes that taxes and contribution are seriously threatening the growth of the firms in Czech Republic. Surveys and interviews conducted among SMEs at the early stages of the Czech economic transformation and before the introduction of the state support program identified the following major problems: excessive taxes, delayed payments, and

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<sup>35</sup>This paper follows North's (1990) definition of institutions: 'Institutions are the humanly devised constraints that structure political, economic and social interaction'. Formal institutions include constitutional, legal and organisational framework for individual actions, while informal institutions consist of unmodified attitudes which are embodied in society regulating the individual behaviour

high interest rates. (Bohata and Mladek, 1999) Nevertheless, same study underlines that taxes and contributions were, however, a smaller problem for foreign firms than for domestic ones. Without exception, financial barriers were perceived as posing substantial constraints on the growth of SMEs (Hashi, 2001, Krasniqi, 2010).

It should be emphasized that, although environmental factors play an important role in the growth of the firm in transitional context, it is necessary to take into account additional factors contributing in explaining the firm growth and entrepreneurial behaviour.

### **3. Empirical analysis of small firm growth**

#### **2.4 The data**

The empirical evidence provided in this chapter is based on three SME surveys with 451 growing firms conducted by Riinvest Institute for Development Research at the end of each year 2002, 2003, and 2004. Firms in each sample were selected randomly from the business register kept at the Statistical Office of Kosova (2002, 2003 and 2004) and the Ministry of Trade and Industry (2004).<sup>36</sup> The survey was designed to study the profile, trends and various constraints on the development and growth of SMEs in Kosova. Interviews were conducted by experienced and trained final year students from the Faculty of Economics, University of Prishtina and monitored carefully by the Riinvest research team. Respondents were mainly the owner or the general manager (occasionally the financial manager) of companies and interviews were conducted through the face-to-face method. The questionnaire contained questions regarding the personal characteristics of respondents (age, gender, education), enterprise data (size, number of years in operation, sector of activity, structure of the assets), entrepreneurs' perception of obstacles in the business environment (taxes, competition, corruption, legislation, demand, access to external finance, etc.), their intention for future development, the use of external resources, foreign cooperation, personnel and training, marketing, and finally membership in business associations. The data are both quantitative and qualitative. The quantitative data includes the number of employees at the beginning of the year and at the end of the year (employment growth), years in business, investment, sector of activity, personal data about the owner/manager, and the education and training of employees and managers. The qualitative data includes the respondents' opinions on their business expectations and perceptions about the impact of business environmental obstacles on the operation and growth of their business. For the empirical analysis in this section, data from three SME surveys conducted in three years (2002, 2003, and 2004) are pooled. The pooled cross-section sample used is representative of the total population of the SMEs, sufficient to enable us to develop statistical inference about the overall SME population in Kosova (see, Riinvest, 2004). The sample includes SMEs from all regions and in all economic activities. Even though the firms in the sample belong to a wide range of activities, we classify them into three major groups: production, trade and services. The number of surveyed firms differs slightly with regard to sector over the years under consideration. The private sector in Kosova consists almost entirely of SMEs and is dominated by micro firms. According to the official statistics of the MTI, 98.5% of the firms (excluding sole proprietorships) are micro, 1.3% is small and 0.2% is medium sized firms. Our descriptive statistics show that overall the average size of the companies in the sample is around 13 employees, which is just above the threshold of the definition of micro firms. In addition to the small size, firms in Kosova are very young too. The surveys indicate the recent origin of the private sector. Around 54 % of the firms are five years old or younger and around 70% of them are no more than ten years old. The overall average age of the companies in the data set is around 8 years.

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<sup>36</sup> For more details on the sample design see *SME Development Report* (Riinvest, various years).

## ***Pooling data***

The pooled data technique is used to test the model of small firm growth in Kosova. The pooled data contain information from three independent surveys over the period of 2002-2004. An 'independently pooled cross sections' technique is obtained by pooling randomly sampled cross-sections at different points in time (Wooldridge, 2006). Data set used here meets these conditions: surveys were random and independent of each other, using the same questionnaire and identical dependent and independent variables. This pooled dataset is equally reliable in terms of representation of SMEs and allows for statistical inference about the whole SME sector because of the increased number of observations and other reasons explained below.

From the statistical point of view the independently pooled cross section data has several important features (Wooldridge, 2006). First, it consists of independently sampled observations, thus, ruling out correlation between the error terms across different observations. Second, it differs from the single random sample because it controls for changes over time by inclusion of year dummy variables. This can result in more precise estimators and more powerful diagnostic test statistics. Finally, a pooled data technique is widely used to simply increase the number of observations and hence have bigger sample size and more robust coefficients (Verbek, 2004; Wooldridge, 2006). Another benefit of using pooled data is that by increasing the number of observations the problem of correlation of explanatory variables becomes less severe and increases the degrees of freedom (Littunen and Virtanen, 2006). This is particularly important for testing a integrative empirical model which tests for a larger number of explanatory variables which otherwise would be econometrically difficult to implement.

## ***2.3 Integrative empirical model of small firm fast growth***

This section develops an integrative econometric model of small firm growth which integrates all the relevant factors identified by the range of theories discussed in previous section. These factors include: firm related factors, the human capital factors, external business environment factors, and management/strategy and entrepreneurial/growth orientation.

## ***Some stylized facts on measuring fast growth***

The definition of fast growing firms is far more complex than the general definition of firm growth discussed in previous sections. Of course, various definition of growth itself has an implication for FGFs particularly concerning absolute versus relative growth. The literature on small business growth suggests that there are a number of ways of classifying the types of growing firms according to their growth rate. For example, Janssen (2002) splits the sample of SMEs in two groups: 'high growth' firms (coded as 1) and 'low growth, stagnation or negative growth' (coded as 0) in order to estimate a logit model. He defines 'high growth' as growth greater or equal to 50% over the period studied, and rest of the sample belongs to a group of firms with less than 50% growth or negative growth. Similarly, in their study of FGF in Finland Autio et al. (2000) define a firm as high growth if it obtained at least 50% sales growth during the three years under consideration (1994-1997). Bager and Schøtt (2002) classify the growth (measured in terms of employment) into three categories: no growth, those which closed down (20% of the sample), moderate growth (0-150%), and high growth ( $\geq 150\%$ ). They carried out several logistic regressions to identify factors increasing the probability of a firm being in those categories: high versus moderate growth, or no growth versus moderate growth. Their findings show that the important factors explaining high growth of small firms are educational background, age and gender composition of staff and their level of income. Other authors such as Brüderl and Preisendörfer (2000) use different criteria for defining high growth. First they use the relative growth measure of definition of

fast growth according to which the firm falls in the fast growing group if it doubles its number of employees (in relative or percentage terms).<sup>37</sup>

Kemp and Verhoeven (2002) define growth of the firm on the basis of a combined measure of absolute and relative growth in following way: fast growing if growth rate is equal or more than 150%, normal growers if  $5\% \leq \text{growth} < 150\%$ , stable companies ( $-5\% < \text{growth} < 5\%$ ), and shrinking companies ( $\text{growth} \leq -5\%$ ). Almus (2002) uses a combined index of relative and absolute growth measures because, as argued earlier, the relative growth measure tends to produce results biased in favour of small firm. Almus adapts the Birch Index in order to correct for this possible bias. He defines the fast growing firms as those belonging to the upper 5 or 10 % of the Birch's distribution. Goedhuys and Sleuwaegen (2010) use two approaches for defining high-growth firms in developing countries. Their first approach involves selecting the 10% fastest growing firms as a 'high growth'; the other approach defines high growth firms as those with an employment growth of 60% over a 3-year period. To conclude, there is no single generally accepted definition of fast growth. For this reason in our empirical modelling strategy we will test our empirical findings using numerous and various measures of FGF.

### ***Role of FGF in Kosovo***

FGF are seen as a special kind to SME. They are rapidly growing and young small firms that are most important drivers of employment generation (Acs and Mueller, 2008; Henrekson and Johansson, 2010). They even more important in least developed countries because they can contribute to peace and transition (Naudé, 2010). Earlier work by Storey (1994a) found that 4% of the fast-growing firms created about 50% of the employment in a 10 years period he studied. Recently, Acs et al. (2008) have shown that high-impact firms (2–3% of all firms) create almost all net jobs in the US economy. An extensive summary of evidence by Henrekson and Johansson (2010) show similar results in other developed countries.

Although not comparable to these studies due to the lack of longitudinal data and the level of development of the country, we find that in case of SMEs in Kosova about 43% of total new jobs are generated by only 11% of firms in the sample during 2002-2004. This difference between more mature market economy such as UK and Kosova is attributed to the small average size of firm in the private sector (around 13 employees). Table 1 provides information on size cohorts and their respective contribution to total new generated employment during the period of study (2002-2004). It can be seen that relatively larger firms (especially those employing more than 100 employees) account for major employment generation in the country (in absolute terms).

**Table 1** New employment generation by size cohort (2002-2004)

<b>Size cohort (No of employees)</b>	<b>Employment</b>	<b>Share in the total employment (%)</b>	<b>Share in the sample</b>
More than 100	354	12.4	1.7
50 - 99	247	8.6	3.1
40 - 49	366	12.8	2.1
30 - 39	258	9.0	4.2
20 - 29	309	10.8	6.3
10 - 19	391	13.7	13.3
5 – 9	372	13.0	16.7

<sup>37</sup> In addition to this criterion they introduce also some restrictions such as: the firm should at least increase of number of employees up to certain thresholds (in their case, 4, 5 and 6 employees) in order to overcome biases towards small firms.

Less than 5	559	19.6	52.6
Total new employment generated in the sample period	2856	100.0	100.0

Source: Riinvest SME Survey, 2002-2004. Author's own calculations.

Note: The total employment here refers only to newly created jobs

## 2.3 Measures of variables

### Measures of firm growth

The growth of a firm can be represented by a variety of indicators: employment growth, sales growth, asset growth, market share, etc. However, employment growth is the most widely used indicator in empirical studies of small firm growth in both, developed and TEs (Audretsch et al., 1999; Bartlett and Bukvič, 2001; Goddard et al., 2006). There are several reasons why employment growth is the usually preferred measure of firm growth in empirical studies. In many countries, the data on sales and profit is required by public authorities. However, in most of the countries if firms are very small according to their sales level, they are not strictly obliged to report financial statements. In Kosova, for example firms which do not exceed a certain sales threshold are only required to self report their sales to the fiscal authority. In other survey studies, especially in TEs where firms commonly tend to under-report their activities, employment growth is more reliable than other measures of firm growth (e.g., sales), because unlike sales or profit figures, employment figures are less likely to be under-reported, easier to remember by entrepreneur and also uncontaminated by price changes (Brown et al., 2005). It is argued that the decision to hire an additional employee will be a significant decision for the owner, one that he would remember and the number of employees reported by him/her will be more likely to be accurate (Mochrie et al. 2006). In Kosova context, the use of growth variables such as sales growth since start-up is problematic because the entrepreneurs (who operated before the War) simply cannot remember the sales figures as the official currency has changed three times in the decade. Under-reporting is a severe problem in TEs, especially when there is a large informal economy sector (Kosova is not an exception either). In addition, small firms often do not use accounting procedures but often keep simple records which often do not allow the accurate measurement of growth by profit (Aidis et al., 2008).

In the empirical literature, growth is sometimes measured in absolute terms and sometimes in relative terms. This may have a significant impact on the empirical results, in particular on the sign of the independent variable of the firm size (Brüderl and Preisendörfer, 2000). This is mainly because the relative measures of growth favour the small firms compared to larger firms, while the opposite holds for absolute measure of growth. This study uses both, absolute and relative measures of firm growth and investigates the impact of the precise measure for small firms in Kosova. Absolute growth (*growth\_abs*) is simply the absolute increase in the number of employees during each year. Relative growth (*growth\_rg*) is measured in relative term using the following formula (see Delmar, 1997; Janssen 2002):

$$rg_t = \frac{E_t - E_{t-1}}{E_{t-1}} \quad (5.6)$$

Where  $E_t$  is employment at the end of year  $t$  and  $E_{t-1}$  employment at the beginning of the year. Relative growth is zero for non-growing and shrinking firms. In the probit estimation, the dependent variable (*growth\_dv*) is a dummy, equal to one for growing firms and zero otherwise. In addition to absolute and relative measures of growth we use other measures of firm growth too. Almus (2002) argues that using the relative growth measure will produce biased results towards small firm while using absolute growth measures will lead to biased



results towards large firms. Thus, we construct two other measures of growth, Birch's (1987) Index (*bi*) and Davisson's et al. (2002) Index (*di*). The rationale behind using other measures of growth is to test whether the findings are sensitive to specific measures of growth (see, Schreyer, 2000; Hölzl, 2009). The *bi* and *di* indicators are calculated in the following way:

$$bi = (E_t - E_{t-1}) \frac{E_t}{E_{t-1}} \quad (1)$$

$$di = \frac{(E_t - E_{t-1})}{\left( \frac{E_t + E_{t-1}}{2} \right)} \quad (2)$$

*bi* multiplies the absolute employment growth by the relative employment growth to determine the employment-generation power of firms in different sizes. This measure of firm growth is not biased towards any particular size. The *di* growth indicator is calculated as final employment minus initial employment divided by average of final and initial employment. This measure, too, is not biased towards any particular size.

### **Measures of independent variables**

Independent variables influencing small firm growth are divided into four groups based on research framework illustrated in Figure 1: firm characteristics, human capital characteristics, business environment characteristics, and management strategy and growth orientation of the firm. In addition to these factors, some control variables such as sector and year dummies are also included. The importance of these factors and their expected effect has all been discussed in the previous chapter. The precise definitions of all explanatory variables are provided in Table 1 in Appendix.

### **2.4 Empirical findings from ordered logit models: factors influencing fast growth**

To gain more through insights about the differences in determinants explaining firm growth amongst different levels of growth we use an ordered logit model. We think that it is important to investigate differences within the sample of growing firms because there is a much clearer distinction between what characterises growing vs. non-growing firms while there is scarce knowledge for differentiating between characteristics of firms that exhibit different levels of growth among growing businesses, i.e. high growth versus different categories of low growth (see Moreno and Casillas, 2007).

For deciding on different levels of growth, data are reorganized in order to have categorical variable with three ordinal outcomes for growing firms (firms that experienced positive growth up to the median; firms that experienced growth between the median and 10 percentiles; and 10 % fastest growing firms). The literature suggests that data can be reordered for the purposes of different research. According to Long (1997, p. 115) '*a variable might be ordered when considered for one purpose, but unordered or ordered differently when used for another purpose.*'

Regarding studies on small firm's growth, Capelleras and Rabetino (2008) and Peck et al. (2006) use a similar approach of reorganizing the data according to different levels of growth. The same approach is used in definition of growth categories here. We concentrate on investigating the impact of different factors on the speed of firm's growth. For this purpose, three cut-off points (thresholds) are constructed on the basis of the summary statistics of the firm growth indicator in order to compile the composition of each group (growth category) based on the distribution of the continuous variable. The summary statistics of growth for four groups of firms is provided in Table 2.

**Table 2** Variance ratio test for firm growth

Group	N	Mean	Std. Dev.	Min.	Max.
1 (low growth )	223	15.02	7.10	0.78	28.00
2 (moderate growth)	175	41.61	9.74	28.57	65.31
3 (high growth)	53	76.64	8.76	66.67	96.55
Total	1606	9.00	18.70	0.00	96.55
W0 = 1129.0 df (3, 1602) Pr > F = 0.000					
W50 = 907.7 df (3, 1602) Pr > F = 0.000					
W10 = 1011.3 df (3, 1602) Pr > F = 0.000					

Note: W0 if Levene's Test for equal variances, W50 replaces means in Leven's test by median, and W10 statistic replaces the mean by 10% trimmed means.

We conducted several statistical tests in order to confirm the differences between the three groups. The analysis of variance and Levene's test of variance homogeneity were applied. Since the null hypothesis of homogeneity was rejected, the Games-Howell's test was applied in order to check the differences between the means of the three groups. The results indicate that the three groups are significantly different in terms of relative employment growth.<sup>38</sup> Thus, our dependent variable consists of three categories: firms that experienced growth up to the median growth of the sample, those between the median and the 10 percent fastest growing firms in the sample, and the 10 percent fastest growing firms. The identical methodology was applied when other measures of growth such as bi and di were used. However only di showed a weaker variation in the mean of firm growth amongst three groups of firms compared to other indicators.

In addition to the previous approaches, it is possible to use ordered logit because it offers additional insight or information on determinants of fast growth.

Therefore, we estimate ordered logit model which has following general form:

$$Pr(outcome_j = i) = Pr(K_{i-1} < \beta_1 x_{1j} + \beta_2 x_{2j} + \dots + \beta_k x_{kj} + u_j \leq K_i)$$

j is possible outcome, i is the observation,  $u_j$  is assumed to be logistically distributed in ordered logit. We estimate the coefficients  $\beta_1, \beta_2, \dots, \beta_k$  (same variables as in previous models) together with cut-off points or thresholds,  $K_1, K_2, \dots, K_{k-1}$ , where k is the number of possible outcomes which in our case is three (k=3). The findings for three ordered logit regressions are presented in Table 3. In all three models the construction of the dependent variable is the same. However, the growth indicators on which ordinal dependent variables are based on different measures of growth to test whether the relationship is sensitive to different measures of growth and not. In model [1] ordinal dependent variable is based on relative growth, model [2] on Birch's growth distribution and model [3] on Davidsson's Index. The general interpretation of the ordered logit estimates are as follows: positive coefficients increase the chances that the subject (i.e. firm) will be observed in a higher category (high growth), and negative coefficients increase the chances of the subjects being observed in a lower category (low growth).

<sup>38</sup> Levene (1960) proposed a test statistic for equality of variance that was found to be robust under non-normality. Subsequently, Brown and Forsythe (1974) proposed alternative formulations of Levene's test statistic that use more robust estimators of central tendency in place of the mean. These reformulations were demonstrated to be more robust than Levene's test when dealing with skewed populations. Therefore we use the last version of Levine's test available in Stata command robvar (See, Rabe-Hesketh and Everitt (2007), p.50-51, for interpreting the tests).

**Table 3** Discrete change in the probability of categories of firms growth for the ordered logit model

Variables	$\Delta$ Change	[1]					[2]					[3]				
		Dependent Variable: % of growth					Dependent Variable: Birch's Index					Dependent Variable: Davisson's Index				
		Coef	$\Delta$	Low	Moderate	High	Coef.	$\Delta$	Low	Moderate	High	Coef.	$\Delta$	Low	Moderate	High
Firm related factors																
	$\Delta$ Range	-1.814***	0.659	0.989	-0.008	-0.981	0.103	0.016	-0.008	-0.015	0.024	-1.416***	0.622	0.917	0.016	-0.934
Insize	$\Delta$ 1		0.156	0.234	-0.191	-0.043		0.016	-0.008	-0.015	0.024		0.094	0.114	0.027	-0.142
	$\Delta$ $\sigma$		0.199	0.298	-0.241	-0.057		0.008	-0.004	-0.008	0.012		0.132	0.161	0.037	-0.198
	$\Delta$ Range		0.136	0.204	-0.166	-0.037		0.058	0.032	0.055	-0.087		0.101	0.122	0.029	-0.151
Inage	$\Delta$ 1	-0.348**	0.029	0.044	-0.036	-0.007	-0.373***	0.057	0.031	0.055	-0.086	-0.352**	0.023	0.027	0.007	-0.034
	$\Delta$ $\sigma$		0.024	0.036	-0.030	-0.006		0.028	0.015	0.027	-0.042		0.020	0.024	0.006	-0.030
urban	0-->1	0.274	0.025	-0.038	0.031	0.007	0.472**	0.076	-0.047	-0.068	0.114	0.185	0.013	-0.015	-0.004	0.019
mult_plant	0-->1	0.319	0.030	-0.045	0.037	0.008	0.397*	0.064	-0.038	-0.058	0.096	0.363	0.027	-0.033	-0.008	0.040
legal_form	0-->1	-0.324	0.024	0.036	-0.030	-0.006	0.098	0.015	-0.008	-0.015	0.023	-0.141	0.009	0.010	0.003	-0.013
buss_expec	0-->1	0.211	0.019	-0.028	0.023	0.005	0.218	0.034	-0.019	-0.032	0.052	0.196	0.014	-0.016	-0.004	0.020
buss_assoc	0-->1	0.040	0.003	-0.005	0.004	0.001	0.482**	0.078	-0.048	-0.069	0.117	-0.344	0.032	0.023	0.006	-0.029
credit	0-->1	0.452	0.044	-0.066	0.054	0.012	0.236	0.037	-0.021	-0.035	0.056	0.303	0.022	-0.027	-0.006	0.033
investment	0-->1	0.892***	0.099	-0.149	0.120	0.029	0.597**	0.097	-0.062	-0.083	0.146	0.663**	0.055	-0.067	-0.015	0.083
Human capital factors																
gender	0-->1	-0.978*	0.057	0.086	-0.073	-0.013	-0.404	0.058	0.028	0.059	-0.087	0.435	0.033	-0.040	-0.009	-0.050
	$\Delta$ Range		0.112	-0.169	0.140	0.029		0.003	-0.002	-0.003	0.005		0.110	-0.132	-0.032	0.164
ent_age	$\Delta$ 1	0.027**	0.002	-0.003	0.003	0.001	0.021*	0.003	-0.002	-0.003	0.005	0.039***	0.003	-0.003	-0.001	0.004
	$\Delta$ $\sigma$		0.021	-0.032	0.026	0.005		0.001	0.000	-0.001	0.001		0.023	-0.027	-0.007	0.034
ent_edu	0-->1	-0.210	0.016	0.024	-0.020	-0.004	0.004***	0.001	0.000	-0.001	0.001	-0.201	0.012	0.014	0.004	-0.018
	$\Delta$ Range		0.059	0.089	-0.073	-0.016		0.622	0.863	0.071	-0.934		0.147	0.070	0.016	-0.087
emp_edu	$\Delta$ 1	-0.622	0.052	0.078	-0.065	-0.013	-1.229***	0.185	0.103	0.174	-0.277	-0.749	0.183	0.059	0.014	-0.073
	$\Delta$ $\sigma$		0.014	0.021	-0.018	-0.004		0.246	0.144	0.225	-0.369		0.094	0.015	0.004	-0.018
emp_train	0-->1	0.684**	0.072	-0.107	0.087	0.020	0.235	0.037	-0.021	-0.035	0.056	0.535*	0.213	-0.052	-0.012	0.064
man_train	0-->1	0.079	0.007	-0.010	0.008	0.002	0.145	0.023	-0.013	-0.022	0.034	0.390	0.305	-0.036	-0.008	0.044
team	0-->1	-0.078	0.006	0.009	-0.008	-0.002	0.237	0.038	-0.021	-0.035	0.056	-0.275	0.016	0.019	0.005	-0.024

<b>External business environment factors</b>																
<i>taxes</i>	0-->1	-0.087	0.007	0.011	-0.009	-0.002	-0.278	0.041	0.020	0.041	-0.061	0.082	0.005	-0.007	-0.002	0.008
<i>admin</i>	0-->1	0.147	0.013	-0.019	0.016	0.003	0.409	0.066	-0.039	-0.059	0.099	-0.249	0.015	0.017	0.004	-0.022
<i>legal</i>	0-->1	0.129	0.011	-0.017	0.014	0.003	0.102	0.016	-0.009	-0.015	0.024	0.225	0.016	-0.019	-0.005	0.024
<i>strong_comp</i>	0-->1	-0.180	0.014	0.021	-0.018	-0.003	0.110	0.017	-0.009	-0.016	0.026	-0.202	0.012	0.014	0.004	-0.018
<i>unfair_comp</i>	0-->1	0.337	0.032	-0.047	0.039	0.008	0.093	0.015	-0.008	-0.014	0.022	0.385	0.029	-0.035	-0.008	0.043
<i>corruption</i>	0-->1	<b>-0.473*</b>	0.033	0.050	-0.042	-0.008	<b>-0.452*</b>	0.064	0.031	0.066	-0.097	-0.399	0.022	0.026	0.007	-0.033
<i>exte_fin</i>	0-->1	0.208	0.019	-0.028	0.023	0.005	-0.144	0.022	0.011	0.021	-0.032	0.036	0.002	-0.003	-0.001	0.004
<i>insuff_demand</i>	0-->1	0.112	0.010	-0.015	0.012	0.002	0.045	0.007	-0.004	-0.007	0.011	0.185	0.013	-0.015	-0.004	0.019
<b>Management/strategy and entrepreneurial orientation</b>																
<i>export</i>	0-->1	0.517	0.051	-0.077	0.063	0.014	<b>0.760**</b>	0.124	-0.084	-0.102	0.186	<b>0.659*</b>	0.055	-0.067	-0.015	0.082
<i>foreign_coop</i>	0-->1	-0.014	0.001	0.002	-0.001	0.000	0.015	0.002	-0.001	-0.002	0.004	-0.160	0.010	0.012	0.003	-0.015
<i>growth_orient</i>	0-->1	0.302	0.028	-0.042	0.035	0.007	0.056	0.009	-0.005	-0.008	0.013	0.344	0.152	-0.031	-0.007	0.038
<i>sep_own_cont</i>	0-->1	<b>0.615**</b>	0.063	-0.095	0.077	0.018	<b>0.437**</b>	0.070	-0.043	-0.063	0.106	<b>0.362</b>	0.027	-0.033	-0.008	0.040
<b>Control variables</b>																
<i>production</i>	0-->1	0.288	0.027	-0.040	0.033	0.007	0.229	0.036	-0.020	-0.034	0.054	0.207	0.014	-0.017	-0.004	0.022
<i>y03</i>	0-->1	0.302	0.028	-0.042	0.035	0.007	0.158	0.025	-0.014	-0.024	0.037	0.338	0.025	-0.030	-0.007	0.037
<i>y04</i>	0-->1	<b>0.837***</b>	0.092	-0.137	0.111	0.027	<b>0.719**</b>	0.117	-0.078	-0.098	0.176	<b>0.682*</b>	0.057	-0.070	-0.016	0.086
<i>Cut1</i>		-2.060					1.749					0.276				
<i>Cut2</i>		1.513					4.369					3.607				
<b>Model Summary</b>																
<i>Obs.</i>		434					434					434				
<i>McFadden's Pseudo R<sup>2</sup></i>		0.339					0.130					0.264				
<i>LR <math>\chi^2</math> test</i>		283.6***					107.7***					209.1***				
<i>Log Likelihood</i>		-275.69					-359.9					-291.16				
<i>Wald test</i>		157.9***					89.56***					133.2***				

Note: \*\*\*significant at 1%; \*\*significant at 5%; \* significant at 10%. : '0-->1 is a change from 0 to 1;  $\Delta 1$  centred change of 1 around the mean;  $\Delta \sigma$  is centred change of 1 standard deviation around the mean;  $\Delta$  Range is change from the minimum to the maximum. **Error! Objects cannot be created from editing field codes.** is the average absolute change. The LR  $\chi^2$  is a test that all the coefficients (with the exception of the cutponits) are zero

However, the computation and interpretation of marginal effects of independent variables in ordered logit is far more complex than in the simple binary logistic regression. As observed by Long (1997, 2001), because the interpretation using marginal effects can be misleading when the probability curve is changing rapidly or when an independent variable is a dummy the better solution is to substitute marginal effects with other measures such as discrete change in predicted probability which are more informative. In our ordered logit model the majority of explanatory variables are dummies so we have decided to use calculated discrete change in probabilities which are presented in Table 3.

Diagnostics tests presented in model summary suggest that the three models have high explanatory power and all passed the Wald test for joint significance of the parameters suggesting that explanatory variables in the model explain the variation in firm growth belonging to three categories: low, moderate and high growth. For each model the first column presents the coefficients obtained from ordered logit regression. Subsequently, an average change ( $\bar{\Delta}$ ) of probability presented in the Table 3 shows an average absolute change in the probability across all outcome categories (low, moderate, high). In addition, the second, the third, and the fourth column of models [1], [2] and [3] contain measures of discrete change in the predicted probability of particular independent variable being in one of the three categories. For dummy variables it measures the discrete probability when the variables change from 0 to 1, holding all other variables constant at their means. While for continuous variables it measures the change in discrete probability for a unit change centred around mean ( $1\Delta$ ), the change for a standard deviation centred around the mean ( $\Delta\sigma$ ) and the change when variables goes from its minimum to its maximum ( $\Delta$  Range) (see, Long, 2001, p. 137-170; Long, 1997, p. 114-147).

As can be seen in Table 3 not all discrete values have the same sign suggesting that the probability changes differently from one category to another which is the assumption of the ordinal regression models. Regression findings suggest that the factors that promote high growth outcomes are generally consistent across three models. If we look at ordered logit coefficients we can see that variables indicating the age of the firm, age of the entrepreneur, firms that made investment and the dummy for year 2004 remain with the same sign in all equations increasing the probability of firm being in higher growth category. Next, a second group of variables which entered significant in two out of three equations are variables indicating separation of ownership from control, exporter status, corruption and, finally, the incidence of employment training, all having positive impact on increasing the probability of being in high growth category, except corruption which is acting as a barrier. Other variables are statistically significant only in one equation therefore we will not consider them robust to measures of growth. One interesting finding is that variable indicating size of the firm (Insize) is very sensitive to the definition of growth, but surprisingly it enters statistically significant and negative in models in which the dependent variable was constructed to take into consideration the possible biases of the measures of growth, bi and di respectively. This reinforces the support for Gibrat's Law. We find weak support for the negative impact of the variable education of employees (emp\_edu), and the positive impact of the variable indicating location of firms in urban area – capital city (urban), geographical diversification (mult\_plant) and membership in business associations (buss\_assoc).

Discrete change in predicted probability for ordered logit. Here we will comment on the discrete probabilities for some of the variables that are significant in all three models (The same interpretation applies to all other independent variables):

- For each additional unit of change of age of the firm, the probability of being in high growth categories decreases by 0.007 in model [1], 0.086 in model [2] and 0.034 in model [3]. However, moving from minimum age to maximum age in the sample changes (decreases) the predicted probability of being in high growth category by 0.037 for model [1], 0.087 for model [2] and by 0.151 in model [3] holding all other variables constant at their means.
- For each additional unit of change of age of the entrepreneur (one year), the probability of being in high growth categories increases by 0.001 in model [1], 0.005 in model [2] and 0.004 in model [3]. However moving from minimum age to maximum age in the sample (i.e. from 18 to 70 years) changes (increases) the predicted probability of being in high growth category by 0.029 for model [1], 0.005 for model [2] and by 0.164 for model [3] holding all other variables constant at their means.
- A probability of being in high growth category is 0.018 higher for firms that divorced ownership from management in model [1], 0.106 higher for firms in model [2] and 0.004 higher for firms in model [3] respectively; holding all other variables constant at their means.

As can be seen the impact of the age of entrepreneur is really minor meaning that even if we change the year of entrepreneur from minimum to maximum it does not have an important effect on being in the high growth category as predicted probabilities almost remained the same. Apart from interpreting changes in predicted probabilities, an equally or even more important point to comment on is the variation of signs of discrete probabilities predicting each ordinal outcome. Findings show that (almost) all signs of the significant variables are the same for the first two groups (high and medium), while opposite signs are found in the estimations of the remaining group (low growth) in equations that are based on the percentage change of growth. On the other hand when we compare signs of discrete probabilities for statistically significant variables in the two other ordered logit regressions which are based on *bi* and *di* measures of growth we find a more clear cut findings i.e. different signs of significant variables for the first group (high growth) compared to remaining two groups of firms in moderate and low but positive growth category. Therefore, findings have two significant implications for this specific study and for others studies related to firm growth. First, related to our study findings suggests a basic split concerning the determinants of firms between high growth compared to moderate growth and those with low growth when using indices that account for size bias of the growth. Second, the findings have important implications for other studies concerned with firm growth suggesting that *bi* and *di* are better in defining high growth firms in the sample. Finally, the findings show that empirical results are to some degree sensitive to the definition of growth at least with regard to employment growth. This implies that future studies should account for these methodological drawbacks as majority of them do not use more than two indicators of growth (usually comparing absolute with relative growth) regardless the use of different proxies for growth (such as sales or profit). Ignoring them might lead to biased results.

### 3. Conclusions and policy recommendations

This paper investigated the determinants of small firm fast growth empirically. The large dataset based on Riinvest SME Surveys was employed to estimate the influence of a variety of factors affecting small firm growth. The statistical overview shows that small businesses which also represent the whole of the private sector in Kosova, and especially the FGFs, play a dominant role in economic development.

The econometric analysis provides a clearer picture of the main determinants of small firm growth in Kosova. The empirical analysis found that four groups of factors have an influence on firm growth: firm related factors, human capital factors, management strategy and entrepreneurial orientation of the firm and external business environment factors. Amongst

the firm level factors the size of the firm, operating in more than one plant and in more than one location, and operating in the capital city are significant variables in explaining the firm growth. Variable size was significant and has negative sign in the majority of specifications, regardless whether the absolute growth measure or relative growth measure is employed. Suggesting that Gibrat's Law holds meaning that small firms grow faster than larger firms. Firms located in the capital city are more likely to experience higher growth rates than other firms. Also firms that operate two or more plants experience higher growth than other firms in the sample. The separation of ownership and day-to-day management activities has a positive influence on the growth of the firm. This urges the need that owner managers should enhance their managerial capabilities by bringing new professional in their firms in order to support growth.

There is a weak relationship between the number of founders and the growth of the firm while no evidence was found to indicate that firms operating as limited liability companies grow faster than other firms, and membership in business association does not seem to have an impact on growth of the firm.

Amongst the firm's human capital characteristics the most significant variables explaining the growth of the firm are owner/manager's and employees' training. On the other hand, the gender and education of the owner/manager does not seem to have an influence on the growth of the firm, while employees' education has a negative impact. Even though it was argued that the growth of the SME sector in transition countries is primarily impeded by several business environment obstacles, our evidence provided support for only two of them: strong competition and financial barriers. This suggests that 'strong competition' and 'external finance' have negative impact on growth of the firms i.e. firms who perceived the 'strong competition' and 'external finance' as the most intense barriers when the whole sample was considered. On the other hand, when FGFs are the focus of empirical work, corruption replaces external finance as a barrier to growth. Export status is another variable to affect growth of the firm positively while foreign cooperation does not seem to be significant. The analysis also does not provide evidence that firms in production sector grow faster than other firms belonging to services and trade. Also the year dummies were insignificant.

To conclude analysis of growth by focusing on different levels of growth by employing different measures of growth based on Birch's Index and Davidsson's Index and other measures constructed for the purposes of this study. Several important conclusions emerge. First, we find support for three mainstream firm growth theories Gibrat's law, Jovanovic Learning Theory and Life Cycle Theory (amongst the key variables in explaining the probability of high growth, in addition to age and size, are the separation of ownership and control). On the other hand we find weak support for human capital theory meaning that firms that grow faster are associated with higher likelihood of having trained their employees particularly those who hold managerial positions in order to compensate for low quality of labour (possibly indicating quality of education in Kosova) to support the growth of the firm in different stages of growth trajectory as postulated by life cycle models.

Taken together, this paper contributes to the literature by bringing together a broad spectrum of variables, methods, measures of growth and applying them to a small firm dataset. Viewed from a theoretical perspective the analysis suggests that internal and external factors are both important in explaining small firm growth patterns. Unlike other studies in TEs that overlooked internal factors, the findings suggest the benefits of using an 'integrative model' and a 'mixed approach' in investigating small firm growth. As noted by Morrison et al. (2003) a key distinguishing feature of the growth of small business is a balanced alignment of the owner-managers' intention, the abilities of the business and the opportunity environment. Viewed from a methodological angle, the implication for other studies in the field is that one should control for different measures of growth in order to avoid methodological biases.

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## APPENDIX

**Table 1** New employment generation by size cohort (2002-2004)

	Abbreviation	Measuring	Definition	Expected sign
Dependent variables	growth_rg	Percentage change in number of employees	$rg_t = \frac{E_t - E_{t-1}}{E_{t-1}}$	
	ordered_bi	Ordinal outcome for three categories of growth based on Birch's Index. The three categories are as follows: low, medium and fast growing firms	$bi = (E_t - E_{t-1}) \frac{E_t}{E_{t-1}}$	
	ordered_di	Ordinal outcome for three categories of growth based on Davidsson's Index. The three categories are as follows: low, medium and fast growing firms	$di = \frac{(E_t - E_{t-1})}{\left(\frac{E_t + E_{t-1}}{2}\right)}$	
Firm related factors	age	Age of the firm	Years since start-up	-
	size	Size	Number of employees at the beginning of the year	-
	urban	Location of firm in capital city	Dummy 1= if firm is located in capital city, 0=otherwise	
	mult_plant	Firms that operate more than one plant	Dummy 1= if firm owns more than one plant, 0=otherwise	+
	investment	Investment	Dummy 1=firm made investment, 0=otherwise	+
	buss_expec	Owners/manager's expectations regarding business prospects in the future	Dummy 1=if firm expects better business Prospects in subsequent year than in previous year; 0=otherwise	+
	credit	Financing	Dummy 1=firm received a credit; 0=otherwise	+
	legal_form	Legal form of business	Dummy 1=if firm is limited liability, 0=otherwise	+
Human capital factors	buss_assoc	Membership of business associations	Dummy 1=if firm is a member of any business association; 0=otherwise	+
	emp_edu	Education of employees	Proportion of employees with at least high school education	+
	ent_edu	Education of owner/manager	Proportion of owners and managers with at least	+

External business environment factors	emp_train	Employees' training	high school education Dummy 1= incidence of employee training, 0=otherwise	+
	man_train	Owner/ manager's training	Dummy 1= incidence of owner/manager training, 0=otherwise	+
	ent_age	Age of the entrepreneur	Age of the owner (or average age of owners when more than one owner) in years	?
	team	Entrepreneurial team at the start-up	Dummy 1=if firm was funded by more than one owner, 0=otherwise	+
	gender	Gender differences	Dummy 1= if firm is owned by male, 0=otherwise	+
	taxes	Taxes	Dummy 1= if entrepreneur ranks level of taxes as a major obstacle to operation and growth of business, 0=otherwise	-
	admin	Effect of administration procedures and bureaucracy	Dummy 1= if entrepreneur ranks administrative procedures as a major obstacle to operation and growth of business, 0=otherwise	
	unfair_comp	Unfair competition	Dummy 1= if entrepreneur ranks unfair competition as a major obstacle to operation and growth 0=otherwise	-
	strong_comp	Strong competition	Dummy 1= if entrepreneur ranks strong competition as a major obstacle to operation and growth of business, 0=otherwise	-
	exte_fin	Availability and conditions of external finance	Dummy 1= if entrepreneur ranks availability and conditions of external finance as a major obstacle to operation and growth of business, 0=otherwise	-
	legal	Laws and legislation	Dummy 1= if entrepreneur ranks legal environment as a major obstacle to operation and growth of business, 0=otherwise	-
	corruption	Corruption	Dummy 1= if entrepreneur ranks corruption as a major obstacle to operation and growth of business, 0=otherwise	-
	insuff_demand	Insufficient demand	Dummy 1= if entrepreneur ranks insufficient demand as a major obstacle to operation and growth of business, 0=otherwise	-
	Management/Strategy and export	Searching for new markets and	Dummy 1= if firm exports, 0=otherwise	+

[entrepreneurial orientation]		expansion		
	foreign_coop	Foreign cooperation	Dummy 1=if firm has permanent foreign partner, 0=otherwise	+
	growth_orient	Plan for growth of the firm ( no of employees)	Dummy 1=if firm plans to increase the number of employees in the future, 0=otherwise	+
	sep_own_cont	Managerial capabilities and development of professional managers	Dummy 1= if ownership and management are separated, 0=otherwise	+
Control Variables	production	Production sector	Dummy 1= if firm operates primarily in production sector, 0=otherwise;	+
	services	Services sector	Dummy 1= if firm operates primarily in services, 0=otherwise;	+
	y04	Year 1	Dummy 1= for 2004, 0=otherwise	?
	y03	Year 2	Dummy 1= for 2003, 0=otherwise	?
	y02	Year 3	Dummy 1=for 2002, 0=otherwise	?

# Gender Differences in Entrepreneurial Self-Efficacy

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Women entrepreneurship is defined as business activity which takes place in the company that is at least 51% owned by a woman, who also controls and leads the company. Despite of numerous studies and researches proving that there are some similarities between men's and women's entrepreneurship, some ongoing discussions are still taking place in the practitioners' and scientists' agendas. By adding a new perspective to these discussions, the purpose of this study was to test gender differences in entrepreneurial self-efficacy. The research is based on the use of two different instruments. One is a 22 items scale (Chen, Greene and Crick, 1998) that measures self-efficacy in marketing, innovation, management, risk and finances domain. The other is a 6 items scale (Linan and Chen, 2006) that measures general entrepreneurial self-efficacy. The sample of 107 male and 92 female students from the University of Applied Sciences VERN' (Zagreb, Croatia) was tested at the ending of their undergraduate studies (Entrepreneurial Economics). In addition, data on their grades were collected, and they were asked whether they had entrepreneurial role model in a family or close surrounding and whether they had entrepreneurial intentions (Linan and Chen, 7 items scale, 2006). The results showed that although male and female students all went through the same entrepreneurial education, and had similar family backgrounds regarding entrepreneurship; women have less entrepreneurial self-efficacy on the general measure. No significant differences were found on the other, more specific measures. Also, although female had better average grades on Business Module subjects (as well as on the other modules), men planned entrepreneurial career for themselves significantly more often than women. Practical implications from these findings are being discussed. The sample of 199 students was relatively small, taken at the institution where the entrepreneurship is a major topic. In order to expand research significance, future research should include repeated test/research of similar sample, and comparison with the results of similar tests given to the sample of students of non-entrepreneurship university programs. The main value of this study is in its uniqueness in Croatia, and even wider, considering the fact that two different measures of entrepreneurial self-efficacy were used. The fact that our male and female participants come from similar entrepreneurial backgrounds, makes them very comparable, and these findings even stronger. This study can serve as a basis for further, in-depth research which will help in gaining deeper understanding about gender dimension in entrepreneurship. Consequently, the findings will ultimately serve as basis for re-thinking support programs aimed to strengthen women entrepreneurship.



## Keywords

Entrepreneurial intentions, Gender dimension, Self-efficacy, Women entrepreneurship

## 1. Introduction

Despite of numerous studies and researches proving that there are some similarities between men's and women's entrepreneurship, some ongoing discussions are still taking place in the practitioners' and scientists' agendas. The fundamental question for debate is: Are men more self-efficient than women? By adding new perspective to these discussions, the purpose of this study is to test gender differences in entrepreneurial self-efficacy.

Women entrepreneurship is defined as an *"entrepreneurship which takes place in enterprises (economic entities) in which the minimum amount of 51 percent is owned by a women, who also controls and manages the company"*. [1] The concept of women entrepreneurship is often contrasted to the concepts of the *universality of entrepreneurship*, *requests for gender-blind policies*, and other similar barriers encountered in promoting and studying women entrepreneurship. [2]

Although women make up more than half the world's population, the predominance of men in the work area in general (including entrepreneurship) is present regardless of how well-developed the society is. The biggest differences are evident in societies with medium economic power, where the ratio of male entrepreneurs amounts 75%, compared to female entrepreneurs' share of 25%, as opposed to 33% of women entrepreneurs in economically high-developed societies or 41% in countries with low economic power. [3]

In addition, the results of Global Entrepreneurship Monitor (GEM), as the largest ongoing study of entrepreneurial dynamics in the world since 1999, show that the range of women's participation in the total number of enterprises ranges from 16% in the Republic of Korea to 55% in Ghana [4].

Since its first involvement in the Global Entrepreneurship Monitor survey in 2002, Croatia has made significant progress: ranked on 32<sup>nd</sup> position (out of 37 researched countries) in 2002. year to 24<sup>th</sup> position (out of 43 countries) in 2008, measured by the TEA index (Total Entrepreneurial Activity), which shows the number of new business ventures per 100 adults. TEA index for Croatia was 3.62% in 2002, and 7.59% in 2008. Entrepreneurial activity measured by the TEA index is gradually growing in Croatia, although in all the years below the average for the countries involved in GEM research.

However, the recession has hit the entrepreneurial capacity in Croatia: TEA in 2010 was 5.5%, and Croatia took the 45<sup>th</sup> place (out of 60 countries included in GEM). Major problem remains the low level of entrepreneurial activity due to perceived opportunities, and huge regional differences (e.g., TEA index in the capital city of Zagreb is 7.06, while in the eastern region Slavonia and Baranja, the index is only 3.95). Croatia has a very low level of entrepreneurial activity based on the perceived opportunity, as the ratio between TEA Opportunity and TEA Necessity Index in all years is below the average for all countries involved in the GEM study.

Furthermore, Croatia has a considerably larger gap between the entrepreneurial activity of men and women than other countries involved in the GEM study.

**Table 1** The gender breakdown of TEA index (Total Entrepreneurial Activity) in Croatia

Index / year	2002	2003	2004	2005	2006	2007	2008	2009	2010
TEA	3.62	2.56	3.74	6.11	8.58	7.27	7.59	5.6	5.52
TEA men	5.4	3.69	5.76	9.78	12.35	9.44	10.76	8.4	7.15
TEA women	1.83	1.42	1.74	2.58	4.87	5.13	4.47	2.8	3.91

The Table 1 presents a gender breakdown of TEA index in Croatia, and shows ratio quite unfavourable to women entrepreneurship - there are three times more men than women entrepreneurs in Croatia.

The entrepreneurial behavior of both men and women is affected by very similar factors; however, there is no perfect match in the reaction. In addition, there is significant fluctuation of women's participation in entrepreneurial activity across countries participating in the GEM project. This implies the existence of gender differences in entrepreneurial processes, and a variety of different factors that affect the start-up processes in both rich and poor countries.

It is still an insufficient number of women in Croatia, which is involved in entrepreneurship. It is estimated that women own only 30% of all ventures in Croatia, and it is considered to be a similar (inferior) ratio at small and medium-sized companies. Reducing the disparity between male and female entrepreneurship is one of the preconditions for the development and expansion of SMEs. The projection has been made that if the women are in the same extent as men engaged in entrepreneurship in Croatia, it would be more than a hundred thousand new businesses.

## 2. Literature Review

Some studies show that even with the control factors such as education, experience, family status, work motivation, wage sectors in the industry, position and sequence of career, women reported a lower level of entrepreneurial intentions. [5]

Interest in researching women's entrepreneurship is somehow behind the ongoing research projects on male entrepreneurship, which partly stems from the stereotype that women entrepreneurs are less qualified, less competent and possess less entrepreneurial ambitions. It also comes from the fact that women's enterprises are usually small, and cover a narrower range of activities, which ultimately leads to lack of interest in research institutions to conduct such sponsored research. [6]

The first research of women entrepreneurship started in the seventies of the last century in Canada, United Kingdom and the United States of America. From the beginning, they have considered a gender as one of the variables, and the purpose of such an approach was to determine who women entrepreneurs are and if there were some significant differences between them and male entrepreneurs. One of the studies provided information about women entrepreneurs having in general higher education, but to a lesser degree having specific work experience before entering into private own business. [7]

The motivation for starting the work proved to be similar for both genders (more control), but the women mention *the uncertainty in the labor market with low wages*, the *rejection of gender stereotypes*, the *desire for more flexibility* in their work [7], the *effect of the glass ceiling* (untouchable barriers and obstacles to advancement in professional carrier), and the *conflict of family and professional roles*. [8]

More research involving the assessment of gender roles where women entrepreneurs are the ones often achieved better scores on the masculine characteristics (such as autonomy, aggression, independence and leadership), rather than feminine characteristics (such as support, conformity and benevolence).[9] Some researchers have even brought in a relationship birth order and entrepreneurial inclinations, and found that women entrepreneurs are often a significant first-born child or an only child, or children who have had special attention to the environment which allowed them to develop self-confidence [10] Research features such as locus of control, risk aversion, openness to innovation, achievement, aggression, etc. are not given significant differences between the genders. Therefore, the researchers are led to the conclusion that women entrepreneurs are *a special kind of woman, more like entrepreneurs than other women*. [7]

The research focus in this area changed during the nineties of the last century, and turned to the questions: why women become entrepreneurs, what affects the growth and development of their enterprises, and how various states affect the growth of women entrepreneurship? [11] Apart from differences in numbers of companies (representation), gender differences are also evident in the nature of women's enterprises, which are mostly involved in sales and service activities. Also, women's enterprises were generally smaller, with fewer employees. [12] This inequality can be interpreted in different ways. Some studies confirm that women entrepreneurs, while conducting their affairs, receive less social support from their environment, both from their own families and the wider environment. Brush (2006) [11] reported that fewer men entrepreneurs participate in and support the activities of their entrepreneurially oriented wives, comparing to the opposite situation when wives support their husbands-entrepreneurs to broader extend. Also, women entrepreneurs get less financial support from institutions and private investors for their development of their businesses. Chaganti and Parasuraman [13] believe that women have different business strategy than men in similar jobs, where they place more emphasis on the quality of services/products, then to cost adjustment and reduction. In other words, women place much bigger emphasis on the intangible aspects of running a business than men. [12] Also, differences in the motivation of entering into entrepreneurship, in particular the need to balance private and professional lives can hinder a woman in complete dedication to the job. In parallel with the new focus in the study of women's entrepreneurship, an interest in the concept of entrepreneurial self-efficacy (ESE) started to develop among researchers. This concept has proven its significance in prediction of entrepreneurial intentions [14] and many authors in this field look for the cause of gender differences in entrepreneurial behavior. Wilson et al. [15] examined gender differences in ESE among both high school and MBA students, and in both samples female respondents had lower ESE and entrepreneurial intentions than male respondents. Betz and Hackett [16] found that high school female students have lower self-efficacy for non-traditional (manufacturing, construction, high technology) than for traditional occupations (sales, services), while high school male students have the same self-efficacy in both groups, which explains the higher number of female-owned enterprises in these, traditional areas.

It seems that the ESE is particularly important in explaining women's entrepreneurship. Kickul et al. (2008) [17] found that ESE has a stronger effect on entrepreneurial intentions of a teenager girls than it is for teenager boys, which is consistent with Bandura's (1992) [18] findings that women frequently limit their career decisions due to a lack of faith in their own abilities. That is, women have lower expectations of their own success in a number of different professions, especially those that are traditionally considered male, including entrepreneurship.

Marlin and Wilson (2003) [19] according to Kickul et al., (2008) found that teenagers believe that success in the business world depends on the success in the fields of finance and work with numbers, in which the girls assess themselves worse than boys. These differences, however, do not reflect real differences in abilities. Kourilski and Walstad [20] (1998), according to Wilson et al. (2007) compared the *subjective assessment* of their knowledge with *actual knowledge* of entrepreneurial skills among young girls and boys. The study showed no gender differences in the current state of knowledge, but the girls have perceived their knowledge significantly lower than the boys have estimated theirs. This trend continues into senior years. For example, Hollensheald and Willt (2000) [21], according to Kickul et al., (2008), found that even 45% of women versus only 19% of men suspected in their mathematical abilities, indicating that as the main reason for not continuing with their MBA education.

Interestingly, however, that if compared the ESE of the current (and even nascent) entrepreneurs, gender differences would not be identified, which again supports the already mentioned hypothesis that women entrepreneurs are *different types of women*, closer with their characteristics to male entrepreneurs than to other women. [14] Similarly, studies of

Wilson et al. (2004), [22] showed that female adolescents interested in entrepreneurship don't have ESE lower than male adolescents with the same interests, which suggests that ESE might be a predisposing factor or something that one brings from his/her own family.

Given the fact that the *personal experience* is the one of the main sources of the self-efficacy theory, the question is whether women have equal opportunity to gain relevant business experience, and, if so, whether these experiences make the same/similar influence on the development of self-efficacy of women and men. Kickul et al. (2008) [17] also found that previous work experience have a significant impact on the ESE for teenage boys than they have with a teenager girls.

Another important choice within the concept of self-efficacy is the *learning by model* experience, based on observation of the behavior of another person and the consequences of that behavior. Sherer et al. (1989) [23] found that the existence of parent-entrepreneur increases the ESE in male children significantly more than in female children. Georgellis and Wall (2004) [24] state that having a parent-entrepreneur, has a strong positive effect on self-employment of the son. That effect is particularly strong if the father is the one who is an entrepreneur, which suggests that entrepreneurship is taught as part of the male gender roles in business-owners families. However, Kickul et al. (2008) [25] found that the presence of a parents-entrepreneurs has a direct and significant effect on entrepreneurial intentions among girls, but not for boys. Therefore, it seems that there are different patterns of action of various sources on entrepreneurial self-efficacy and entrepreneurial intentions among women and men.

So, one of the key questions is if education can affect the increase in ESE and reduce gender differences in entrepreneurial activity. According to Bandura [18] the answer is positive, in particular through providing opportunities for direct experience with entrepreneurship, which constitute a major source of ESE.

However, research in this area did not give consistent results. For example, Peterman (2002) according to Wilson et al. (2007) [26] found that the attendance of entrepreneurial training increases the perception of the feasibility of starting own business, particularly for those respondents who positively evaluate their education experiences. Another study resulted with the findings about the interaction of effects between the gender and the entrepreneurship education, indicating that the education/training increases ESE more at women than at men. [22]

As it has been already mentioned, women entrepreneurs often enter into their own entrepreneurial business with higher educational attainment than men. It has two-folded role: it serves as a further proof of their caution and a self-criticism, but also as a need to comfort their uncertainty through formal confirmation of their knowledge, or through formal schooling. Men are apparently receiving sufficient input with informal learning achieved within the family business. However, regardless of the validity of this hypothesis, these findings indicate the importance of entrepreneurship education, which will be both gender sensitive and provided in a timely-manner. It should start before the girls gain impression and/or belief that entrepreneurship is not a suitable option for them.

### 3. Goals and Methodology

Main goal of the research was to determine whether there are differences in entrepreneurial self-efficacy between male and female students of the same undergraduate study program Entrepreneurial Economics, while examining their academic successes in basic entrepreneurship/business courses. Their entrepreneurial intentions were also examined, so as the existence of entrepreneurial family background.

The research is based on use of two different instruments. One is a 22 items scale (*Chen, Greene and Crick, 1998*) that measures self-efficacy in marketing, innovation, management, risk and finances domain. The other is a 6 items scale (*Linan and Chen, 2006*) that

measures general entrepreneurial self-efficacy. The sample of 107 male and 92 female students from the University of Applied Sciences VERN' (Zagreb, Croatia) was tested at the ending of their undergraduate studies in Entrepreneurial Economics. In addition, data on their grades were collected, and they were asked whether they had entrepreneurial role model in a family or near surrounding and whether they had entrepreneurial intentions (*Linan and Chen, 7 items scale, 2006*).

## 4. Results and Findings

The results showed that although male and female students all went through the same entrepreneurial education, and had similar family background considering entrepreneurship; women have less entrepreneurial self-efficacy on the general measure.

Main results are shown in the Table 2 Gender differences in entrepreneurial intentions, self-efficacy (2 measures), grades and entrepreneurial family.

**Table 2** Gender differences in entrepreneurial intentions, self-efficacy (2 measures), grades and entrepreneurial family

<b>VARIABLE Gender</b>	<b>N</b>	<b>Sum</b>	<b>Std. Deviation</b>	<b>t-test</b>	<b>Sig. (2- tailed)</b>
Entrepreneurial intentions Women scale (Linan and Chen, 2006) Men	92 107	21,90 24,45	6,189 5,156	-3,166	,002
Business module grades Women coefficient Men	92 107	1,3947 1,2751	,27436 ,29673	2,933	,004
Entrepreneur in a family Women (0=no; 1=yes) Men	92 107	,80 ,85	,399 ,358	-,859	,391
Entrepreneurial self- Women efficacy scale 1 (Chen, Green and Crick, 1998) Men	92 107	81,07 81,93	14,472 11,607	-,860	,642
Entrepreneurial self- Women efficacy scale 2 (Linan Men and Chen, 2006)	92 107	21,89 23,45	4,394 3,702	-1,557	,007

Also, although women have better average grades in business module subjects (as well as in the other modules) they have less entrepreneurial self-efficacy on the second, more general measure. This measure includes items like *"I believe I would be completely unable to start a business"* or *"Starting a firm and keeping it viable would be easy for me"*. No significant differences were found on the other, more specific measure which includes self-appraisal on very concrete business/start-up knowledge and skills like *"I'm able to perform financial analysis"* or *"I'm able to create new market or territory"*.

Although, information on respondents' prior level of ESE was not tested at the beginning of their study, it can be assumed that learning business/entrepreneur subjects helped respondents in raising specific EPE. In this specific measure no gender differences were found, therefore it would have been more influenced by studying. Another assumption is that general level of ESE measured by other instrument(s) would be influenced by study, but, as it was found out, to a lesser extent with female students.

The same effect was visible on entrepreneurial intentions. Female students also had (a) an initial interest in entrepreneurial economics; they have (b) entrepreneurial role models in their

families and probably have (c) social, financial and other relevant support for start-up (as their parents are paying expensive scholarships). Furthermore, they have got (d) positive feedback from their teachers (i.e. visible through their grades). However, they are still reluctant to start their own firms. What is holding them back? Therefore, more in-depth research was needed in order to determine their arguments "why not" entering into entrepreneurship. Some of the possible reasons include the following: (1) are they hearing different things while being taught, (2) are they remembering just negative sides of entrepreneurship, or (3) are they just planning different scenarios for their lives which put private life as the most important focus?

They are taught that the entrepreneurship is a 24/7 type of job. Is it ever possible to expect women to be equally willing to sacrifice their private time or family time in order to manage a successful business? Is it reasonable (or even moral) to expect them to be secondary parents to their children so they can have time and energy to develop a business? Or are expecting even more of them, while sending them a message that wanting a successful private life is not an "excuse" for not running a successful business at the same time? Is that the direction our educational efforts should go - persuading women that they must put their career goals as high as men do? Are we not creating new prejudices with that? One issue is to create a discrimination-free environment (same financial, educational, social, economic opportunities) and the other is to force women to be the same as men.

Besides measuring what education does to entrepreneurial self-efficacy (that is measuring ESE at the beginning of a study and at the ending), a follow up study is also needed. The next round of questions should include the following ones: Who actually becomes an entrepreneur? What happens to ESE several years after education, and are there similar gender differences trends?

## 5. Further Research

Since the sample of 199 students was relatively small, and it is taken at the institution where the entrepreneurship is a major topic, it will be necessary to expand research significance. In addition to introduction of measuring self-efficacy at the beginning and at the end of the studies, future research studies should include repeated research of similar sample, and comparison with the results of similar tests on the sample of students attending non-entrepreneurship university programs.

The main value of this study is in its uniqueness in Croatia, and even wider considering the fact that two different measures of entrepreneurial self-efficacy were used. The fact that male and female respondents come from similar entrepreneurial background, makes them very comparable, and these findings even stronger. This study can serve as the basis for further, in-depth research which will help in gaining deeper understanding about gender dimension in entrepreneurship. Consequently, the findings will ultimately serve as basis for re-thinking support programs aimed to strengthen women entrepreneurship, get concrete results through education and other programs, and in general - better promote women entrepreneurship.

In an attempt to answer to the questions on what can be done to promote women entrepreneurship and how to assist the implementation of concrete results, one is often imposed to a number of considerations that most effectively respond to it. Following are the most important ones - long-term activities, or "dealing with the causes", which include clarification of the three key reasons why there is a lack of involvement of women in entrepreneurship:

- a) Lack of public support which allows women to easier make decision about entering the world of entrepreneurship
  - A lack of nurseries and kindergartens, especially those with flexible working hours,

- Change of focus of the media to support business, as opposed to emphasizing the traditional role of women in the family, and reducing its role to the mother, wife or housewife,
- Promotion of partnership in the family and the division of labor,
- Promotion of successful business women ("role models"),
- b) Insufficient financial incentives and support - lack of diversity of funding sources as opposed to conventional mortgages, which are for many women, due to the lack of real estate ownership, still elusive,
- c) Lack of appropriate channels for the flow of information relevant for (future) entrepreneurs, training programs for beginners, available counseling programs, access to various networks and funding sources. Although such programs exist, there are not enough of them, and, moreover, they are not equally available to all women in Croatia.

## 4. Recommendations

Promotion of women entrepreneurship and further understanding of gender differences in entrepreneurial self-efficacy may be facilitated through support of the advocacy and lobbying activities of existing associations of business women and/or entrepreneur associations in their efforts to introduce gender mainstreaming in (self)employment policies (e.g. preparing women-politicians to effectively influence budget debates in the parliament, support the adoption of legislations which support women's entrepreneurship, etc.). Furthermore, facilitation of exchanges of experiences between successful entrepreneurs and beginners through mentoring, presenting success stories and learning from own mistakes, different types of training for both the promoters of women's entrepreneurship and for the women entrepreneurs, access to media in order to promote issues relevant to strengthening women's entrepreneurship, etc.

A variety of grant programs, in direct response to very specific needs of women entrepreneurs, should be offered in broad cooperation of national, regional and local partners and their existing or planned activities:

The education and training institutions should offer programs and exchanges, thus enrich current training portfolio, and create prerequisites for entrepreneurial self-efficacy of new and current women entrepreneurs through:

- workshops on topics chosen by the target groups of women, in accordance with available expertise and the importance for job creation,
- study tours, field trips (e.g. organized visits to business incubators), thematic tours (e.g. women from economically disadvantaged areas to visit developed areas in order to get an insight into a comprehensive set of infrastructure designed to support women's entrepreneurship),
- support for networking, in cooperation between civil society organizations (e.g. involved in social entrepreneurship) and respective local and regional networks of entrepreneurs,
- support initiatives and programs directed at providing training and information needed to launch business activities in a safer way,
- guarantee schemes for obtaining the initial capital (loans) in close collaboration with a successful local programs of this kind (micro credits, loans, equity capital, etc.),
- introduction of new and innovative ways of financing growth (business angels, venture capital, leasing, factoring and other etc.),
- encouraging women to enter into clusters,
- promotion of business incubators services for start-ups,
- obtaining accurate and high quality information through info-points (e.g. web pages, etc.) or by using existing commercial offices, business centers, business areas or

departments of the Ministry for working with specific needs, issues and questions of entrepreneurs (both the new ones and the established ones),

- activities aimed to promotion of exports (e.g. participation in various trade fairs),
- assistance in obtaining free or subsidized consultancy services of foreign and domestic consultants,
- providing an opportunity to women entrepreneurs to participate in conferences and forums, which can help them while developing their businesses, and
- promoting issues of importance to women's entrepreneurship and entrepreneurship in general (networking, etc.).

## 6. Conclusions

The goal of this paper is to help stakeholders to recognize the need to increase efforts aimed to increase entrepreneurial self-efficacy of women and encourage them to enter in bigger numbers into entrepreneurship. As women entrepreneurs contribute to their societies, all efforts aimed towards empowering them and equipping with the necessary skills, self-confidence and capabilities needed for starting-up and managing entrepreneurial ventures within supportive environments are of utmost importance for the society aiming to grow and provide prosperity to its citizens.

Since there is a full scope of motives for entering into entrepreneurship – from necessity (due to unemployment, frustration with the current underpaid job, existence of glass ceiling, the impression that "women must work harder and better to be equal", under-appreciated contributions, etc.), to the perceived opportunity, it is key to develop support programs in increasing entrepreneurial self-efficacy of current and future women entrepreneurs.

Some positive trends, such as (a) growing number of highly educated women who opt for entrepreneurial ventures, (b) importance of soft (sometimes called "feminine") skills (*communication skills, time management, team work, setting priorities and establishing a balance among the objectives, etc.*), (c) expansion to global markets, (d) fight against poverty and (e) visibility of successful entrepreneurs-role models, are providing valuable impulses to expect better representation of women entrepreneurs in the future.

Perceptions of growing cultural and social support to women entrepreneurship, and increased support to self-efficacy of women entrepreneurs, have major impact, although somewhat less than positive personal situation. While women in rich countries are investing in businesses as a result of their choices, women from poorer countries prefer employment in other's firm more than self-employment at their own company. However, the efforts towards higher standard of living change roles of women: from being just an observer to becoming active participants in the economic arena.

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# Evaluation of the Performance of Employees

*Afrim Loku, Lindita Mehmeti*

One of the most important issues and specifically on the issue remains without doubt the Performance Assessment. Through this paper work we shall provide an instruction institution business about the importance of performance evaluation in improving the quality of capital human resources. Our approach will be mainstreamed into the presentation of ideas and best practices in Human resource planning. Define the resources needed to become enterprises in order to achieve the objectives of the analysis enterprise. Process of the strategy is essential to identify the availability and need, so that the enterprise is ready to achieve the goals set.

## Keywords

Performance, Evaluation, Analysis, Human Resource

## 1. Introduction

The purpose of performance evaluation is to find strengths and weaknesses of employees.

Results are seen primarily by Human resources and discussed with staff during the evaluation process. This process includes standards to assist in comparing the performance of the employees. Measuring performance is a process that takes time and effort by the managers of the company. In many companies promotions or ranks of the employees are based in comparing actual performance to the desired one.

Performance assessment is the process by which employees of an institution may reflect, discuss and change behavior. At the institutional level process enables the systematic collection of data about individual performance. If done correctly, creates Performance Evaluation of the culture of justice, and supports continuous improvement of the standards set.

Not all employees understand the importance of the assessing the performance, considering it as a routine request to the company, showing lack of the interest for cooperation of minimal involvement. We will address some basic tips that can stimulate and clarify the involvement of employees in the performance evaluation and the benefits they receive as a result. Performance evaluation should be treated as a continuous process of the development in more than just a formal annual review. The whole process should be closely monitored both by employees and by assessors to ensure in this way that objectives are archived if we wish to cooperate demonstrate more assessors to develop your role, you will create a positive impression.

To assess your performance as objectively as possible, we should try to see it from the perspective of the manager. Need to make sure if you are familiar with the rules and procedures for evaluation of the company. Lodge step by step documentation of performance assessment, to prepare for and respond to your comments.

The transformation of our society into an information society, knowledge and experience of employees of an institution will affect the future and its reputation. In service of the goal, each institution's main objective is to develop and implement policies and procedures for development and motivation of human resources, in order to achieve the objectives of the institution.

In cooperation with other departments Human resources Department provides personnel needs and according to their institution and objectives, plans consistently human resources.

With the announcement of a free place to work, employment in the procedure, taking care to create equal conditions of employment and to avoid discrimination at work. Based on the results achieved by employees working models of career personnel through the adoption of policies efficient for rotation at work. To create an environment that offers professional growth, motivation and a challenge for continuous improvement, the Department should pay special attention to the preparation of programs and promoting the diversity of training and specialized training for employees, in accordance with tasks will arrive. He also prepares and administers social policy institutions. In this regard, provides programs for economic relief and health care to its employees, and organizes various cultural activities and artistic and athletic staff.

## **2. Evaluation of Performance**

One of the most important issues in human resource management is to assess the performance of the employees (staff, managers). This is the organizational issues and managerial. Is issuing, because made organizational planning, organization, leadership, direction and control of managers in the assessment aimed at the towards achieving the goal.

### ***2.1 What we mean by performance?***

With the notion of performance we understand the phenomenon and the ability of employees to understand and effectively carry out the workmanlike and synthesize knowledge on the issues, and experiences and other characteristics specific to any job requires<sup>39</sup>

### ***The performance is measured and that can be done***

One of the most important problems in the performance evaluation is to determine the criteria, which include: quality and quantity of the work, self-initiative, ability, reasoning, permeability, experience, skills creativity, innovation, scientific knowledge, communication, security, approach to decision making, etc. A good system of the performance evaluation can help organizations attract and highly skilled workers. Administrators must understand the reason for the implementing performance assessment, which is effective in furthering the goals of the organization and human resource development. To develop a performance evaluation system should be an important part of management responsibility for many reasons. In these reasons clouds include<sup>40</sup>.

- a. Assessment of works is an important task of management, because management must be able to take administrative decisions that cause changes in the status of the worker.
- b. Management must have current information on the performance of individual units and departments. Between individual performance evaluation, management can get information about the unit in which the individual parts do.
- c. Systems performance Evaluation of supply managers with information about workers' skills and abilities, these data contribute to workers' skills and abilities. These data support the validity or change the selection procedures of organizations and foundations to provide recommendations regarding the training of workers.
- d. Performance appraisal systems provide valuable information regarding the quality of supervision.

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<sup>39</sup> Dr.Sc.Enver A.Kutllovci "Human Recourse Management", Prishtine 2004, p.87

<sup>40</sup> Dr.Sc.Enver A.Kutllovci "Human Recourse Management", Prishtine 2004, p.88

e. Performance appraisal system, if successfully implemented, provides information necessary for analyzing the role of effective change management and development performance of workers.

How can an organization develop performance evaluation systems, which will yield the desired results for all?

In each systems particular importance should be given to evaluating the human side, because in the final analysis the best system can be given as it is evaluating the human side, because in the final analysis the best system can be as effective as it is understood by employees. If the system is understood by employees as effective, all levels of a management responsible must implement it fairly and consistently. This section addresses the physical and mentally parameters<sup>41</sup>. Since the performance evaluation system is considered as successful, management staff and employees must understand its development and take it as on organizational need for organizational survival.

The first system of performance evaluation in the industry is held by Robert Owens in Scotland, in 1800. Owens has established a colored block in each workers' job, to show how well the employee has met the previous day. Different colors show different levels of performance. Formal systems of evaluation are used for the first time in the United States Federal Government and several administrators of cities. Frederick Taylor and his program of work measuring the underlying business have established performance evaluation, just before the First World War.

In 1916 Walter Scott Dell started developing the table of classification of man, which is widely used to identify and assess military leaders during the IPR. These early systems evaluation factors are associated with different numerical efficiency studies conducted by the simplification of the work and time studies and the popular notion of industrial engineers<sup>42</sup>

### 3. GOAL Performance Evaluation

Performance assessment serves for multiple purposes such as:

- Analysis of the progress of employees,
- Identification of the problem in meeting the required work,
- Opportunities to improve performance,
- Long-term career planning and

Past performance is reviewed in light of the results and achievements. Historically, valuation of the performance evaluation has served as the basic for decisions about promotion, transfer and adaption of the payments. It can also be used as a basis for determining the termination of employment, especially for organizations that have decided to reduce the work force.

Function development of performance evaluation is helpful in terms of increased capacity of members of the organization to be more productive, more effective and satisfied. For development purposes, evaluation of performance improvement facilitates of skills and motivation at work, it also facilitates career planning and effective instruction between managers and employees<sup>43</sup>

The assumption is that all managers are actively involved in the evaluation of the performance, whether it is better organized and whether trial or development.

The role of performance assessment in organizations is becoming more crucial to the efficiency of the institution and simply for survival.

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<sup>41</sup> [http://www.scribd.com/doc/Human recourse Management](http://www.scribd.com/doc/Human+recourse+Management)

<sup>42</sup> Dr.Sc.Enver A.Kutllovci "Human Resource Management", Prishtine 2004, p.90

<sup>43</sup> [http://en.wikipedia.org/wiki/Human\\_resources](http://en.wikipedia.org/wiki/Human_resources)

Therefore, it seems reasonable that management should spend an appropriate amount of time analyzing the needs of its performance assessment and to develop a system that can be effective for achieving these needs.

#### **4. Objectives-System for Performance**

Staff appraisal system serves all institutions, directors and employees, and creates expectations on their part. There are cases where the objectives and what are expected to achieve the same for all and in these cases there is significant cooperation between all institutions<sup>44</sup>. However, it often happens, particularly in institutions where there is no consistent system of assessment of employees, it expects what the employee and manager are not the same or compatible, which often leads to anxiety, irritability, and conflict within the institution.

Managers who are interested to establish a rating system should be aware of difference between the objectives of the institution and directors and employees before they perform the assessment.

#### **5. Benefits from the Performance Evaluation System**

A performance evaluation system is important for both managers and employees for the following reasons:

- a. It is a method which is agreed by both parties to be used for evaluating performance and in accordance with this will be further assessment of the achievements of employees<sup>45</sup>
- b. He makes clear that employees and management decisions are fair and not based on personal preference or discrimination.
- c. Assists in the professional development of employees
- d. Helps develop long-term organizational HR.
- e. It gives employees a more objective view of whether the institution has gone before or has done any progress.
- f. Adds motivation to improve performance by providing information, introducing new challenges and assesses the steps for improvement

#### **6. Emergency and Rewards of Work Performance**

Management research findings substantially rank several factors as salary and bonuses of exceptional performance in relation to work. Different types of rewards like appreciation or praise are also important and should be used for fulfilling the basic rewards of extraordinary<sup>46</sup>

Mohr Man, Resnick-West and Lawler emphasize that connectivity between the levels of reward exceptional performance has a significant impact on the effectiveness of the organization. When this coherence is evident and as a result, motivation is higher, then even those working on the week seek to work more and better to reach the winning prizes. Thus, a performance evaluation system not connected well with awards will not be successful in motivating the workers as a system that has good connections with awards<sup>47</sup>. Contemporary theories about the nature of management and organizational effectiveness provide a positive

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<sup>44</sup> Prof.Dr.Shyqyri Llaci Human Recourse Management,(second edition II Tirana,2005)

<sup>45</sup> Charles Lusthaus,Marie-Helene Adrien,Gary Anderson,the Fred Carden,Improve Performance in Organisation,1990

<sup>46</sup> Dr.Sc.Enver A.Kutllovci”Human Resource Management”,Prishtine 2004,p.107

<sup>47</sup> [http://en.wikipedia.org/wiki/Performance-related\\_pay](http://en.wikipedia.org/wiki/Performance-related_pay)

approach and the way human nature that encourages people to work with the desire and achieve the best of their opportunist.

Usually when using a rating system is expected to further increase productivity and motivation within the organization will be greater.

### **6.1 Worker's Compensation System**

Compensation and salaries are not the same. Compensation of employees refers to all remuneration which an employee receives for work done<sup>48</sup>. Monetary amount that represents wage worker gets the job done. Otherwise wage is taken as the monthly income of employees and other employees who have not been paid on working hours but are paid as agreed between the employer and the employee.

Compensation is the sum of salary, bonus, bonuses, benefits and other benefits. The main goal of the building an effective system of wages is building a sustainable structure for workers compensation depending on their work and level of performance shown.

### **6.2. Objectives of Compensation System**

To attract enough workers and appropriate

- To keep employees that are necessary
- To reward employees for effort, loyalty and achievement at work<sup>49</sup>

## **7. Conclusion**

In any organization HR management is the most important function. Unlike mechanical or physical resources, personnel recourses shall add an element without encountering experience with other sources. Monetary value and the value of the physical resources of the human factor are added and everything connected with it. It requires a special management attention very highly trained specialist.

Human resources today are faced with numerous challenges, including very high competition for qualified employees, and maintaining and motivating employees.

The human resources include all members of an organization-ranging from the institution most drivers high to lower levels.

In this context, effective leaders are those who realize how important and valuable human resources and taking concrete and active steps to ensure that their organization support and fully use its human resources, providing in this so great an advantage in competition with others.

To be successful human resources creates a new way of thinking and the pursuit of the new missions. These elements - coupled with the need for staff and oriented to the goals of the company-related to human resources in order to development necessary. Human capital is a key and can make the difference between success and failure of the strategy of long-term growth of a company.

Performance Management is used in private organizations, and public administration institutions. Today public administration is more and more compared with a profit organization and its intention is that all its processes should be monetary evaluated. Expressions such as "cost of the service", "do not have enough money to apply these change", "human resources are not enough", "results orientation", "improving the quality of service", "client orientation", "the competition with the private market", have become a normal

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<sup>48</sup> Dr.Ilijian Lipi,Human Recourse Management-case Study,(2009)

<sup>49</sup> Dr.Ilijian Lipi,Human Recourse Management-case Study,(2009)

expression of various policy postulates developed in various fields. Today almost every employee is obliged to provide statistical data for comparing numerical activity, cost of various processes, etc

An assessment of performance is the process by which employees of an institution may reflect, discuss and change their method of working. The process level enables individuals to learn and change behavior. At the institutional level process enables the systematic collection of the data about individual performance. These data, in turn, serve the Human resources Unit to identify training needs to be promoted the right individuals in the proper positions and set the path of organizational development of the institution. Assessment of performance is a management tool that serves the employees, managers and HR management.

If done correctly, performance evaluation creates a culture of justice, and supports continuous improvement of standards set.

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# Microcredit as an Alternative Mechanism for Supporting Micro and Small Entrepreneurs' Sector

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Sector of micro and small entrepreneurs has a great social, economic and political importance 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. Also small entrepreneur' activity is the most relevant topic for today that is discussed in economic papers. In a growing stream of academic literature devoted to small business activity and financial resources attraction the concern about entrepreneurial contribution to the growth and competitiveness is evident. Small business development depends on its financing. The financial strategy of a starting entrepreneur defines the future business development. This statement is true not only for the starting entrepreneur, but also for the sector of micro and small entrepreneurs. There are several methods of financing small entrepreneurs, for example banking loan, venture capital, business angels and informal capital. But all of them have some shortcomings. 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 organizations are those institutions that help to achieve this balance. More specifically, credit cooperatives are able to replace informal cash flows and become 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 organization). International practice analysis has shown that microcredit program provides 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. History and current situation justifies 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. My research 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.



## **Keywords**

Informal financing, formal financing, microcredit, microcredit organization, micro and small entrepreneurs

## **1. Introduction**

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 factors hampering the development of micro and small entrepreneurs. 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. Today, development of micro-entrepreneurship is the cutting-edge issue of the developing economies

There are two basic methods of financing small entrepreneurs: formal and informal. Formal financing is a banking loan, venture capital, business angels. But all of them have some shortcomings. Thus, there is a need for an alternative method of financing small entrepreneurs or informal methods of financing – microcredit.

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.

## **2. Literature Background**

Small entrepreneur' activity is the most relevant topic for today that is discussed in economic papers. In a growing stream of academic literature devoted to 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 defines the future business 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. This investment source is used during the growth phase of business development. 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 of 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. Microcredit perspective is considered as an instrument for the risk mitigating along with preserving the cash flow intensity.

### **3. History and the Content of Microcredit**

Ideas relating to microcredit can be found at various times in modern history. In the mid-19th century, Individualist anarchist Lysander Spooner wrote about the benefits of numerous small loans for entrepreneurial activities to the poor as a way to alleviate poverty. But the origins of microcredit in its current practical incarnation can be linked to several organizations founded in Bangladesh, especially the Grameen Bank. The Grameen Bank, which is generally considered the first modern microcredit institution, was founded in 1976 by Muhammad Yunus.

Microcredit is a financial innovation that is generally considered to have originated with the Grameen Bank in Bangladesh. In that country, it has successfully enabled extremely impoverished people to engage in self-employment projects that allow them to generate an income and, in many cases, begin to build wealth and exit poverty.

Microcredit is not only provided in poor countries, but also in one of the world's richest countries, the USA, where 37 million people (12.6%) live below the poverty line. Among other organizations that provide microloans in the United States, Grameen Bank started their operation in New York in April 2008. According to economist Jonathan Morduch of New York University, microloans have less appeal in the US, because people think it is too difficult to escape poverty through private enterprise. Other developed countries in which the micro-loan model is in fact gaining impetus include Israel, Russia, the Ukraine and more, where micro-loans given to small business entrepreneurs are also used to overcome cultural barriers in the mainstream business society.

So, 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), their 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 core activity of MCOs is the provision of microcredit services to target groups.

Microcredit is provided in the form of microcredit programs. Microcredit program is the complex of 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. Microcredit 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.

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 those of commercial banks, therefore to defrayal such costs micro credit organizations have to use high rate which is higher than market rate
- Characteristics of a portfolio. Micro credit organizations can also provide financing for a short period of time. Here organizations gain from the economy on scale.
- Management. Most of the microcredit organizations have similar organizational structure. Most of them have several small offices which directly interact with clients and back offices which provide financial, managerial and technical support.

#### **4. The Need of a New Mechanism for Financing Micro and Small Entrepreneurs' Sector**

As was already mentioned, access to finance for small enterprises was largely limited during the financial crisis access. The first signs of improvement appeared in late 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, who had difficulties with funding, decreased (56% in November and 75% in January, 2009). However this problem for small business is still very acute [11].

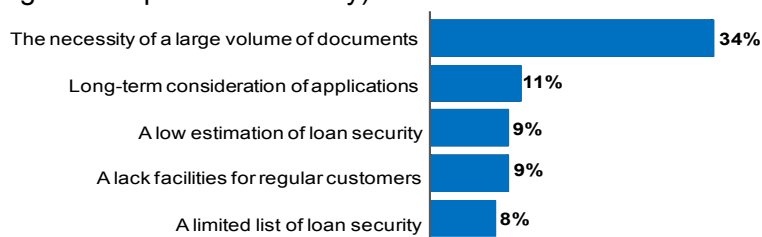
But the need for enterprises in debt financing has not disappeared. According to the NISIPP survey in May 2009 [12] 48.3% of the enterprises needed to attract financial resources. At the same time, the availability of these resources is still restricted: about 36.9% of

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 the fact that micro and small entrepreneurs have increasing appetite for financing. 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 for 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, short period for approval, 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 main barrier according to entrepreneurs’ survey is the credit policy of banks. The main problem associated with credit process is the enormous number of documents which should be prepared and long period of applications approval. 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’ survey).



**Figure 1** Factors of dissatisfaction about credit services, % of respondents [11]

Microcredit financing overcomes the problems listed above but another problem is inherent in micro crediting, in particular decrease in adverse selection of not highly profitable businesses. The challenge is to find a balance between formal issues and marked informal advantages.

Keeping in mind, that the inability of entrepreneurs to receive 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].

## **5. The Analysis 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 2000-2010. 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).

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) – according to 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 reduced gradually (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% (according to 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 in accordance with the list which follows:

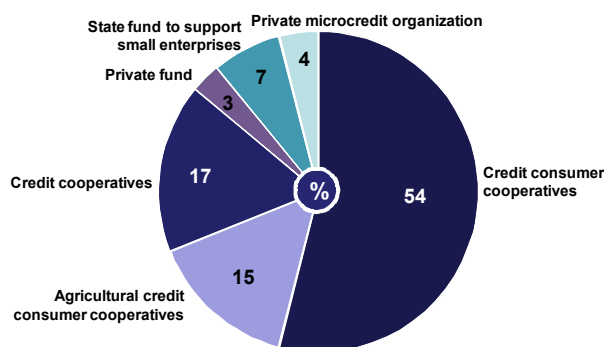
- The lack of working capital due to a significant reduction in small enterprises' turnover;
- The growth of the bad debt balance;
- Restricted access to bank lending (in conjunction with stricter requirements for borrowers and rising interest rates on loans);
- The reduction in effective demand for products of small enterprises;
- No access to financial resources provided by the government.

Liquidity crunch of 2008-2009 in the banking sector reduced the banks' ability to provide credit to small businesses. Small businesses use credit primarily for working capital financing, 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 most pronounced impact of the banking crisis.

The financial crisis led to the escalation of the problems inherent in small entrepreneurship. There was a significant reduction of access to additional financial resources.

In period from 2003 to 2010 microcredit market in Russia had positive dynamics. Number of microcredit organizations (including separate divisions) in 2011 is more than 2000 units.

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 2010 year) is shown in Figure 3. Credit cooperatives are usually formed on a territorial, industrial or professional status. Credit cooperatives most actively develop in small Russian cities and in rural areas.



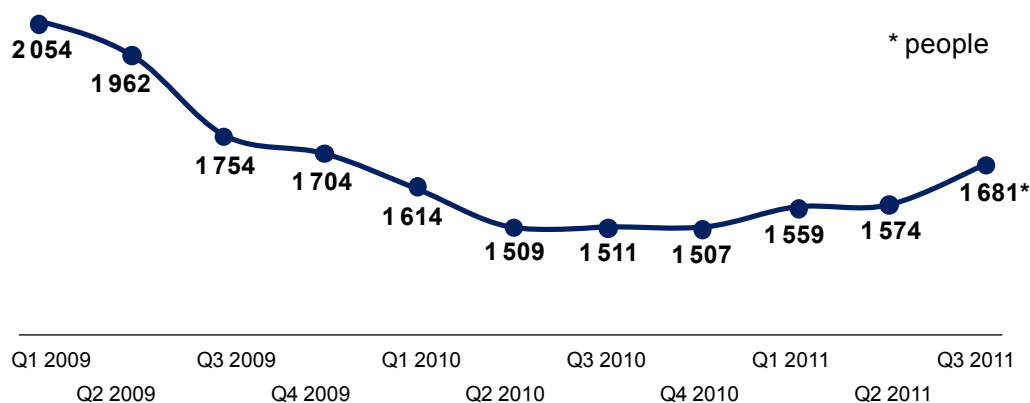
**Figure 2** Structure of microcredit organization in 2010 [16], [18]

The users of microcredit services are small businesses, individual entrepreneurs, farms and individuals. According to Russian Microcredit Centre from August 1, 2010 to March 1, 2011 MCO issued 1497 million rubles on small business development, in particular, early entrepreneurs, funding totaled 142 million rubles (for 2818 start-ups).

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 2010 the situation changed and the main users were individuals. The same picture 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).

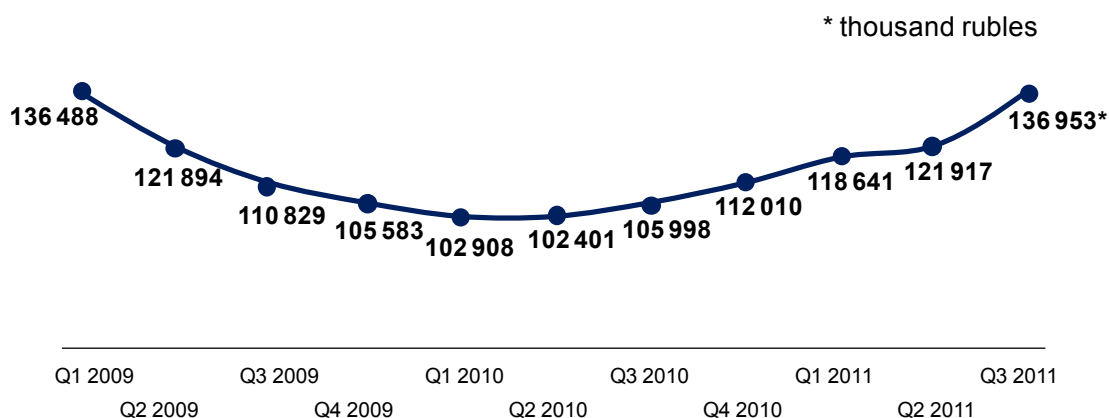
Over the past 7 years the structure of the loan portfolio has changed significantly for all types of microcredit organizations. The share of loans for business purposes is reduced year by year and by 2008 amounted to only 28% (2003 - 62%). The share of loans to consumers, to the contrary, increased from 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.

In 2009 the number of active borrowers is reduced to the level of Q2 2010, then a gradual "recovery" of borrowers. This decline of borrowers' activity can be explained by effects of the financial crisis, people are afraid to start a new business or develop an existing in a fragile economy. Today the average number of active borrowers for one MCO is 1691 people, this is higher on 11% than last year (1511 people).



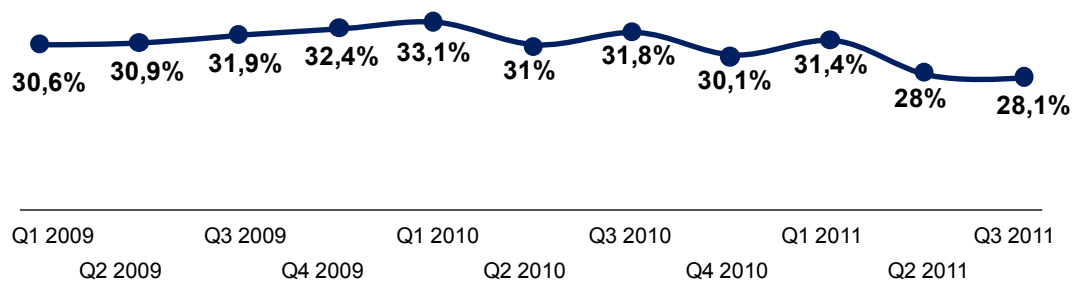
**Figure 3** The average number of active borrowers for one MCO, people [17], [18]

Loans MCO have a similar trend: a gradual decline until Q2 2010, then a gradual increase. Since the beginning of Q2 2011 the growth rate of the average portfolio for one MCO was 12.33% or the average portfolio for one MCO - 136.9 million rubles. For comparison, the banking sector there was a similar situation - the growth of the total loan portfolio at 5.97% since the beginning of Q1 2011 and 18.62% compared to Q2 2010. The growth rate of the loan portfolio in microcredit sector exceeds the rate of growth in the banking sector.



**Figure 4** The average portfolio for one MCO, thousand rubles [17], [18]

The weighted average interest rate on loans, as can be seen from the graph, in 2011 began to decline: in early 2009 it was 30.6%, in 2011 - 28.1%, which is 2.5 percentage points less.



**Figure 5** The weighted average interest rate on loans [17], [18]

## Conclusions

So, there were a positive dynamics of almost all major financial performance of MCOs in 2011. This trend indicates the formation of long-term development and perhaps of a new period of active growth of microcredit sector. Growth rate of the loan portfolio of MCOs exceeds the growth rate of credit portfolio in the banking sector (12.33% and 5.97% respectively). This means that microcredit sector more popular than banking institutions.

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. One of the aims of this research is to elaborate on the exhaustive classification of the entities providing informal capital financing.

Informal capital in the small business financing has various impacts. Firstly, it is a crucial condition for the business origination at the predetermined 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 favor of this financial strategy in order to enhance social status or to improve the well-being.

Secondly, informal capital can exist as additional source of financing which is an outcome of personal relationships. Notwithstanding this fact, other financial sources are available to successful businesses. In other words the balance should be found to insure an economic growth.

Microcredit organizations are those institutions that help to achieve balance between formal or informal finance. More specifically, credit cooperatives are able to replace informal cash flows and become 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 organization).

The analysis shows that microcredit should be used as an alternative mechanism for financing micro and small entrepreneurs' sector.

Microcredit helps in the development of an economy by giving everyday people the chance to establish a sustainable means of income. Eventual increases in disposable income will lead to economic development and growth. 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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# Added Values by Green ICT and its Importance for the Environmental-Engineering Criteria for the Enterprises in the Choice of the IT-Suppliers and Products

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The improvement of the environmental balance and costs savings illuminate the aspects of the value added by the Green ICT. Parallel organisations use increasingly energy - and produce with it increasingly the building of greenhouse gases. The energy supply in the enterprise, however, becomes also a greater growing expense factor. Particularly here the Green ICT offers considerable saving potentials possibly by more efficient hardware and an intelligent use of the infrastructure. Beyond the addressable customer circle the fulfilment of social duties is likewise perceived. An ecologically deliberate enterprise action and with it also a sustained handling with the ICT is observed increasingly and is therefore an important brick of a comprehensive Corporate Social Responsibility strategy (CSR strategy). This is an essential factor for the development of the brand value and the enterprise picture in the general public. The aspects of added values by Green ICT and the linked criteria with it for the choice of the IT-suppliers and products are, by using of the example, assessed in this paper.

## **Keywords**

Green IT, Corporate Social Responsibility (CSR), Investment, Sustainability, User Role, Managed Office Workplace

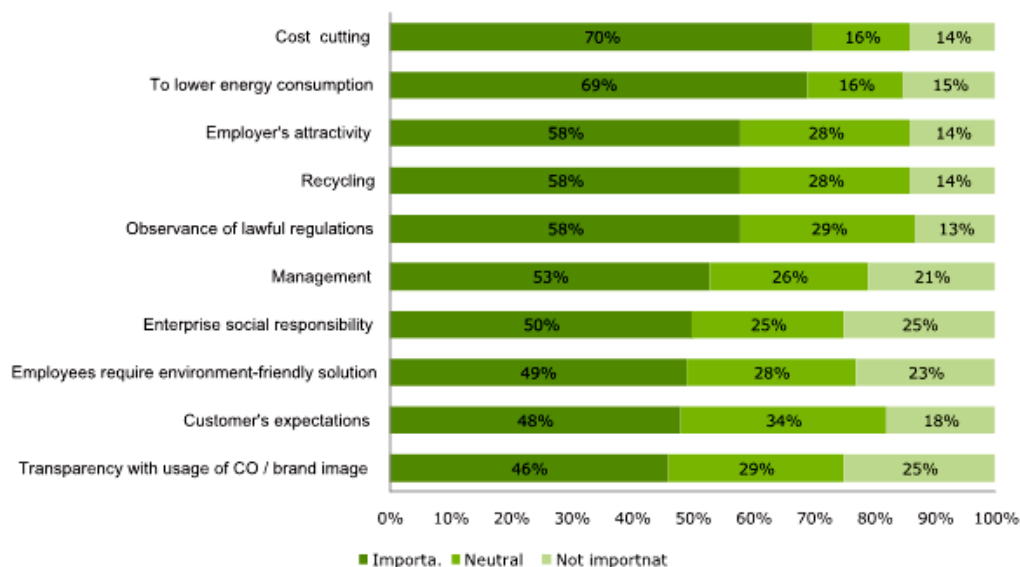
## **1. Introduction**

Worldwide in the economic life and in the private life information technology (IT) plays a bigger and bigger role. It becomes in increasing role an essential energy consumer and Carbon dioxide (CO<sub>2</sub>) issuer. According to [1] in 2011 the worldwide energy expenses amount to 46 Bn. of \$, which are mostly used for the refrigeration of the IT devices, mostly in the electronic data processing centers. According to the studies done by the Technical University in Dresden [2] in order to enable normal function of the WWW in the Year 2030, it will be necessary as much electrical energy as today's whole world population requires. As stated by [3], Google published a long protected secret about the own worldwide power consumption and the own greenhouse gas issues of the company. So, company spent 2.26 Bn. kWh of electricity - this corresponds to the consumption of approximately 200,000 households. Hence, sustainability is also for economic reasons a driving force of the future IT market. With the catchword „Green IT“ ecological aspects of the lastingness and sustainability are addressed. Analysts, manufacturers and suppliers understand by Green IT all information technology solution which leads to energy conservations in the company. Hence, Green IT encloses hardware, software and also services. In the hardware area, energy-efficient desktop PCs, Thin Client - architectures and electronic data processing center hardware, offers conservation potentials as well as the energy supply systems and integrated cooling system. In particular visual display software and solutions for the dynamic capacity

management as well as electronic data processing center planning or Storage Offshore Platforms, offer potential for energy conservations in the software and service area. On account of the increasing convergence of IT and telecommunication technology positive attempts of Green IT still must be enhanced with the energy conservations and savings solutions from the telecommunication area, as e.g. video conference systems, so that tendency from Green IT to ICT takes already roughly shapes. Extensive examination show that Green ICT encloses further only rarely discussed aspects along complete life cycles. Those aspects are resource-careful and eco-friendly purchasing, deliberate workplace behavior and electronic data processing center function taking into consideration sustainable produced energy, up to environment-appropriate disposal of old electric machines and very extensive recycling. Indeed the ICT is not fundamentally eco-friendly, because it uses energy and commodities itself, but in order to decorate more efficiently business processes, ICT is a lever for energy conservations namely beyond the self consumed energy. With Green ICT it is basically about the question in which way user and supplier of ICT take into account the ecological consequences of the use of the ICT.

## 2. Corporate Motives for the Investment in Green ICT

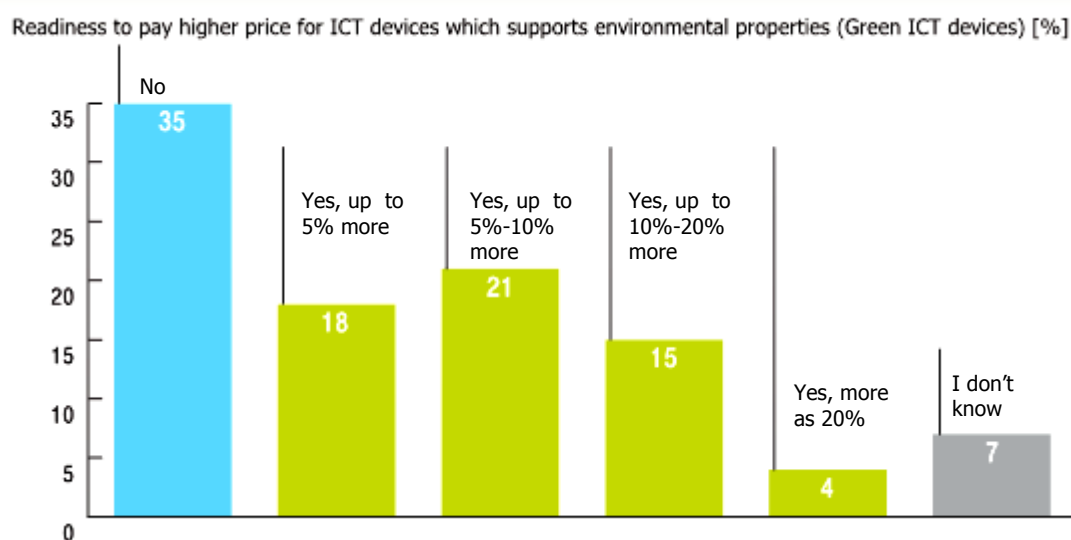
Companies use increasingly more energy - and, hence, emit increasingly to greenhouse gas. However, today's companies also take seriously the subject of energy saving and conservation into account. As stated by [4], meanwhile more as 82% of the mayor global companies have voluntarily publicized their greenhouse gas issues. As stated by [4, p.8] "global emissions fell 1% on the back of the economic downturn", but emissions reported by the mayor global companies "rose to 3.4 billion metric tons CO<sub>2</sub> accounting for 11% of total global emissions". At least 50% of the companies have published their self-obligatory issue reduction targets. Following figure presents, according to [5], the main motives of the companies for investment in the Green IT.



**Figure 1** Motives of the Companies for Investment in the Green IT

Obviously companies perceive their social responsibility, reduce the so called Carbon Footprint - the sum of all CO<sub>2</sub> issues - and improve thus their environmental balance. Because the energy supply becomes increasingly important cost factor, consequently in the companies, cost-savings in this regard becomes for them highly prioritized. Green ICT allows particularly by more efficient hardware and a smart use of the structures a slightest electric and material consumption and addresses therefore also the desired cost saving potentials.

Companies motives for the debate with topic of Green ICT and substantially are more multi-layered and complex. Companies today are not only unilaterally and point-wise occupied with the Green ICT. All suitable activities must be bundled up within the scope of a more comprehensive Green ICT strategy which also takes into consideration other requirements, and not only cost aspects and aspects of the lowering of the energy consumption. That's because an environmentally friendly operating company is for instance, more positively valued by the general public and the capital market. Thus the loyalty and contentment of the employees can be increased, and further the acquisition of the new customers becomes more easily. The consideration of environmental properties can offer a determining competitive advantage, because many customers pay attention today increasingly to the aspects of lastingness and sustainability and show this with their purchase decision. As stated by [5] the majority of the consumers is ready, for instance to pay a higher price by the purchase of ICT devices in order to support positive environmental properties of the device. It is illustrated in the following figure.



**Figure 2** Costumer Readiness to Support Green ICT Devices by Higher Expenses

Particularly the consumers which are belonging to the group of so called lifestyle of health and sustainability proponents, which see lastingness and social responsibility as a basic component of their life style and consumption style, can be demanded with it as a new customer group. But also existing customers perceive Green ICT, what can raise their contentment and thus increase the customer's commitment to the product or service. Also beyond the addressable clientele the fulfillment of social duties is recognized and accepted. An ecologically deliberate, enterprise oriented action and thus also a lasting and sustained contact with the ICT is perceived increasingly as an important component of a comprehensive corporate social responsibility strategy (CSR strategy). The objective of CSR is to embrace duty and obligation for the firm's actions and give confidence to a positive influence through its behaviors on the surroundings, clients, workforce, society, stakeholders and all other components of the public area. CSR is labeled to help a companies' assignment and lead to what the enterprise stands for and therefore gives support to its clients. Improvement of the business ethics is one of the types of functional ethics that scrutinizes moral philosophy and principled or moral problems that can happen in company surroundings. This is an essential factor for the development of the brand value and the company's picture in the general public. Besides, a positive relation to Non-Governmental Organizations like Greenpeace and joint projects with or exemplary mention by the NGO – can have positive implications on the image of the company. These can be for instance top rankings in so called sustainability rankings or the intake in sustained share indexes, as for

example into the Dow Jones Sustainability Index or Climate Disclosure Leadership Index of the Carbon Disclosure Projects [1]. However, with look at the previous and expected development the investor's interest seems to track no fashion trend but to grow with lasting effect [6]. But only a third of the responding companies which took part in the survey done by [6] train the employees to the subject of Green IT. Here, a still clear potential for improvement exists. Another criterion will be in future the fulfillment of statutory rules. In addition, the development of the CSR activities of a company is at many rating agencies of increasing importance. Thus the application of Green ICT can have positively affects on the stock exchange rate and company value and raise the attraction for investors. Social and ecological criteria become also the determining factor with investments. According to [1] more as three hundred public funds oriented to lastingness and sustainability in Central Europe which also take into consideration environmental aspects and ethical interests beside the income return, had in 2011 already a layout volume of more than 34.4 Bn. of \$. This corresponds compared with 2005 to a triplication. In addition, the subject related to the so called "CO2 certificates" becomes more and more important. According to Bloomberg forecasts, a strong increase of the global market up from 2012 is expected. The amortization times of investments can be shortened by the sales of issue rights in technologies friendly to climate and to CO2 friendly electronic data processing centers. However, Corporate Responsibility has an effect not only outwardly, but also in the company itself. Also in competition around potential new employees, in the matters of the searching for the new talents, the social commitment of a company is an important factor. Different studies show that employees prefer it, to work in the company which acts in the environmentally friendly way. Confidence in the employer, loyalty and job satisfaction is with it, influenced positively. The first hype of the engineering fascination has really given a way to a rational discussion and analysis with the subject of Green ICT or the subject of sustainability. Therefore, it is a matter of decorating business processes more energy efficiently.

### **3. Green ICT in the Office Workplace**

How can a company configure its ICT more sustainable? In the following some aspects are presented, how the mentioned improvement of the energy efficiency concerning ICT can be achieved. If one considers primarily more exactly in which areas of the ICT the carbon dioxide output is caused, two decisive fields can be identified: the office workplace and the electronic data processing centres. As stated by [1] only 40% of the ICT conditioned CO<sub>2</sub> issues are caused by personal computer and workstation and corresponding monitors, and further 23% by server and its integrated cooling system. That's why this paper focuses at first on the attempts which can sustainable reducing the CO<sub>2</sub>-issues by Green ICT in the office workplace and in the electronic data processing centres.

#### ***2.1 Equipment of Workplaces based on Role of the User***

Managed Workplace services are based on a central knowledge that most working environments in the organization have very similar profiles of utilization. One can equip them therefore, with cost-saving standardized ICT solutions. According to [7] three different models based on role are defined, which can be assigned to 80 percent of all workplaces. Those are so called Service Workplace, Office Workplace and Traveler Workplace. Service Workplace is according to [7] the most favorable workplace. Hardware and data are separated clearly of each other. In this scenario only one simple output device stands on the desk of the service employee, with a terminal which covers all data, applications and services dynamically out from the electronic data processing center via "cloud ". For a huge number of shared-desk-or call centre workplaces such "Thin Client" as working tools is completely sufficient. The virtual desktop is realized here to 100 percent. Therefore, the Service Workplace is the most efficient variant. Differently than the Thin Clients within the

Service Workplace, the Office Workplaces offers to the user also the own arithmetic power. This scenario is necessary mostly in two cases. First, if in the some organizations the range of the Internet connection is not sufficient to cover all applications from the cloud. Second, special activities require data-intensive programs and concentrated arithmetic achievement. This is possibly the case where architects work with CAD systems or within of companies users are working with multimedia applications. Traveler Workspace is linked with business people who are often on the journey and have access from everywhere on their habitual workplace. With, for instance the Smart Phone, they have any time access to their virtual desktop. For the reading of bigger documents they can activate the virtual working environments also at the next computer capable of Internet via access key. All data and applications are available immediately, also in real-time, without of leaving data tracks on the foreign system. The whole system runs via Internet.



**Figure 3** Workplace according to the Role of the User [7, p.4]

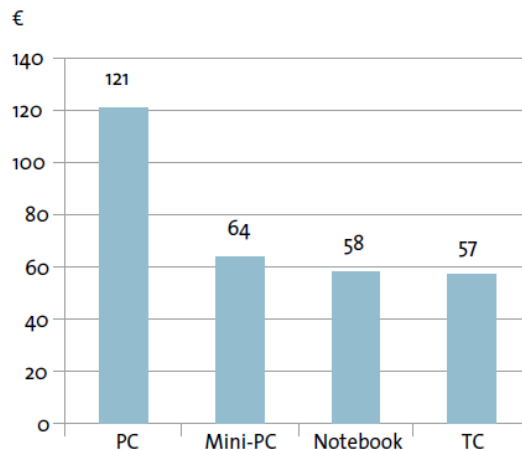
All those, more as 26 million personal computers in company, authorities, schools and universities in Germany consume with 4 TWh/year more electricity than a big coal-fired power station can produce in the identical time [6]. And in two decades the German Fraunhofer Institute forecasts another increase of the power consumption in the ICT area for about at least 20% [8]. It is to be acted in the time, because every single office workplace offers for itself the chance to save energy. Thus even without any utilization of resources, only by behavioral changes of the employees, clear energy savings can be already realized. The use of rest state and power management software by final devices or on both sides printing of paper and the general avoidance of paper expressions can be realized by simple company guidelines and thus the employees can be sensitized for Green ICT. However, unfortunately, the companies use even today for printing, to faxes, copying and scanning too many devices. As stated by [9] In the service area companies use approximately 5,3 different peripheral device per user. This scenery leads as a rule, to lacking of the transparence and to unawareness of calculation of the expenditure for the company, which has to actuate those devices. Nevertheless, the so called user-devices-ratio can be clearly reduced by actual and demand analyses as well as by a sensible system migration and provide the best possible extent of utilization without long stand-by times.

## ***2.2 Document and Final Device Management as a Source for Improvement of the Energy Balance***

To have fewer devices is one crucial point but second important thing is than organization show the interest for reducing of paper utilization. Companies are confronted towards an increasing flood of documents. Every single day thousands of letters, written mails etc. becomes printed, sent and archived. This binds staff and capital in company. By managed documents services the complete document management process can - from the digitization

via archiving up to the dispatch of the documents by mail, as a letter or preparation as a web page for Internet – be transferred in a digital workflow and taken over by a service company. Energy conservations arise automatically by avoidance and scales effects in the optimized provision of the computer capacities, for instance, for archiving. Further also with the printing of salary vouchers, invoices etc., by the digital dispatch thanks to safe encryption, must not be printed in future on paper. With digital workflow solutions previous paper-based solutions can be more efficiently, as well as more ecologically organized. One practical solution possibility for it is so called the innovative Paper and Pen solution [1]. A special pen with an integrated camera can capture all signs of the manuscript and allows with it the digital processing of handwritten and hand-signed documents. The pen produces with the writing a digital carbon copy inside of the pen. The original document remains with the customer, who gets sent and archived a digital carbon copy to its central server via mobile radio and so-with printing becomes reduced by 50%. Accordingly the production as well as the transport costs for the saved paper is decreased and with it CO<sub>2</sub>- issues related. Beside the energy-efficient contact with the final devices also the application of energy-efficient final devices allows of course also a more sustained contact with resources. Always to make available final devices which are highly efficient and energy-efficient - and with it cost-saving-, signifies for CIOs, nevertheless, the mastering of a gigantic assignment. To make easier a possibility of this task, the outsourcing of single ICT components up to whole ICT scenery in the office is important point of consideration. Thus in a relatively simple way, also for the purposes of Green ICT, the number of the personal computers and printers becomes minimized and efficiency increased. Besides, the center point for the efficient supply of a (ICT-) workplace is the tuning of the task and roles of an employee with the available infrastructure of the company. Different roles – Service, Office, and Traveler Workspace - of the usual employee are already described in the previous text. Other requirements for use and supply of the ICT infrastructure like with an office worker or a call centre employee arise completely from the activity of a C-Level decision-maker as a rule. If a company wants to arrange as little as possible unused computer performance or idly infrastructure, it must plan the contact and application of final devices in each case depending on the role which an employee accompanies in the company. Besides, configuration and life cycle of a workplace system should also align to the requirements of utilization of the roles previously defined. So, with a role change of the employee necessary adaptations should automatically be able to be carried out. On the basis of the roles an optimum mix from individuation and scales effects relevant to expenses can be achieved, which raises not only the acceptance and contentment of the users, but also reduces the companywide energy costs, which result with hardware procurement, operation and maintenance. For the case that final device are according to energy-efficient aspects cyclically renewed and if hardware without users becomes in the medium term diminished, another energy conservation effect can be achieved. In a current study [10], about the workplace-related computer solutions and their development up to 2025, ordered by the German Ministry for Environment, ecologically interesting facet of the future workplace provision are indicated. According to the study, there is an increasing trend for the central software supply. In plain language, more as 20% of the software applications will run in 2020 in the German offices on the final device - the rest in the own computer centers or in the “cloud”. That signifies „Thin Clients “ (TC) are sufficient for most roles in the company as a final device. They are smaller, quieter and more durable than conventional PCs. According to the study [10, p.10] expenses for electricity per computer workplace (incl. terminal server use, without monitor) for 3 years (2012-2014) by new acquisition of the devices in 2012 is presented in the following figure.





**Figure 4** Expenses for Electricity per Computer Workplace [10, p.10]

Besides, the Fraunhofer Institute [8] has determined that the TCs operate, compared to traditional desktops, substantially power-saving and thereby reduce CO<sub>2</sub> issues as well as purchase costs and overheads. If a desktop PC is replaced with a TC included terminal, the CO<sub>2</sub> issues of the workplace system drops by over 54%. Covered up to an overall system (in each case included LCD monitor), the savings amount up to 44%. TCs have a substantially slightest weight, a slightest volume and consist of fewer components what becomes effective, above all, with the transport, with the disposal as well as with the material consumption. Further practical cost saving solutions in regard to the Green IT, can be reached by the mobility and collaboration solutions as for example in the case of so called Road Sharing solution, as well as with particular solutions for the electronic data processing center based on cloud-related infrastructure. Important issues in this context are so called Smart Building solution as a part of the holistic Energy Management concept of the organization. Those issues will be presented in further papers.

## 4. Conclusions

The subjects related to the climate change and environmental cares are discussed already since decades. Now they have also arrived in the reality of the companies which now take over the responsibility for the CO<sub>2</sub> issues caused by them as a part of their Corporate Social Responsibility strategy. Every company has different initial requirements. These should be analyzed at first. Possible starting-points in the core processes as well as in the areas of the electronic data processing center and the office workplace have been discussed in this paper. Besides, quick success can be realized, above all, by means of energy-efficient contact with final devices or by the configuration of the office workplaces based on role. Therefore, business processes are sustainably improved by Green IT.

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# External Business Intelligence in Small- and Medium Sized Firms – A Case Study of Finnish Marine Industry

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Business intelligence can be seen as a process, in which firms gather, analyse and utilise information cum intelligence in their decision-making. It is, thus, an ongoing and systematic way of transforming various kinds of data and information into useful knowledge. The availability of external business intelligence for firms has multiplied in the past decades. At the same time the importance of this in the competition between firms has been increasingly highlighted. Similarly, in Finland the significance of business intelligence management has increased steadily. However, this poses challenges especially for small- and medium sized enterprises (SMEs), where the availability of human and technical resources is limited. The purpose of this paper to delineate a general picture of the conditions of external business intelligence management as it applies to SMEs in the Finnish marine industry, and to excavate their most essential needs and challenges. According to the results, external business intelligence management was generally occasional and unsystematic, which was not unsuspected considering the firms' size. It is also clear that the need and use of external business intelligence increases in relation to the size of firms. Finally, development proposals are put forward to help SMEs enhance and rationalise their external business intelligence management processes, according to the development targets that they have identified: acquisition, dissemination, utilisation, and documentation of intelligence, adding value to information, identification of intelligence needs and networking with other firms inside the industry. The targeted proposals include the exploitation of existing analyses and information services, clarification of practices, documentation of tacit knowledge, training of staff, storing of information, outsourcing and the development of industry specific databanks.

## **Keywords**

Business intelligence management, Finland, Marine industry, SME

## **1. Introduction**

The potential to use external business intelligence (BI) for firms has multiplied in the past decades for several reasons, including technical development and the increase in the amount of information. It follows, then, that many firms are, struggling to manage the excess of information to some extent. In general the challenge for many firms has, thus, changed from finding the information to screening the necessary information but especially managing the information. At the same time the importance of information in the competition between

firms is increasingly highlighted, as enterprises seek competitiveness and competitive advantage through BI.

In the North American literature BI is referred to as competitive intelligence and can be seen, in a simplified way, as a systematic process, whereby firms gather, analyse and utilise information in their decision-making. BI can be internal: information concerning the firm's performance, and; external business intelligence. In this paper the main emphasis will be on external BI, which normally includes competitors, markets, technology, products, customers and partner information. This information is usually acquired from competitors, customers and business environment via interviews, news reports and the Internet. [1-2]. According to previous Finnish studies [3] the need for external BI increases in parallel with increased competition and internationalisation.

Globally, the significance of Business Intelligence Management (BIM) has increased steadily throughout recent decades. This imposes challenges especially for small- and medium sized enterprises (SMEs), where the resources for systematic BIM, large technical applications, human resources allocated to BIM and acquisition of information services are limited when compared with large-scale enterprises. BI and its management can be of utmost importance for competitiveness, growth and even SME survival. On a more positive note, even small improvements in BIM can produce fast and significant results for SMEs.

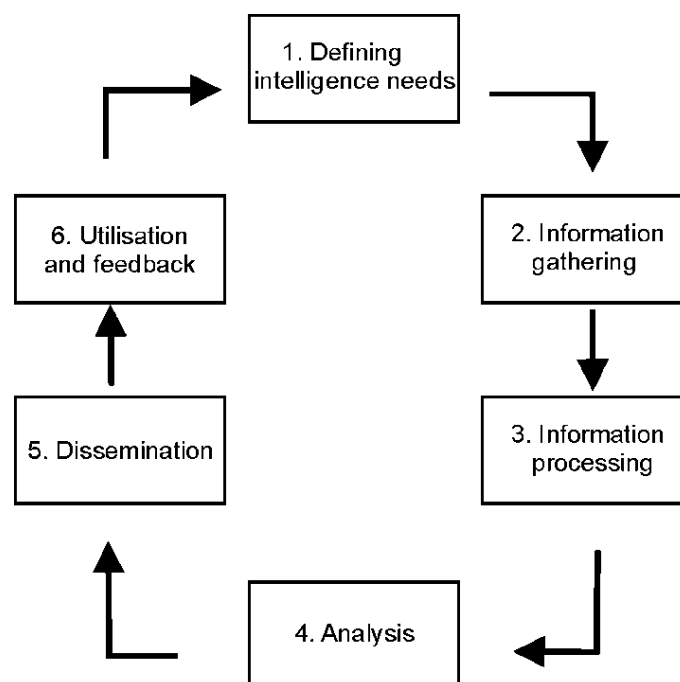
The purpose of this paper is to draw a general picture of the condition of BIM in the SMEs of the Finnish shipbuilding industry, to find the most essential needs and challenges and to propose actions to support the individual firms and the development of that sector. The results of this paper are based on a survey conducted by the Centre for Maritime Studies, University of Turku [4].

## **2. Business Intelligence in Finnish firms**

There is generally no agreed definition of BI, but rather a set of different ways to specify the process. For the purposes of this study the definition by Hannula and Pirttimäki [5] was used: 'BI concept is described as organized and systematic processes, which are used to acquire, analyze and disseminate information significant to their business activities'. Related concepts including competitive (a synonym in North American literature), customer, market, strategic and technical intelligence are also used to describe similar processes. In European literature, however, BI is considered as an umbrella concept encompassing the other intelligence-related terms [6]. Similarly knowledge management is sometimes confused with BIM, but whereas BIM focuses on explicit knowledge, knowledge management encompasses both tacit and explicit knowledge [7].

Based on its definition BIM is, thus, an ongoing and systematic process whereby raw data is transformed into useful knowledge. The phases of a typical BIM process are outlined in Figure 1 [for alternative process models see 8]. In the first stage the needs for intelligence are defined. According to the needs the information is then gathered from relevant sources and processed in the third stage to a structured form, which can be then analysed in the fourth stage. The analysed information is then disseminated to all relevant personnel with various methods (including reports etc.). In the last stage the intelligence is utilized and feedback is given in order to start the next round in the BIM process. Without the last stage the BIM is useless for the firm, as only BIM processes that actually lead to action can be considered as valuable [9]. This depiction is, of course, a crude generalisation; in real life the relationships between different phases are not so clear-cut and chronological. Regardless, the lack of BIM can be considered as a major deficiency in the operations of firms: ineffectiveness in decision-making can impose financial losses for firms. Furthermore, whereas in the early days BIM was viewed and used exclusively to support strategic decision-making, organisations have recently began to exploit BIM for the purposes of supporting wider business activities such as supply chain, production and customer services

[see 10]. Concomitantly, several studies have theorised that the use of BI correlates with good business performance [e.g. 11-12]. However, it is difficult for firms to recognise concrete paybacks from BIM [13-14].



**Figure 1** The main steps of a typical BIM process [1]

In Finland the current BI ideology and terminology surfaced in the 1990s [15], but still the condition of BIM has been mainly studied *vis-à-vis* large enterprises. A study of the BI processes of the 50 largest companies in Finland [3] revealed that, in almost all of the largest companies the use of BI is organised in a systematic way and that the firms are ready to invest more to develop their BIM. The most important forms of BI for the largest firms were: competitors, customers and industry intelligence most often used in the development and planning of business activities. Furthermore, the largest Finnish firms perceived the good quality of intelligence for supporting decision-making, the increased dissemination of intelligence and the enhanced perception of threats and possibilities as the main advantages of BIM. Executives are the ones who most commonly use the intelligence provided by BIM. At the same time, the importance of other personnel in the BIM is emphasised, as a vast potential is lost if BIM is solely used by the managers [16]. Similarly, employees can be seen as an important asset as a source for valuable information on the external business environment [17]. As BIM is increasingly a part of the personnel's work and decision-making, the need for proper BI training for personnel is seen as important. Continuing training is, thus, one of the most important tools for BIM as well as other implements of gaining competitive advantage such as innovations [18-19]. All in all the role of BI in Finland, at least in the large companies, has expanded since 1990s [20].

In Finland BIM is fused with parts of other business activities. However, Halonen and Hannula [3] have shown that firms that have a responsible employee or a separate unit for BIM with an allocated budget, compared to those that do not, perform and develop BIM in more efficient ways. One possibility for enhancing the efficiency of BIM is to outsource it [1] and most of the largest Finnish firms have already outsourced at least some parts of their BIM processes [15]. Similarly, Finnish enterprises expect that the cooperation and networking in BIM will increase in the future, as these activities and the benefits derived from them are now under-utilised [5]. The fostering of networking between SMEs should be

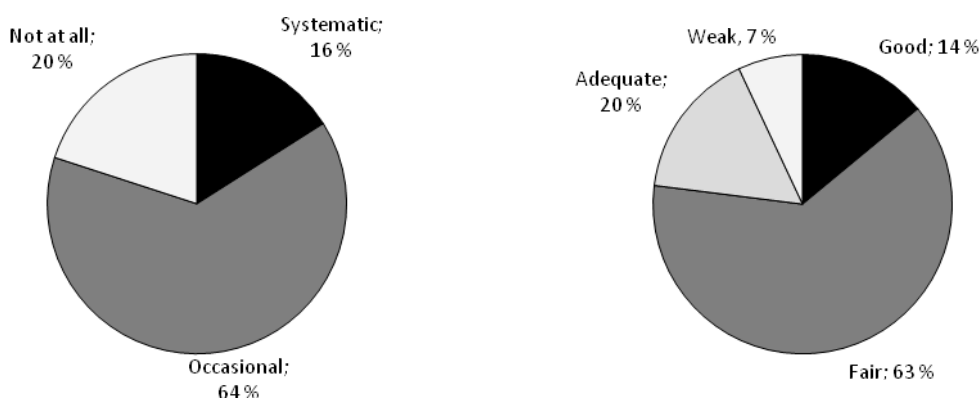
fastened to inherent partnerships, not to the false notion that every SME is eager to collaborate: the lack of this understanding has proven to be a major hurdle for BI cooperation in other countries [e.g. 21].

As an exception within the Finnish BIM literature that is mostly concerned with large companies, Lampela [22] states that, the lack of resources imposes limitations for SMEs in BIM compared to large enterprises. Thus, the BIM of SMEs should be organised as lightly as possible: cheap and lightweight architectures and tools are required [23]. As the difficulties in retrieving important information can be a hindrance to BIM adoption [24], it should not take too much of employee's time nor should it impose heavy costs [22]. The recognition of the intelligence needs and sources are of utmost importance for SMEs [also 25]. Furthermore, the significance of data storing in a logical way and the need for industry specific data banks for SMEs were highlighted extremely important. However, the creation of an industry specific databank requires an independent organisation to coordinate the content of the databank.

### 3. Results

The data was gathered through a net-based survey designed for SMEs in the Finnish shipbuilding industry. A total of 46 chief executive officers (CEO) of SMEs, supplemented with 9 other interviews, responded. The data covers the views of 55 CEOs of SMEs. For a more detailed description of the data and results see Makkonen *et al.* [4].

According to the results the use of external BIM is mainly occasional (Figure 2). Still, 16 % of the respondent firms claim to have systematic processes for external BIM. Moreover, one third of the firms that use external BI occasionally are planning to develop their processes towards the systematic use of external BI, but more than half of the respondent firms were planning to increase their investment in the external BIM in the future. The firms that did have systematic processes for external BIM are generally larger than the firms that do not. Moreover, firms that do not use external BIM at all do business solely with domestic customers [cf. 3]. The biggest limitation for the use of external BIM is the shortage of time to be allocated for these processes. External BI is most often sought when there is a change in the customer base of the firm, when new competition arises and when enterprises are seeking for collaboration and networking partners. Most of the firms consider the condition of their external BIM to be good or at least fair (Figure 2). Firms that had organised their external BIM systematically were more satisfied with their processes than firms that do not.



**Figure 2** The rate of the use of external BIM in the respondent firms (left) and their own estimation of the state of external BIM in their firms (right)

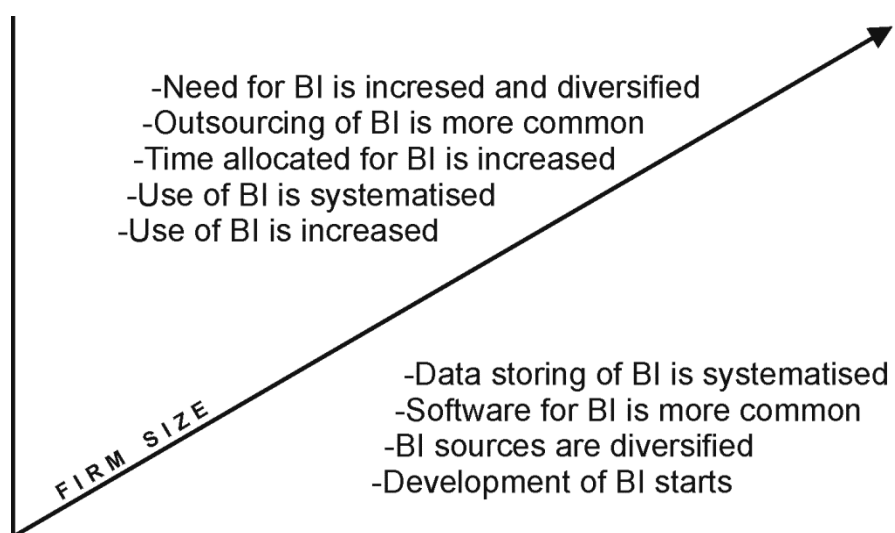
Executives are the ones most often in charge of external BIM in the respondent firms and they also utilize external BI most regularly. The most important sources for external BI for the respondents were: news reports, seminars or conferences and the firm's own personnel.

Usually the storing and dissemination of the intelligence is done only occasionally and there are no real rules that would guarantee its successful application. Only a few firms had a separate person in charge, software or an allocated budget for external BIM. Most often external BIM is done alongside other work duties. Similarly, only a few companies had outsourced their external BI processes, but some were planning to do so in the near future.

The perceived pros and cons of external BIM are those regularly stated in the BIM literature [e.g. 3; 22]. Pros include the sharpened forecasting of threats and market possibilities and the increase in the overall intelligence of the business environment. Again, the lack of resources available and the difficulties to see any concrete paybacks from external BIM were the most common cons reported by the firms.

## 4. Discussion

The use of external BIM in the SMEs of Finnish marine industry seems to be rather occasional. This did not come as a surprise, since many of the respondent firms were quite small, which is also the case for the marine industry as a whole. However, keeping in mind the advantage of BIM, there are promising signs that the use of external BIM is becoming more and more organised and systematic. Furthermore, previous studies [e.g. 11] have shown that, in addition to the increased satisfaction of the perceived state of external BIM, the gains from it will build up as the processes are developed in a more systematic direction. As the most common limitation for the use of external BIM is the lack of resources, it is easy to see that the systematic use of it is more a characteristics of larger firms. The development of systematic external BIM usually begins when the firm grows and matures, although the gains from it would be visible even in smaller firms. These views are supported by cross-tabulations, which show that there is a systematic relationship between the firm's size and its external BI processes: outsourcing, software, the rate of the use of external BI, information sources and needs etc. (Figure 3).



**Figure 3** The characteristics of external BIM in relation to firm size

According to the respondent firms there are many targets for development regarding external BIM. The most potential targets for development and development proposals that could help firms in their BIM processes are presented in table 1. The development proposals are drawn from the results of this survey and from previous literature presented in the literature review. As external BIM is a continuous process, the development proposals overlap: some of the

proposals can be used to improve the process in several stages. The goal is to develop the use external BIM in individual firms as well as in the marine sector as a whole.

**Table 1** The most essential development targets and proposals of BIM

<b>Development targets</b>	<b>Development proposals</b>
Rationalising information acquisition	Exploitation of existing analyses and information services
Rationalising intelligence dissemination	Clarification of practises
Utilising employee information	Documentation of tacit knowledge
Raising valued added	Training of staff
Rationalising documentation	Developing of documentation
Identifying intelligence needs	Outsourcing
Increasing networking	Developing of an industry specific databank

The exploitation of existing analyses and information services would help firms to rationalise their information acquisition and cut cost in the process: there are many organisations constantly producing valuable information about the sector in the form of surveys, reports and databases that firms should take advantage of. If someone has done the work for you, why do it again? Furthermore, it would be well advised to appoint an employee in charge of the information acquisition (the position need not to be a full-time occupation rather a part-time task): this would save 'hidden costs', time and money, as only one person is following the information sources and disseminating useful parts of it to the rest, in comparison to a situation where most of the staff is checking the same data oblivious to each others.

Dissemination of the BI should be done in an organised and systematic way. It is important that all employees have knowledge/rules on available information, and when and to whom it should be disseminated. Otherwise, firms risk the possibility that valuable information is lost, as it remains underutilised. Furthermore, the value added of the intelligence is enhanced when more personnel are involved in the analysing process, when appropriate.

The documentation of tacit knowledge possessed by the employees would significantly increase the possibilities for utilising the information that already exists inside the organisation. Now, it seems that dissemination of this sort of information is random and unofficial. This shortcoming could be tackled e.g. by documenting exhibition, conference or seminar excursion by company employees in a way that the information can be disseminated to other staff.

Increasing the valued added from external BI could be achieved through training of personnel: it raises the methodological and technical skill of employees to analyse and interpret external BI. The training should be organised in a light and flexible manner, but it should be continuing in its nature, to keep the staff 'up-to-date'.

Documentation and storing of information was conceived as a potential development target, as some of the acquired external BI can become outdated relatively fast. Thus the amount of stored information should be limited to intelligence that does not need constant updating. In other cases the main focus should be on disseminating the information that should be acquired ad hoc.

Outsourcing could help firms, in specific cases, to identify their intelligence needs and in information acquisition. Outsourcing helps firms to tackle limitations not related to financial restrictions i.e. shortcomings in the time available for external BIM and in the technical and methodological skills, related to BIM, of the personnel.

Increased networking, when mutual needs arise, could solve some of the problems faced by Finnish SMEs in the marine industry. Joint-acquisition of services would lower the firm-specific costs and enhance the possibilities for smaller firms to follow external information of their business environment etc. One possible solution could be an industry specific databank. In fact, there already is a databank, maintained by the Association of Finnish Marine

Industries, providing external BI for marine industry firms, but it could be developed significantly further.

## 5. Conclusions

In conclusion it can be stated that the use of external BIM in the SMEs of the Finnish marine industry, where shipbuilding is concerned at least, is still relatively unsystematic. The use and need for external BI increases in relation to the firm size, especially since smaller firms have fewer resources to be allocated to external BIM. However, the interest in developing the external BIM processes is evident in the smaller firms. The most common development targets expressed by the respondent firms can be summarised in seven key points: acquisition, dissemination, utilisation, value adding, documentation, identification and networking. Firms identifying these targets and seeking to develop their external BIM processes could benefit from considering the proposals put forward and related to exploitation of existing analyses and information services, clarification of practices, documentation of tacit knowledge, training of staff, storing of information, outsourcing and the development of industry specific databanks.

Although the case here has focused on Finnish SMEs, the results and recommendations have wider European relevance. The current financial crises and problems faced by many European shipyards add to this discussion [e.g. 26]; for a firm to survive, a competitive advantage is needed and BI offers one means to achieve this. In particular the largest European shipbuilding nations (including many South-West European countries such as Italy, Romania, Croatia, Spain and Turkey) could benefit from benchmarking their marine industry BI functions against the experiences gained from the Finnish marine industry. Since over 80 % of the firms in the shipbuilding industry in the EU-27 countries are SMEs [27], the specific focus on them is all the more relevant. Thus, the recommendations offered here are not only case-specific for Finland, but can be applied to other European counterparts. One previous report has brought to the fore recommendations, including the building of knowledge databanks for shipbuilding companies, aimed at improving the competitiveness of the entire European shipbuilding industry [27].

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# An “Adventurous” Approach towards Virtual Entrepreneurship

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In the recent years the utilization of Internet services as a widespread mean for doing business is considerably growing, influenced by several factors, namely - exchanging business information via Internet became an everyday human practice, the time for information exchange and processing is drastically reduced, information services are now easily accessible and at low cost, people awareness and skills in using Internet are growing constantly and the business is ambitious to achieve higher levels of competitive power. Further, Virtual Factories and Networked Enterprises are now a well-established concept that tries to foster the business development, especially for SMEs (Small and Medium Size Enterprises). The current solutions in the area however, are still limited in scope at business and technological level. They lack appropriate means for provisioning and processing real-time information, needed for the efficient involvement of these enterprises in global cross-company distributed production processes. This concerns not only the static information about their products and manufacturing capabilities, usually published on their web sites, but also the dynamic information in terms of current capacity and resource availability. Current technologies do not answer adequately to the strong requirements of reliable end-to-end cross partner interoperability of ICT systems and to easily fuse dispersed assets such as processes, information, status and other resources. Thus a separate SME is not able to influence global production processes neither with passive participation nor with active entrepreneurship. In order to cope with the demand for improved flexibility and fast-paced business innovation, there is a need for a more integrated approach, which is able to establish, manage, monitor, and adapt Virtual Factories. In the above context, the paper is introducing and studying an innovative methodology and framework to support plug-and-play Virtual Factories based on cross-organizational manufacturing processes. This work is a part of the FP7 EU project ADVENTURE (ADaptive Virtual ENTERprise ManufactURING Environment). The focus is mainly on realizing the needed tools and methods for data provisioning and discovery to support the ad-hoc involvement of SMEs in Virtual Supply Chain networks and also to enable these SMEs to manage such networks in the role of entrepreneurs.

## **Keywords**

Virtual Factory, Networked Enterprise, Entrepreneurship, Manufacturing, ADVENTURE

## **1. Introduction**

In the recent years businesses more and more intensively use Internet in their attempts to improve their competitiveness and to successfully participate in the Global Market. Utilization of services like: Searching for potential customers and partners; Offering (advertising) products and services on websites; Selling and purchasing products and services in on-line

shops; Performing negotiations via email; Exchanging business documents via email, has become an usual practice. With the Information Technologies (IT) rapid growth and the shift from software to services these Internet instruments, have now to a great extent exhausted their exploitation potential and in many cases have showed as ineffective instead of bringing economic value. Entrepreneurs strive to overcome this by introducing more sophisticated means for electronic collaborations like Virtual Factories and Networked Enterprises that are now intensively developing in order to foster the business competitiveness, especially for SMEs (Small and Medium Size Enterprises).

The current solutions in the area however, are still limited in scope at business and technological level. They lack appropriate means for provisioning and processing real-time information, needed for the efficient involvement of these enterprises in global cross-company distributed production processes.

Current technologies do not answer adequately to the strong requirements for reliable end-to-end cross partner interoperability of ICT systems and for seamless fuse of dispersed assets such as processes, information, status and other resources. Thus a separate SME is not able to influence global production processes neither with passive participation nor with active entrepreneurship. In order to cope with the demand for improved flexibility and fast-paced business innovation, there is a need for a more integrated approach, which is able to establish, manage, monitor, and adapt Virtual Factories.

In the above context, the paper is introducing an innovative framework to support the vision of “plug-and-play” Virtual Factories based on cross-organizational manufacturing processes. This work is a part of the FP7 EU project ADVENTURE (ADaptive Virtual ENTERprise ManufacTURING Environment) that is developed under the “Factories of the Future” objective. The project aims at developing an end-to-end IT solution in order to achieve higher management efficiency and foster innovation in networked operations related to manufacturing, as well as to support the emergence of “smarter” virtual factories and enterprises. The project is in its initial, conceptual phase.

The paper is structured as follows: In the second section, Virtual Factory, the main concepts are defined and the challenges of the current solutions are analysed. In Section 3, ADVENTURE enterprise model is presented. Section 4 outlines the main innovative technologies to be exploited – Service Oriented Architecture, Data Provisioning and Discovery and Semantics and proposes advanced methods for their application such as Manufacturing as a Service. Section 5 concludes the presentation by exploring the clear advantages the ADVENTURE solution will have on entrepreneurship at EU level and more concretely in supporting the ad-hoc involvement of SMEs in Virtual Factories and also in enabling these SMEs to manage such networks in the role of entrepreneurs.

## **2. Virtual Factories and Challenges**

Manufacturing of complex products nowadays is seldom a self-contained process that is carried out by a single company. In fact, a number of partners are typically integrated into manufacturing processes forming so-called Virtual Factories. Relationships are established on short-term as well as a long-term basis.

There are a number of definitions of the term Virtual Factory. Some focus on the network aspect, others – on the virtual aspect. A Virtual Factory is defined in [1] as an integrated simulation model of major subsystems in a factory that considers the factory as a whole and provides an advanced decision support capability. It seeks to go beyond the typical modelling of one sub-system at a time, such as the manufacturing model, the business process model and/or the communication network model developed individually and in isolation.

A great number of other definitions of close or related terms Virtual Enterprise, Virtual Network, Virtual Factory are explored in [2]. The connective element of these several

concepts under the umbrella designation of Virtual Enterprise is the distributed operating and the common goal to operate efficiently and flexibly through cooperation.

In this paper we will refer to the following definition that best suits the ADVENTURE approach:

Virtual Factory is a temporary alliance of factories from multiple organizations, managed by a distributed, integrated, computer-based system that interfaces with all systems (of the partnering organizations) necessary for the design, production and delivery of a product.[3]

The general requirements emerging from manufacturing companies in that context are at least the ability to create flexible manufacturing processes that are controllable and manageable and thus sustain in global, highly competitive markets.

A variety of challenges arise with regards to such processes. For example:

- Currently, the real-time information that is often necessary to assess the risks and status of manufacturing processes is missing, or not shared by the respective Information Technology (IT) systems. It is normally impossible to drill down a complex supply chain where a supplier is also a customer to another supplier in the same process to fetch real-time information for the current state and future forecasts for the process.
- The high and often complex integration efforts required to ensure interoperability are an obstacle to the required dynamism.
- Missing ability to automatically generate data and information of the production process for further (automated) processing or manual consideration. There are often manual steps in data retrieval that form obstacles in this respect.
- Poor flexibility in manufacturing process due to lack of comprehensive and timely insight leads to poor corrective measures, high risks and waste, and a lot of manual adapting.
- Current solutions require manual work and seldom offer functionality to find appropriate business partners or to establish a business community if any at all. Tools or technologies to help align manufacturing steps with appropriate partners are missing as well, i.e. partners integration is far from seamless.
- Across different partners, a realistic estimation of the current status of manufacturing is still a problem. Monitoring of manufacturing processes is important, i.e., to permanently update, integrate, and consolidate process information provided by different sources. It requires well-integrated open infrastructure supporting partner interoperation and the ability to constrain data access and handle data respecting specific further restrictions, such as privacy concerns
- Measuring the environmental friendliness of a product (as intended by PCF – product carbon footprint) is yet another challenging issue when considering large stakeholder-spanning manufacturing processes. It requires tight integration, coordination, and unification of processes, standards, and data exchange, which is still a big challenge.
- In effect, the existing solutions have limits like:
  - Scoped at the business level
  - Provide an isolated view on certain virtual factory aspects
  - Simple extensions to classic ERP and SCM systems
  - Restricted to simple tasks
  - Limited integration from information sources (e.g. sensors)
  - Lack of distinction between internal and cross-organizational processes
  - Limited interoperability of systems/data across factories
  - Environment impact assessment as integral part of the factory design and execution is still not commodity feature

In addition, the seamless inclusion of SMEs is still a big challenge. They often lack means or resources to advertise their capabilities, particularly in their dynamic aspect (e.g. current

manufacturing capacity), in a manner that would be acceptable in a Virtual Factory dynamic process. This reduces their chances to be concurrently selected for participating in large cross-organisational processes and they miss business opportunities. Overcoming and solving these problems bears the potential to support in particular SMEs, which usually neither have the capabilities to control the whole manufacturing lifecycle nor the market power to enforce their own interfaces and standards, in manufacturing, to massively reduce cost, to increase competitiveness, and to generally improve production processes.

### **3. An Adventurous Enterprise Model**

The concept of virtual factories has been around for quite some time. It evolves with the maturing of technologies and the economic conditions. Through its innovative enterprise model ADVENTURE specifically addresses the competitiveness of SMEs in a highly dynamic world where it is vital to be fast in finding new and responding to emerging business opportunities efficiently and flexible in adapting to changing operational conditions. The model involves the steps of joining, searching, plugging and playing the ADVENTURE Virtual Factory.

The first step of joining the ADVENTURE is mainly related to data provisioning. ADVENTURE defines formal, structured, semantic-driven descriptions of factories, their products, their demands and offers in terms of semantically enriched services and their properties. Examples of such properties are skills, locations, standards, regulations, costs, material, capabilities, capacities, current capacities, availabilities etc. These descriptions are provisioned through the ADVENTURE semantic infrastructure and can be correspondingly found and compared and eventually involved into production processes by the interested parties at the second step - searching. This provisioning step also includes the definition of data formats for exchanging information between factories. This will ensure that factories can interoperate at technical level and that they can be involved in complex processes based on their abilities to offer competitive services in the next steps of plug and play.

The core of the ADVENTURE Virtual Factory is the "Smart Process", which integrates reusable smaller processes/services and other metadata, provided by the partners that take part in the Smart Process. This process is defined by the so called "broker" partner that plays a central role and manages the entire process. The broker designs the process by defining every step/activity of the process based on skill and technical requirements rather than identifying one particular partner who offers a distinct service. Further, through semantic search, ADVENTURE will recommend specific factories or a group of factories to the different steps of the process that best match the criteria for the concrete step as defined by the broker.

Next, through simulation, optimisation and forecasting the virtual factory brokers will be able to see the potential outcome for the worst case, based on criteria like costs, delivery time, carbon footprint, etc. The average potential outcome based on the selected factories will be also calculated, as well as the outcome of adding new factories or setting specific constraints to the process.

Once potential factories have been assigned to the different steps of the manufacturing process it can be executed i.e. play-ed, A step-by-step execution is performed, based on real-time monitoring. At the end of each step, an automatic decision is taken about the execution of the next step in order to optimize the requirements and metrics of the process. This adaptive execution allows for considering unexpected events such as delays in the manufacturing process, strikes, delays in the transportation, etc. Based on the current condition of the process, the most suitable factory will be used for the next step. This can also help to achieve load balancing and therefore to reach a higher stability and compliance of the overall process.

On Figure 1 the overall enterprise model is presented with the respective steps that constitute the ADVENTURE lifecycle [3]. The corresponding stakeholders and results are also depicted at each step

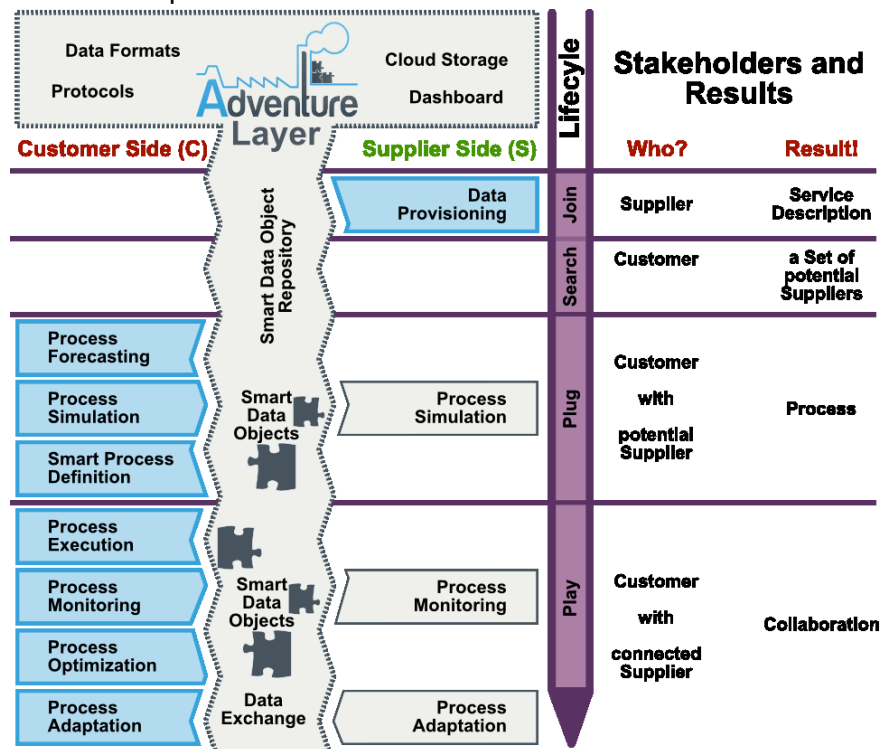


Figure 1 Adventure Enterprise Model

## 4. Adventure Innovative Technologies

### 4.1 Manufacturing-as-a-Service

The software industry has been moving towards software services for a decade. The technology shift fostered new opportunities for orchestration of distributed services, sometimes across organizations, and repurposing in order to produce brand new offerings. The conceptual enabler for this new technology paradigm and software economy change, known as Service-Oriented Architecture (SOA) is an object of intensive research and adoption in industry. Some key advances in this research area lead to (among many others) lowering the entry barrier for service provisioning and consumption [4], intelligent service discovery [5], business-oriented (key performance indicators driven) automation of service compositions, dynamic service binding, semantic interoperability of services and data [6],[7], automation of Service Level Agreements (SLAs), end-to-end monitoring, simulations [8].

Research projects like SOA4All [4] have studied the opportunities for boosting the adoption of SOA by increasing the automation and in the lifecycle phases by means of semantic technologies. The result was a platform and tools that enable organizations and individuals to quickly sketch processes focusing on their business goals, abstracting from the technical implementation, which can be completely or semi-delegated to the automated recommendation and matchmaking system to select the right service providers and services to do the job according to the settled constraints and even propose and change the process structure according to best practice patterns. Services that participate in this process as potential matches are heterogeneous resources described with lightweight semantics and can also be either REST or WebService implementations. The interoperability of the services

is ensured on technical level, by employing the Web Service standard and on semantic level, by employing domain ontologies and mapping their concepts in service inputs and outputs.

In effect, this approach proved to be able to lower the barrier for business users, decouple significantly the business process modelling from its technical implementation, seamlessly integrate best practices and process patterns, and dynamically and quickly adapt to changed requirements.

These are compelling results and concepts. The task to study how they can be transferred to the world of manufacturing, more specifically – into the Virtual Factories to offer Manufacturing-as-a-Service paradigm, is subject to several research projects, among which is ADVENTURE[3], where this approach is referred to as a ‘plug-and-play’ Virtual Factory.

A Virtual Factory can be thought of as a ‘system of systems’. In particular, it can be seen as an organized composition of software information services provided by the partnering organizations IT. One of the key requirements to a contemporary Virtual Factory, particularly in cross-organizational scenarios and especially when SMEs are involved is the loose-coupling of the partners. Interoperability as a minimal sufficient requirement to a functioning process is favoured as compared to integration that locks in parties in long term and costly relationships and this reflects the dynamism of the business. SOA is seen as a natural solution to this and ADVENTURE will employ the power of SOA as an architectural approach and enabler for cross-organizational orchestration of loosely-coupled, distributed partner services in a plug-and-play Virtual Factory process.

ADVENTURE defines the Virtual Factory process as an abstract process that is a reusable and adaptable blueprint specification for the intended business goals of the process broker by means of activities and process-level constraints and requirements. The system will then look for partner service providers that will match best the process specification and may propose further optimizations according to best practices or ‘second best options’ and produce the final, concrete, executable process instances. When the process is executed, the system will orchestrate and monitor the execution of the services at runtime.

The current state of the IT support of Virtual Factories suffer from many limitations in the seamless information flow that lead to loss of efficiency and correction options. ADVENTURE aims at reducing and eliminating the lack of transparency of information for the state of the Virtual Factory process at runtime, by means of a comprehensive monitoring and message exchange platform that will provide runtime information, reported by the services that constitute the process. The platform’s role is to integrate information from heterogeneous, distributed service providers, including e.g. sensors as smart objects that offer information services, ensure semantic interoperability, provide secure channels, respect involved parties privacy and authorization and finally deliver to interested parties as an appropriate format for further processing by custom tools or easily comprehensible, human readable form.

The complex, structured information delivered by the Virtual Factory monitoring is intended to provide timely feedback on critical operational issues. The corrective measures based on that information can be manual or delegated to ADVENTURE’s runtime adaptation capabilities.

ADVENTURE aims at innovative application of latest technology advances from software engineering and internet of things research areas into the manufacturing domain in order to realize fostering of innovative business models and execution effectiveness through unprecedented dynamism, flexibility and transparency without compromising reliability or locking into costly integrations.

## ***4.2 Data provisioning and discovery***

In order to be able to provide the above described functionality, ADVENTURE requires appropriate data definition and maintenance. As far as many different independent parties are involved in the virtual manufacturing, ADVENTURE faces the challenge of integrating

data from different origins and sources. In this regard efficient Data Provisioning and Discovery is of major importance and constitutes a substantial part of the ADVENTURE research and development.

Along with the data representations, Data Provisioning and Discovery includes also the respective mechanisms that act upon these data representations, that is, for provisioning (or deployment on the platform) and discovery (or search inside the platform). The mechanisms may appear at different levels, i.e., they may concern business activities, manufacturing processes, companies, factories, services, offers/demands, information resources, etc.

Referring to the enterprise model and its steps, as described in the previous section, it is obvious that Data Provisioning and Discovery is an important part of each step (join, search, plug, play). Following is a description of the ADVENTURE functionalities with the corresponding Data Provisioning and Discovery Support.

An entrepreneur wants to join ADVENTURE, in order to find appropriate suppliers for its products development. In this case the entrepreneur will be in the role of the process broker. ADVENTURE provides the Broker with a user-friendly interface (part of the common ADVENTURE interface called Dashboard) and a logically separated Repository (part of the cloud based ADVENTURE storage) where Broker's ADVENTURE Information Resources are maintained. These include: access Information (authentication and authorisation), broker's business semantics (descriptions and data), internal production services, external production services, communication points, manufacturing process models, history of the executed processes, messages exchanged (descriptions and data). This information constitutes the Broker's ADVENTURE Operational Environment that supports the definition, simulation and execution of virtual processes for optimizing and managing distributed manufacturing. The Broker is responsible for maintaining the concrete ADVENTURE Operational Environment but there are also some parts of the information (such as actual capacity) that should be maintained by the external partners.

Further, through ADVENTURE tools, the broker can construct new production process in terms of production activities (steps) and the corresponding criteria (time frames, production services requirements like effort, machines, raw materials, and intermediate products) for every step. The appropriate semantics should be constructed and provided for describing the specifics of the broker's processes. It contains descriptions of produced services, as well as of production activities (steps), services needed for every production activity, quantity and quality metrics currencies, etc.

The production process includes two types of production services. Internal production services are provided by the broker's internally (within the broker factory). Every single factory uses specific means (semantics, syntax and formats) supported by its ERP/Legacy systems to describe the internal production services through their master/reference data. ADVENTURE considers all these means as broker's internal semantics. External production services are provided by external partners (suppliers). For describing the external services ADVENTURE common ontology is used. Further in order to be aligned and to support the search of appropriate partners, internal semantics is also mapped to the common project ontology.

While the internal production services are relatively constant for broker's organisation, there could be a variety of external production services provided by different suppliers. When designing the process (and supported by simulation and optimisation mechanisms), the broker selects the most relevant (based on the requirements) external production services for each step and assigns them as default services (provided by default suppliers) for the production process model. The ability of the different suppliers to ensure the needed quantity of services however, varies over time, as they have to fulfil many different orders (also outside ADVENTURE). Thus it is possible during process execution a default supplier not to be able to deliver the default external production service (or not to be able to fulfil some of its constraints like quantity or time) within the current Virtual Factory. In such case external production service from other suppliers should be involved (at run time also) for producing



the final product. In order to be able to perform the described supplier change the broker should have available at hand a number of candidate external production services that are considered appropriate to participate in the concrete production process. In this regard ADVENTURE provides the needed instruments to organisations/factories to publish information about the production services they offer. Through the semantic infrastructure every organisation/factory can create and maintain appropriately formed and annotated profile. Thus it will be visible for potential customers within ADVENTURE community and further involved into Virtual factories.

ADVENTURE provides capabilities for performing semantic search through the ADVENTURE Infrastructure. The broker can search the listed in ADVENTURE companies and find the production services that fit best to the specific steps of the broker's production process. Then the broker assigns these production services as appropriate for its production process as well.

In a case when no suitable service provider is found within ADVENTURE community such providers can be found outside ADVENTURE through conventional means. Nevertheless in order to be further involved in broker's process and to allow monitoring at runtime the information of this service provider should be inserted in the appropriate format in ADVENTURE.

Though negotiation is out of the scope of ADVENTURE research, some of the results and terms from agreement are considered to be important and further reflected during monitoring. Conditions from negotiation with the provider include among others the method and format through which this external service will provide its data (e.g. current capacity). Several methods of maintaining the current provisioning capacity are foreseen: manually by the broker, manually by the external production service provider, automatically through ADVENTURE; automatically by the ERP/Legacy system of the external production service provider

Depending on the agreement conditions (e.g. the production services provider may want to be listed in ADVENTURE), the broker can further introduce production services in ADVENTURE.

If the broker has found a partner outside the ADVENTURE, he/she can introduce the partner's profile into ADVENTURE as a potential partner for the broker's process. If the partner agrees, the broker can indicate the partner's profile (services) as public and thus make it visible (findable) for other entrepreneurs through ADVENTURE.

After the production process is modelled, the broker can publishes through the ADVENTURE Infrastructure the demands of External Production Service as a kind of Request for Quotation (RFQ). This RFQ is not directed to a separate preliminary known supplier, but is made observable for all potential suppliers. Services providers can browse ADVENTURE in order to find appropriate RFQs that they could satisfy. When a company detects the broker's RFQ it can propose its service for satisfying this RFQ and after the corresponding negotiations this service can be indicated as external production service for the production process. This feature increases the probability to meet entrepreneurs and suppliers.

### **4.3 Semantics**

Semantics has an important role in the ADVENTURE approach at Virtual Factories.

One of the key concerns in organizing partner services in a Virtual Factory as coherent, fluent mechanism is the interoperability between these services.

Interoperability in theory can be split in different levels – technical, semantic and organizational [9]. Semantic interoperability is a non-trivial task that often requires domain knowledge. Two semantic constructs are interoperable if the meaning of either of them can be unambiguously matched to the other by the processing software. A common practice for realizing this goal is to map semantic concepts, either directly or indirectly (via another

semantic construct). This kind of interoperability is essential to the smooth operation of the services in the process as their inputs and outputs in the process activities will be semantically coherent.

On the other hand, a key feature in ADVENTURE is the provisioning of partner services to the platform in a manner that allows a high level of automation in the process of matchmaking of service providers for a process in the design and runtime phases of a virtual factory lifecycle. Semantic description and intelligent matchmaking and inference are the enablers of these mechanisms.

ADVENTURE aims at creating reusable semantic assets for a diversity of ADVENTURE applications for different entrepreneurs as well as reusable for other kind of business applications. This is an investment that is expected to improve the quality of the semantic assets, to foster a large community around them and ensure critical mass of ADVENTURE adopters. It will also allow ADVENTURE to contribute in developing global semantic assets knowledgebase in SEMIC.EU/Joinup initiative and other similar activities.

The semantic metadata used to describe the partner services in ADVENTURE has several aspects. It describes both the business entity providing the service and the operational parameters of its offered service. All of these are captured in ontologies and provided by the platform's Data Provisioning and Discovery component.

The solution for employment of semantics in ADVENTURE presumes semantic construction on three levels:

- *ADVENTURE ontologies.* This level introduces upper ontologies, presenting concepts that are domain neutral. An example ontology of this sort can be the Business Process Modelling Ontology[10],[11] that defines the core concepts in a process model and can be used to describe an ADVENTURE blueprint, smart process (Virtual Factory). All ADVENTURE tools share and understand the concepts in this semantic cluster. Other prominent example of a common ontology is GoodRelations, which can be used as a lightweight semantics to describe business entities and their services.
- *Domain ontologies.* In the real business world the semantics of an entrepreneur often includes concepts from different domain areas. For example, if the entrepreneur produces mixing machines for making bread, he needs a concept "Bolt" (from the mechanical industry domain area). But they probably also need the concept "Nutrient" (from the food domain area). This small example shows that the relation between an entrepreneur business and the ontologies used to describe the business is one-to-many. Within each industry domain there's defragmentation of the ontologies in use. Where possible, upper ontologies per domain will be introduced to reduce the opportunities for "knowledge silos". A prominent, practical tool to significantly improve the inter- and intra domain concepts associations is Linked Data [12].
- *User ontologies.* This level reflects the entrepreneur's internal, business specific semantics. Large enterprises often have developed internal knowledge management and ontologies. SMEs on the other hand rarely invest into this. However, in order to be able to include SMEs into the marketplace for business opportunities offered by ADVENTURE, they need to be semantically described as well. This means that their internal concepts need to be mapped to semantic concepts that can be resolved by the ADVENTURE mechanisms. Again a prominent inclusion mechanism here would be Linked Data but unfortunately there seem to be little or no Linked Data exposed on the Internet from the manufacturing domain. Thus ADVENTURE might be a pioneer in this.

## 5. Conclusions

Due to their important contribution to the European GDP and to the number of people they employ, European SMEs play a major role in the European economy and society. Currently, European SMEs operate in an open, global market, facing strong competition from large

companies and from non-European companies, namely those coming from BRIC countries, where, among other things, low labour costs and more flexible labour legislations represent a strong competitive advantage. This reality, together with the global economic crisis, turns product customization and quick time to market into key success factors, as European SMEs must create sustainable competitive advantages other than low prices. Product and process innovation and new business models are essential for the success of European SMEs in such a market situation.

ADVENTURE will help virtual factories and enterprises move beyond their existing operational limitations by providing concrete tools and approaches for optimizing the information exchange between factories, as well as the manufacturing process design and execution. The latter will be achieved by integrating runtime business partner selection, forecasting, monitoring, and real-time collaboration. Thus, the proposed environment will enable higher levels of flexibility, capacity and capabilities. This will enable European SMEs to create business ecosystems able to offer to their customers unprecedented levels of availability, capability and innovation potential.

Further, ADVENTURE will address the objectives mentioned above by simplifying the establishment, management, adaptation, and monitoring of dynamic manufacturing processes in virtual factories, building on concepts and methods from the field of Service oriented Computing, Data Provisioning and Discovery and Semantics and therefore benefiting from the progress that has been made in these domains during the last years, but also contributing to it.

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# Regional FutureWatch – a Framework to Renew SMEs' Competitive Advantage for the Future

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This paper describes the framework for regional anticipation and innovation system supporting SMEs' renewal and growth. Application of the framework will take place in Finland's semi-rural areas close to small cities around the capital region. The facilitation process is network-based consisting of developmental organizations, educational and research institutions and other support organizations. They together form the basis for regional development work as well. The main framework used is Learning by Developing (LbD) model. LbD is a pedagogical approach in which learning is linked to applied research & development projects and regional developing. The emphasis is given to the social interaction, knowledge and competence sharing, researching and problem solving. LbD improves mobilization of talent resources of the region, which allows new ways for innovative knowledge creation. Learning, research and development practice meet to add value to the reach activities and region. For the companies LbD offers the knowledge, creativity and the contact network of the universities including their students and staff. The basis for our work has been created by studying innovation processes in SMEs. We have also conducted several workshops in order to find out the expectations for innovation and development support from the universities. We to create a regional model to support different actors, information, competence and perceptions coming together for decentralized anticipation and innovation platform to enhance SME's ability to innovative and compete in long range. Our framework includes elements from the futures research methodology and foresight practises. The background theories are open innovation and communities of practise.

## **Keywords**

Anticipation, foresight, open innovation, regional development, SMEs

## **1. Introduction**

SMEs have an increasing role in economical renewal capacity of a region. In this context competence is a necessary [1] production element. Its development requires dense and stable relationships between companies, change agents to drive the dynamics of the change and creation and further improvement of networking functions. Networks are necessary both for the transition and development of capabilities. They also are essential for the innovation process as well as productivity. The development requires positive social environment and culture.

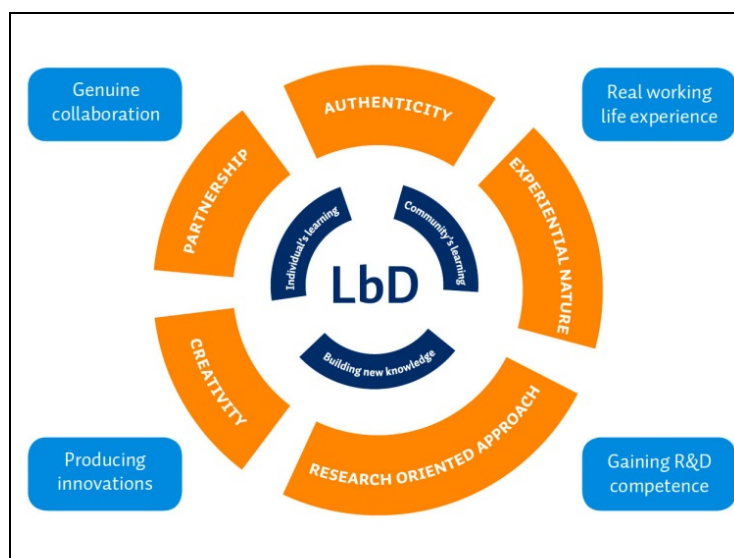
Regions can be considered to be islands of innovation and entrepreneurship [2]. The regional stage can be exceedingly dynamic. It can enhance learning processes, innovation and techno genesis and at the same time reduce uncertainty. Regional dynamics is based on the networking concept, which is the basis for regional competitive advantage, communication networks, network structures and service institutions. Networks create channels for effective logistics, marketing, information gathering and processing.

SMEs very often lack the necessary competence for innovation and growth, which are very difficult to obtain without interorganizational cooperation. Therefore we intend to drive the network based development where the necessary elements, actors, resources and surroundings, are brought together. There is a call for regional change agents and universities of applied sciences are by law expected to support regional development and SMEs. A survey on Finnish regional development to solicit information about power, influence tactics and competence in the context shows, that interpretive and network power are more important to regional development officers than institutional and resource power [3]. Could a university be a regional knowledge creation enabler?

## 2. Theoretical framework

### 2.1 Learning by Developing

Laurea University of Applied Sciences uses a pedagogical approach called Learning by Development (LbD). The LbD action model centers on a development project that is genuinely rooted in the world of work, requiring collaboration between lecturers, students, workplace experts and end users. A project forms a learning environment, where progress is made through the identified stages and true outcome is learning in individuals, leading to personal professional growth, as well as learning in a community, and finally the production of new knowledge [4].



**Figure 1** Learning by Developing, LbD-model [4, 5]

According to teachers experienced in LbD, the defining characteristics of LbD are authenticity, partnership, trust, creativity and an investigative approach [4]. Authenticity arises from the genuine workplace projects that form the learning environment. Partnership is built on trust and on a commitment-inspiring agreement. All partners participate as equals, sharing experiences and finding meanings in order to produce new knowledge in their varying roles and responsibilities. The model is shown in figure 1. Its core elements are

individual's learning, community's learning and building new knowledge. LbD also forms the basis for the university's regional development and innovation work. It is a powerful tool for joint knowledge creation when used properly and with care.

How do we support the innovation process of the SMEs in open innovation surroundings?

LbD is targeted towards flexible use of university students in development activities. Their tutors are at the same time available for information transfer. Apart from that we arrange workshops where networking is possible with non-profit support organizations as well as other companies from the same sector. Widening of the foresight perspective is carried out through company customer surveys and workshops.

## ***2.2 Anticipation and foresight in regional and company context***

Studies have found three crucial success factors for future innovation in the region [6]: Foreign investments can act as a focus for cluster formation. State machine is important in kick-starting the networking process, building up supply chains and development partnership. Firms become more R&D and innovation conscious in clusters including university researchers. Corporate globalization strategies are meaningful only if local, regional and national differences exist and can be harnessed on a global scale [7]. This means that regional innovation policies should derive their parameters from a global horizon. They should also help in creating innovative local environment by the regional actors.

The advantages of regional innovation system are [8] common patterns of interpretation, institutionally embedded meaning system, stabilized regional cooperative networks, institutional density and recombining ability of technical knowledge, institutional learning processes and problem-related recombining of technical knowledge by academia and industry. Success factors are innovative capacity of the companies, regional interactions based on trust and reciprocity and feeling of belonging. Main obstacles are difficulties of institutional change, cooperative as well as communication barriers between actors in different clusters. Foreseeing the future makes companies and regions to see or be aware of things beforehand. When used properly it may create competitive advantage. Foreseeing can be done with different concepts and techniques [9] for example extrapolation and analytical or judgmental forecasting using Delphi, S-curves, time series and trends, cross-impact or content analysis. Scenarios and environmental scanning can be seen as managerial efforts to create the future. Innovation through creative imagery, action and politics are means of creating the future.

The concept of megatrends [10] was launched in 1982. They were ten most important, overarching trends influencing our lives when entering the new millennium. Each megatrend generates societal needs on a global scale and gives rise to profound changes in both personal and professional daily lives. Needs could form a basis for new industries to provide the products and services demanded. In finding new business and product ideas the concept of minitrends [11] could be more useful. Minitrends are emerging trends that may not be recognized, but promise to become important to your business, field or life in 2-5 years. Minitrends go hand-in-hand with megatrends, but are harder to spot. The concept encourages the adoption of a mindset that opens our imagination. Many possibilities are afforded by modern globalization and societal change. Demographics as they are today offer a few awesome scenarios [12]. In order to achieve growth the companies should use different methods of foresight as it could create significant value in innovation [13].

## ***2.3 Open Innovation and communities of practice***

Current understanding of innovation process emphasizes the role of networks and innovators working together. Innovation is manifested in the interaction of interdependent actors, learning and exchanging information [14], in a system. All this is based on trust and its

building up continuously in the joint processes. The role and nature of trust [15] is important in global knowledge sharing. It should also be studied in more detail within regional context. Incremental innovation has become crucial for the survival of the firms [16] requiring many learning interfaces inside and outside the firm. As rapidly responding innovation processes increase the importance of multi-skilling and networking skills, learning becomes crucial part of the overall firm performance. The stages of learning include learning by doing, by using, by interaction and also by learning. Innovation requires institutional learning concepts and probably the regional concepts as well. Reflexivity, transdisciplinarity and heterogeneity can be enhanced in the context of innovative regional clusters.

Future performance of innovation system will mostly depend on social processes between regional economic actors. This also requires certain critical mass of the regional institutions. Characteristics of communities of practice [17] are: body of common knowledge/practice, sense of shared identity and some common or overlapping values. Lack or limited shared identity and consensual knowledge base can inhibit inter-community knowledge processes according to case studies. This can be tackled by development of trust. One of the key questions is the mechanism of trust building in regional context. Other important questions to be answered include: who are the regional players and how the process should be facilitated to make regional anticipation system work effectively.

Barriers to sharing knowledge are awareness, access, application and perception [18]. Overcoming the barriers needs central place where people can be found, directory of participants and their key skills and interests, evaluating the submissions to a repository, fostering a comfortable environment and increasing the visibility of member contributions. Do our regional systems have the elements needed for a community of practice and effective knowledge sharing?

## ***2.4 Regional competitiveness and growth of SMEs***

Regional competitiveness includes five critical components [19]: ability of the local companies to sell their products in competed markets, value of these product and productivity of the production process, effective use of local human and other resources, joint ability of the local actors to create new resources to enhance local competitiveness and joint ability of the local actors to use improved competitiveness for regional welfare and to create structures that support it. Open innovation exploits the inwards and outward flow of information to speed up internal innovation process and explore new markets [20]. The sources of external information could be anywhere: customers, suppliers, universities, competitors and partner companies. The new paradigm also means that the evaluation indicators for the success of innovation process should be revised.

Regional information networks may explain differences in the efficiency of open innovation. Regional innovation system can enhance institutional learning [21] and at the same time companies innovation processes. Innovation [22] can be regarded as a micro level interactive learning based phenomenon. Levels on innovation can be observed at three levels, technological or sector based, institutionally specific nationalized and spatially embedded. The regional informal networks benefit especially SMEs as they gain access to the local information communities [23]. Small companies are more bound to deep and long-lasting relationships [24].

Empirical research [25] has pointed to innovation as a key factor in the high growth of firms. However the studies also confirm that any firm can be a growth company. SMEs studies [26] suggest that the enterprises characterized by radical and diversified innovation development are younger than the non-innovators or the incremental innovators. The findings reveal only a weak relationship between growth and innovation performance. Innovation process uses tacit knowledge which transforms best in close cultural and spatial connection. Organizational closeness arises from shared values [27]. Outside institutional and geographical structures determine the information flows that are available for the companies.

Universities can be part of networks in many ways: education, research and students' participation [28]. Information may also include non technological and tacit knowledge, which is more valuable for innovation [29]. The supporting factors for the company growth are positive business environment, encouragement of entrepreneurial attitude, training of SMEs especially in management skills and promoting innovation and internationalization. One of the challenges is that SMEs have particular difficulties in implementing cooperative relations [30].

### 3. Findings

The innovation process and the needs of the SMEs have been studied by carrying out a company survey as well as seven company interviews. In addition, two company workshops was arranged to discuss in detail, what the regional cooperation needs and expectations in the direction of universities are. The findings are based on discussions in small groups and their joint analysis together with researchers, SME representatives as well as national and regional level developmental officers.

The innovation process of the interviewed machinery and metal sector SMEs in Western and Central Uusimaa region is still unclarified and contact networks diffuse. The majority of SMEs do not have an own product, which makes development of the production their priority area. For the same reason it is not, at least alone, possible to expand functions abroad. There has been very little, if at all cooperation with the universities. The SMEs wish the university representatives to visit the companies more often in order to able to deliver company based development services. Our studies also verify that the innovation process of SMEs is mainly based on tacit knowledge. Its focus is in incremental innovation and the production system. Main sources of innovation are customers and suppliers. The background interviews and workshops gave us implications on the university services needed by the private sector. They can be divided into three categories (table 1): creating an open innovation environment, anticipating the future customer and market needs and building new company skills and competence. The future customer needs and business concepts were studied and analyzed trough a case company survey and a workshop.

**Table 1** SMEs views on University's role in helping companies to grow

<b>Construction of an Open Innovation Environment</b>	<b>Anticipation of the Future</b>	<b>Developing Capabilities and Knowledge Base</b>
<p>Strengthening the flow of information</p> <ul style="list-style-type: none"> <li>- networks, personal relationships, nominated coordinators, conferences</li> </ul> <p>Supporting networking</p> <ul style="list-style-type: none"> <li>- student/teacher/researcher exchange, projects, collaborative workshops</li> </ul> <p>Creating an Entrepreneurial Atmosphere</p> <ul style="list-style-type: none"> <li>- less bureaucracy, flexibility, visiting lecturers from companies</li> </ul> <p>Feeding Local Buzz</p> <ul style="list-style-type: none"> <li>- benchmarking, international networks, visiting lecturers</li> </ul>	<p>Exploring Customer Needs</p> <ul style="list-style-type: none"> <li>- www-surveys, trend analysis, foresight forums, foresight reports</li> </ul> <p>Exploring New Markets</p> <ul style="list-style-type: none"> <li>- student/teacher/researcher exchange, co-operation with different organizations</li> </ul> <p>Creating Competitive Edge</p> <ul style="list-style-type: none"> <li>- foresight, managing IPR issues, searching for international partners</li> </ul>	<p>Enhancing Dynamic Capabilities</p> <ul style="list-style-type: none"> <li>- lab services, virtual networks, opportunity recognition</li> </ul> <p>Improving Technological Knowledge and Know-how</p> <ul style="list-style-type: none"> <li>- benchmarking, co-creation, spin-off companies, risk management, company-orientated R&amp;D&amp;I activities</li> </ul> <p>Supporting Internationalization</p> <ul style="list-style-type: none"> <li>- knowledge sharing, student/teacher/researcher exchange, networks</li> </ul>

#### 3.1 Future customer needs

Our case company A is combining electronics, mechanical engineering and electrical automation to produce components and whole consumer electronic products for huge variety



of customers. Its competitive advantage is based on latest production equipment, talented personnel and flexibility throughout the production line. Customer tailoring is carried out in cooperation starting from material selection and production planning to fast high quality delivery. The production process needs constantly to be adapted to the varying customer needs. This is why the company is looking for proactive methodology still to improve its flexibility. The firm is operating in Lohja region with 120 employees and in Estonia with 30.

We conducted a Future customer needs -survey for existing and potential customers. The survey was sent to 64 companies of which one third replied. The findings of the survey varied customer by customer depending on branch as well. The majority of the companies (90 %) were interested in joint development activities. Most of the companies considered new products and services to be the joint focus area. One fourth also saw scanning the environmental challenges and developing functional systems together important.

Even though the answers were quite individual, most of the customers anticipated some or considerable changes in the products used during next 3-8 years. Products would include assembly services (80 %), testing (40 %) and R&D services (20%). When asked about the future challenges the top three were product development, quality and logistics. Partnership and internationalization, raw and other materials, production technology and operational systems were regarded important as well. The future cooperation would grow in marketing and expanding to new territories as well as productivity and cost reduction. The need for cooperation would reduce in strategy and quality areas as well as concept and prototype building and procurement. Some companies also regarded joint competence development as a new field of cooperation.

### ***3.2 Business branch focused scenarios with new business models***

Case company B is providing industry with conveyor and automation solutions as well as subcontracting services for maintenance, modernization and material supply. There is constant need for new planners as the business could be growing fast. New markets are emerging and this would mean a jump to new ways of doing things. The company is operating in Kirkkonummi region very close to the capital area. The cooperation included a workshop for branch scenarios and their effect on business plan development and models.

Idea creation happens through mutual change of information. Sometimes outside views are surged through networks. Personal relationships and chemistry are crucial for the network building. The success of the company is based on the ability to adapt to customer needs. Inventions can also include old solutions used in new environments or branches. The company intends to build a modular solution system as they regard innovation phase very challenging and time consuming. They have created a competitive advantage in fast proto building and through it in production friendly solutions. Business branch development is expected to take place in food and energy sectors. Combining different know how and solutions gives a lot of new possibilities. The problem is actually not the lack of ideas or innovation, but how to build them in new businesses and growth without losing the ability to innovate. Several possibilities for growth generation were found: establishment of a company board, company to company mentoring, benchmarking the growth patterns of SMEs and outside financing to research functions. All include the identification of current competency profile and a plan to its further development and securing.

The three dimensions of the regional development work described earlier are needed in order to fulfill the needs of SMEs. Because the primary task of the companies is to maintain their long-term competitiveness and growth, they cannot always allocate sufficient resources for the other developmental measures that would also serve these goals in long run. This is why Laurea University of Applied Sciences aims to build up permanent structures and service models to reply especially to the needs of SMEs. We will continue to provide regional cooperation and networking possibilities between companies and different support organizations.

## **4. Regional anticipation and innovation system building**

### ***4.1 Knowledge creation and innovation***

Nonaka & Takeuchi [31] have based on their studies created common framework and rules for management to guarantee effective knowledge creation within a company. It includes a vision to guide it, personnel for doing it, dense networking and outside information channels, utilization of the innovation process for new product development as well as adoption of new management and organizational systems. The process model for knowledge creation is dynamic. The new theory links knowledge creation to competitive advantage for firms competing for markets [31].

The six phases in the process of technology transfer are creating relationships and image, building contacts between the sources and receivers, finding the vehicles and channels, transmitting, receiving and application of the knowledge [32]. The forms of transfer can be human capital, written or oral, hardware or tacit knowledge. Barriers for technology transfer are related to market, sociocultural environment and time and space. Even if the knowledge transfer is nowadays seen more widely and part of the barriers has been overcome by technological solutions, some of the barriers like language, culture and rural areas still exist and need to be tackled case by case.

Knowledge creation [33] as a source of competitive advantage needs to be supported by managers. This is called knowledge enabling. Organizational knowledge creation is sharing tacit knowledge, creating concepts, justifying concepts, building a prototype and cross leveling knowledge. Knowledge creation may occur in interaction with salespersons and new customers or any other interaction.

### ***4.2 Innovation system, process and networks***

An innovation system consists of elements and relationships that interact in the production, diffusion and deployment of new and economically useful knowledge. It is a social system with common analytical framework. "The innovation system of a specific territory consists of a set of institutions whose interaction determines the production, diffusion and use of economically useful knowledge [40]."

The Finnish innovation system [35] is for several reasons facing new challenges. There is a need for new thinking from innovation process to industrial clusters, from optimization to identification and elimination of the bottlenecks and from systemic approach towards interaction and learning networks. Success requires innovation capability and innovation requires the right surroundings and right networks.

Innovation processes involve the exploration and exploitation of opportunities for new or improved products, processes or services. Because of the high degree of uncertainty in innovation, innovation processes involves a process of learning through experimentation or theory. From this framework innovation is constructed into three overlapping processes: the production of scientific and technological knowledge, the translation of knowledge into working artifacts and responding to and influencing market demand. [34].

The obstacles for innovation [36] are mainly the lack of interdisciplinary cooperation and international cooperation. From the company perspective the deficiencies are economical resources and knowledge problems [37]. The social nature of innovation [38] also creates challenges. The core competence in regional development [39] have been found to be approaching the learning region thinking where innovation system is a combination of educational, research, R&D&I financing, innovation and cooperation network systems. Learning regions include also traditional companies and lower level educational institutions. Studies have also found that non-rural surroundings can restrict the innovation activities.

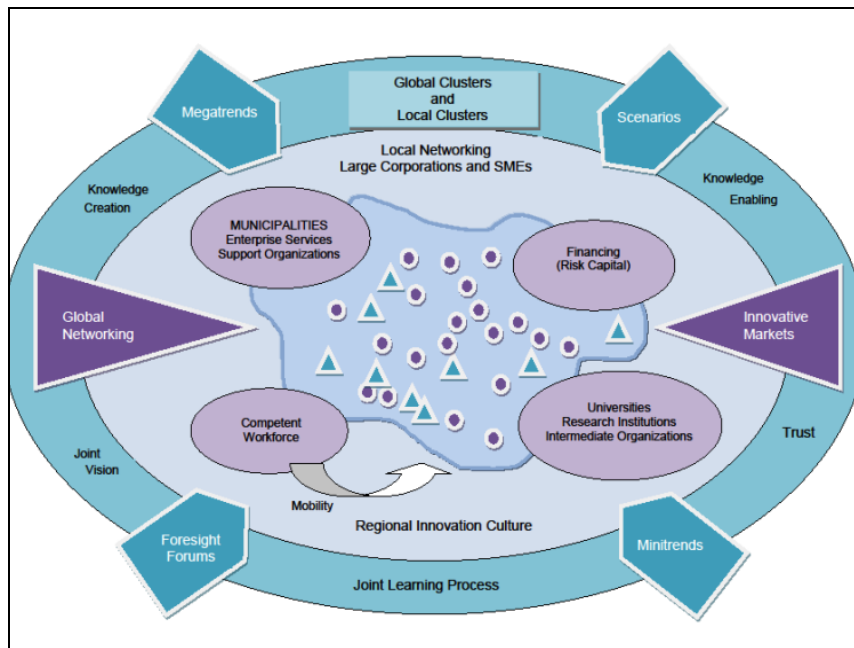
There is a need for peripheral innovation system or peripheral learning model based on systemic innovation concept, incremental renewal, regional raw materials and values as well as regional uniqueness. Innovation capabilities of SMEs should take into account [39] that innovation system has two subsystems: knowledge creation and dissemination and utilization and application of knowledge. Three central processes needed in order to build joint problem solving within a community are social construction, collaboration and common language [41]. New communities and new technological practices can also emerge by increasing specialization, combining existing resources in a new way or adding social dimension of innovation through continuous conversation [42]. Knowledge-sharing and routines [43] within a company include innovation as learning by collaborating with other organizations. It is influenced by absorptive capacity [44]. The ability to recognize the value of new external information, assimilate it and apply it for commercial ends requires exploiting the outside resources of knowledge. SMEs seldom have time for doing this.

Innovation has three concepts: the process of developing a new item, the process of adopting the new item and the new item itself [45]. Customers' role in service innovation, idea generation and development can be operated through communities of practice [46]. They legitimate peripheral participation. Conversation is necessary to produce individual tacit knowledge and innovation [33]. The concept of Ba is revisited when user networks are used as sources of innovation, because they influence and generate innovation processes.

## **5. Conclusion: Regional FutureWatch creating Competitive advantage**

The idea of the Regional FutureWatch is based on former theory and practical findings during the process. Its purpose is to enhance innovation and business processes in SMEs. It is built on the following assumptions:

- The innovation process of SMEs is mainly driven by tacit knowledge.
- Sustainable competitive advantage of SMEs requires wide variety of innovations.
- Knowledge creation is based on communication and can be enabled by regional efforts and networking.
- Foreseeing the future may create competitive advantage both for the region and SMEs.
- Both the process of knowledge creation and dissemination as well as utilization and application of knowledge should be taken into account.
- The regional FutureWatch to enhance innovation and SMEs' competitive advantage need to build up vision, common language and concepts as well as trust between companies and the supporting institutions.
- The model stresses the role of local actors and the municipalities. They affect both the system of application of knowledge and establishment of transfer organizations.



**Figure 2** Regional FutureWatch (modified from innovation ecosystem [35])

The model will be developed and tested with a network of several regions including universities and other educational providers as drivers of the structure building.

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# **Internal and External Factors of Entrepreneurial Intention and the Influence on Small Business Growth : Evident From Small Firms Producing Locally Proceeded Food (Dangke) in South Sulawesi, Indonesia**

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Small scale of food processing industry are crucial to rural development in developing countries such as Indonesia. One type of small business scale in food processing industry that has long operated in Indonesia is small firms that processing bullalo milk into the soft cheese (local peoples namely as Dangke). Although the small firm have potential to growth but most of them not be able to growth became medium size. This research paper aims to contribute by applying the integrates internal and external factors of entrepreneurial intention on small firm growth. Data collected from 137 small firms Dangke in Enrekang, a district of South Sulawesi Province in Indonesia was selected using stratified random sampling technique were distributed proportionally according to age of firms. Data analyzed using path analysis that conducted with the help of SPSS. The results of this study found that internal and external factors of entrepreneurial intention influence the growth of firms directly and indirectly (interaction). Although there is no difference in influence between the internal and external factor, but external factors contributed relatively to the more dominant influence on the growth rather than internal factors. Including variation of firm growth rate, social economic of entrepreneur and firms characteristics are recommended for future research. In order to increase the growth of Dangke small firms, the entrepreneurs should responsive to the external factors, and local governments should help entrepreneurs in reducing the constraints of the external factors.

## **Keywords**

Entrepreneurial intentions, internal and external, small firm Dangke, Firm growth

## **Introduction**

Small scale of food processing industry are crucial to rural development in developing countries. By generating employment opportunities in the rural areas, small scale of food processing industries reduce rural-urban migration and the associated social problems. They are vital to reducing post-harvest food losses and increasing food availability (Austin, 1981; Saragih, 1994). In Indonesia, small scale of food processing industries also played a role as a rescuer of the national economy during the crisis years of 1998 and became a driving force which is crucial for national economic development. The amount of small food processing industries in 2009 was as much as 2,7 million, with employment as 8,09 million people, generating added value Rp 145.6 billion and export foreign exchange accounted for U.S \$ 13.69 billion (Director General of Small and Medium Industries, 2010).

One type of small scale business of food processing industry that has long operated in Indonesia are small firms that processing buffalo milk into the soft cheese, which local people namely as a Dangke. The Dangke was a typical local processed food that only produced by small firms in Enrekang, one district of South Sulawesi province. Small firms of Dangke in the Enrekang has been known since the early 1900s and marketing its products not only in the country but also has been exported to foreign country such as Malaysia (Marzoeki et al, 1978). Although small firms Dangke in the Enrekang has existed since long time but almost of the firms still remain on the scale of such firms at the time of its intention. While the theory of growth, the firm's growth is seen as a naturally occurring phenomenon that the firm will grow to an optimum size and therefore the growth of the firm changes from one equilibrium situation to a situation of equilibrium to another (Viner, 1932). The results of the baseline survey by Research Centre of Hasanuddin University on the growth of small firms Dangke in the South Sulawesi Province in 2008, showed that out of total of 115 small firms surveyed, as much as 45.57% had never add workers, as much as 31.64% increase 1-3 workers, as much as 12.66% increase 4-5 workers, and just as much as 10.13% increase over 5 person workers since the business was founded. One of our central interest lies in the following question: why small firm Dangke that have most growth potencies, such as a long live/higher survival rate, government support, market opportunity, etc but most of them do not even recognize their growth potential and therefore, they not able to growth became medium size firms?

Much previous studies on firm growth has focused on the observation in a large business or small business start-up, while the growth of small businesses that have long live and high survival rate received less attention but a lot of job opportunities are created by small firms that have long live and high survival rate (North et al., 1992). Then, the studies on small firms growth based on small firms in general; Those proceed focusing on small firms are producing processed food are sparse. Another limitation of previous research focused primarily on the internal and external factors of the firms such as government policy, limited market demand, accessing new markets, the cost and availability of finance, competition from home and abroad, managerial deficiencies, Shortage of orders, and domestic legislation. But these factors can not explain the phenomenon of differences in growth among small firms, as founded by Gadenne (1999) that, against other researchers' evidence, the internal and external factors of firm do not explain the performance of the small firms.

Few research have examined internal and external factors of entrepreneurial intentions (of starting up a business) influence on small firms growth, which Davidson (1991) and Foss dan Klein (2006) claimed the role of the entrepreneur in business formation and growth. According to them, small firm growth is an indication of continued entrepreneurship, entrepreneurs make decision to start a business to that of the decision to grow up. Moreover, studies on the influence of internal and external factors on the growth of small firms are fragmented into two streams. The flow of the first study that uses micro-environment approach (internal) primarily on the individual characteristics of entrepreneurs such as work experience, the source of initial capital and the psychological condition such as the support from nearest person (family), the desire for independence and the role model. The second research stream that uses a contextual approach to external factors beyond the control of individual entrepreneurs such as the availability of resources and technology, the availability of facilities infrastructure and government policies. As result of fragmented research, then research that integrates internal and external factors of entrepreneurship is a chain of research that is missing (Wijewardena and Tibbits, 1999; Liao et al, 2003). Thus, we need a comprehensive research, integrating the influence of internal and external factors of entrepreneurial intention on the growth of small firms that have long live and high survival rate such as small firms Dangke in South Sulawesi Province

Based on the above, this study aims to analyze and seek clarity the influence of internal and external factors of entrepreneurial intentions on the growth of small firm Dangke in the South Sulawesi Province. The findings will increase our understanding of the internal and



external factors of entrepreneurial intention (and their interaction) associated with the growth of small food processing firms.

## **Literature Review and Hypothesis**

### ***Definition of Firm Growth***

Expand the business scale is an important means of realizing the enterprise's growth. Non-classical economic theory and classical, all suggest that enterprises pursue economies of scale, the scale of enterprises to grow and develop continuously. The enterprise's growth is a process of development from small to large enterprise and of the weak become strong (Mao, 2009). Britton (1994), and Stanlake (1988) stated that the enterprise can grow in two ways, namely (1) internal growth and (2) external growth. Internal growth is a normal and natural process for many enterprises that started from a small scale, to obtain a continuous segment of the market and then expand by producing more (expand the market) existing products or to expand its product line. While the external growth is grow by acquisition and occurs by the take-over or a merger or integration.

According to Ylitalo (2010), there are several reasons why growth of small business has been in the focus of a large number of research studies in recent years. First of all, there is research to suggest that growth is one of the most important outcomes of entrepreneurial efforts because it indicates the degree of success in that effort. Second, new firms emerging, growing, and finally replacing the older firms is an important form of economic renewal. Thus also economists are generally interested in growth of firms. Third, from the economic and social point of view, there is the fact that firms that grow more are the ones that generate more new jobs. Firm level growth is a prerequisite for industry or national level growth, which eventually leads to creation of new jobs. Fourth, shareholder value has an upper limit regarding profitability improvement. Therefore pursuing sustained, long term growth is an important way of further improving the value of the firm.

### **Determine of Small Business Growth**

In their review of alternative conceptual frameworks for explaining SME growth, O'Farrell & Hitchens (1988) classifies business growth theory into four main groups, namely: (a) static theories of competitive equilibrium, (b) stochastic growth model, (c) a strategic management perspective on small firm growth, and theories of entrepreneurial choice.

In static theories of competitive equilibrium, the size of the firm is determined by the efficient allocation of given resources, including entrepreneurial resources, under given technologies. Accordingly, the observed firm size is the efficient size, in the sense that long run costs are minimized at that point. Growth follows from the assumption of profit-maximizing behavior and from the shape of the cost functions. A firm will grow until it has reached the size where long run marginal costs equal price, which is assessed as the "optimum" size of the firm. Thus, Lucas (1978) equates the firm with the entrepreneur or manager and he assumes that a firm's output is a function of managerial ability as well as capital and labor. Lucas postulates therefore one production technology subject to constant returns to scale, and a separate managerial technology with diminishing returns to scale or "span of control." Managers with higher abilities (i.e., higher efficiency levels) will have lower marginal costs and therefore will produce larger outputs. However, firm expansion will be limited due to decreasing effectiveness of the manager as the scale of the firm increases. An implication of the Lucas model is that, for a small business to grow, the small business owner must be willing and able to relinquish many day-to-day control functions and delegate those tasks to an enlarged, specialized management team. According to Lucas' theory, the variation in

levels of business acumen is the major determinant of business growth (as well as of business formation and dissolution). Alternatively, as proposed by Kihlstrom and Laffont (1979), the major determinant of business growth is the differing taste for risk among individuals. Thus, Kihlstrom and Laffont assume that production technology is risky, and that entrepreneurs who have the ability or propensity to take risks in the face of uncertainty will produce more output. Firm size is therefore limited by the entrepreneur's willingness to take risks. Jovanovic (1982) addresses these deficiencies by developing a model of the firm life cycle based on learning. According to Jovanovic's life cycle model, individuals differ in their entrepreneurial abilities (as in Lucas), but they are unsure of their abilities. In his model, production technology is risky (as in Kihlstrom and Laffont), partly because individuals are uncertain about their abilities and partly because production is inherently risky. His model also assumes that individuals learn about their abilities over time by observing how well they perform in a tough business world. Individuals who find out that they have underestimated their abilities in one period will expand output in the next, while those that overestimated their abilities will dissolve their business. Jovanovic's model has a rich set of empirical implications. Young firms have accumulated less information than older firms about their managerial abilities. Consequently, younger firms have more variable growth rates than older firms because they have less precise estimates of their true abilities. For the same reason it follows that there will be more exits among younger firms, but also that among surviving firms, younger firms will grow faster than older firms. As younger firms tend also to be smaller firms, Jovanovic argues that the same observations hold for small firms as well. Surviving small firms are expected to grow faster than larger firms and to have more variable growth rates.

In a stochastic model theory, developed mainly in the fields of economics, which, in summary, suggests that 'many factors that affect growth and, therefore, there is no dominant theory'. In this context, it is important to be aware of Gibrat's law of proportionate effect which states that an independent business growth rate of firm size. Empirical evidence that the law upholds Gibrat for manufacturing Small Medium Enterprises (SMEs), and they also mentioned the empirical support for the proposition that the variability in the rate of growth decreases with firm size increases.

In the perspective of strategic management theory, focusing on the strategic dimension to achieve sustainable growth and the way in which owner-managers respond to business and personal environmental indicators. Therefore, they concentrate on the identification of the owner-manager policy and strategy for business development and their subsequent translation into managerial actions that will lead to the development of sustainable business. This is considered a business strategy is determined by the perception of what the owner-manager wants, or thinks he can be, achieved through his business, in light of the opportunities and obstacles he sees. In turn, these aspirations and perceptions will be partly determined by personal characteristics of owner managers in SMEs.

In theories of entrepreneurial choice, people have certain characteristics that are associated with the propensity for entrepreneurship. Individuals who have more of these characteristics are more likely to become entrepreneurs than those who have fewer. An individual chooses to create a new business so as to maximize his expected utility. Utility, in turn, is a function of entrepreneurial or wage income, and of attitudes that affect the utility that the person derives from entrepreneurial activity, such as one's taste toward work effort, risk, independence, working close to customers, etc. Income, in turn, depends on the individual's ability to generate profit, such as managerial abilities to raise capital, and abilities to perceive new market opportunities and to innovate.

Pasanen (2006) reviewed literatures and presented classifications of factors affecting firm growth. First, the general preconditions for growth have been suggested Davidsson (1991): (1) entrepreneur's growth orientation; (2) adequate firm resources for growth; and (3) the existence of the market opportunity for growth). Second, Storey (1994: 158) claims that

there are three key influences on the growth rate of a small independent firm: (1) the background and access to resources of the entrepreneur(s); (2) the firm itself; and (3) the strategic decisions taken by the firm once it is trading. The most important factors associated with an entrepreneur are motivation, education, the firm having more than a single owner, and the firm having middle-aged business owners. The growth of the smallest and youngest firms is the most rapid. The location and industry sector also affect the growth. The most important strategic factors are shared ownership, an ability to identify market niches and introduce new products, and an ability to build an efficient management team. Storey argues that these three components need to be combined appropriately for growth to be achieved. Third, Gibb and Davies (1990), have grouped the factors explaining growth into four types of approach. These are: (1) personality-dominated approaches, which explore the impact of personality and capability on growth, including the entrepreneur's personal goals and strategic business aspirations; (2) firm development approaches, which seek to characterize the growth pattern of the firm across stages of development and the influence of factors affecting growth process; (3) business management approaches, which pay attention to the importance of business skills and the role of functional management, planning, control and formal strategic orientation in terms of shaping the growth and performance of the firm in the marketplace; and (4) sectoral and broader market-led approaches which focus largely on the identification of growth constraints and opportunities relating to small firm growth in the context of regional development or the development of specific industrial sectors such as high-technology small firms

## **The Entrepreneurial Intention and Small Firm growth**

Entrepreneurial intention emphasizes the convergence of attitudes and situational factors to influence intentions. Attitudes are grouped into two perceptions of desirability and feasibility (Shapero, 1982), and situational factors include economic environments, prior exposure to entrepreneurship, availability of role models and social attitudes towards entrepreneurship (London, 1983). Intentions are determined by attitudes and related to motivation, which is the driving force in decisions to begin a business. Motivation is influenced by perceptions of feasibility, a concept that is closely related to that of self efficacy. The concept of self-efficacy refers to a judgment of one's capability to accomplish a certain level of performance or achieve a desired outcome. It is the belief that one has the capability to perform certain tasks, as the strength of a person's belief that (s) he is capable of successfully performing the various tasks and roles of entrepreneurs (Chen et al. 1998)

The theory of the entrepreneurial life cycle of Hisrich and Peters (1995), states that the factors that motivate and lead individuals to grow their business are influenced by past events (background job), the present (the availability of financial resources, moral support from family / husband / wife, friends, relatives / children, parents, grandmothers, aunts, uncles, and suppliers), and the future (the desire for independence; role model of successful entrepreneurs).

Furthermore, the environmental control theory of Aldrich (1990), states that the external contextual factors motivate and lead the individual entrepreneur to grow his business. External factors consist of the role of government, the availability of infrastructure, availability of technology, availability of raw materials and market opportunities. Moss, (2007) stated that internal and external factors interact with each other entrepreneurial individuals in the affected entrepreneurs to grow the firm.

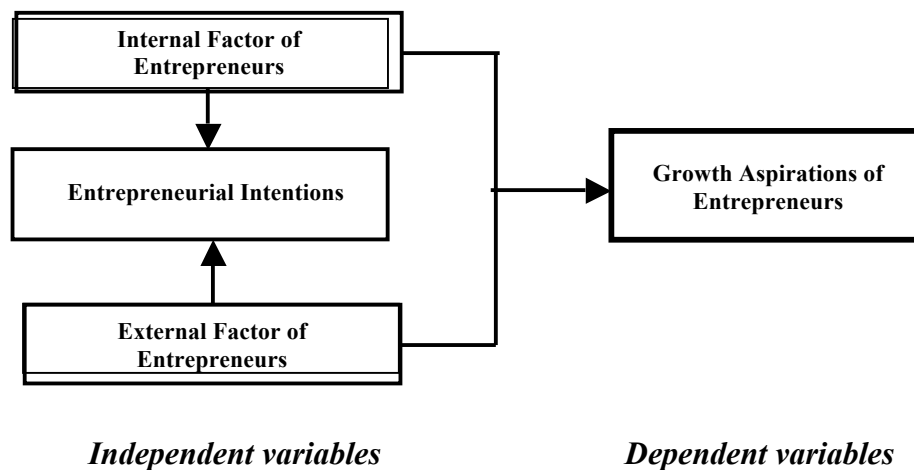
Theories of small business growth have extended analysis of the decision to start a business to that of the decision to grow the business. According to Davidson (1989, 1991), firm growth is an indication of continued entrepreneurship. Davidson notes that economic theories take the willingness to grow a business for granted, by assuming profit maximization. However, empirical evidence suggests that small business owners are reluctant to grow even if there is room for profitable expansion and that profitable firms of different sizes co-exist within

industries. Thus, Davidson argues that growth is a choice of the owner-manager and that profit maximization is only one of the possible motives for business growth. Davidson draws from psychological theories of motivation, which recognize that individuals differ in their motivational make-up. According to the "Need for Achievement" motivation theory, individuals differ in the degree they strive for achievement satisfaction. If profit is used as a measure of success, then the striving for achievement coincides with the behaviour predicted by profit maximization, but he stresses that the latter is neither the sole nor the dominant motive for growth.

Many forces that interact with each other in order to determine a person in decisions to begin a business. These forces grouped in two factors that are: factor internal of individuals, and the factor external or outside the individual (Lambing dan Kuchl, 2000). According to Ahmed et.al. (2011), as a matter of fact there are both internal and external factors that affect the entrepreneurial intentions but very few studies have taken a holistic picture of these factors of and its effect on small firm growth. Morris et al. (2006) stated that motivations for starting a business would seem an important determinant of growth aspirations, as those who are motivated by the desire to get welfare or to meet a challenge would seem more interested in growth than those motivated by a desire for personal expression. Liao et.al, (1999) have grouped factors of growth intention into two broad categories levels that is micro and macro. On a micro level, internal factors such as the motivations and aspirations of the entrepreneur. On a macro level, the external factors such as public policy, market infrastructure, financial markets and technological developments

Previous studies on internal and external factors of entrepreneurial intentions, Benzing et al (2009) on entrepreneurs in Turkey found that the success of small businesses affected by the attributes of personality and psychology of entrepreneur, and the external environment. Personality attributes such as education, and experience of the entrepreneur and the attributes of psychology / motivational factors (ambition, risk aversion, the encouragement to be independent, orientation to innovate) have a relationship with success, where the nature of environmental conditions are been found to relate to success, whereas environmental conditions would be related to satisfactory government support, access to capital and support of family and friends. Regersen (2001) studied small enterprise in Africa found that enterprise that successfully grow is to have access to markets, raw materials, technology, and capital from external sources, and is characterized by self-employment by level of education, technical knowledge and previous experience in large industry, capable of learn new skills, innovative and take risks. Arrighetti and Vivarelli (1999) found a positive effect of the background work on the growth of small business entrepreneurship. Bailey (1986) conducted research on Australian entrepreneurs found that work experience and the desire for independence is a major determinant of small business growth. Liao and Welsch (2003) found that small business growth can be predicted from the relationship variable micro (motivation) and macro variables (infrastructure, government support, market opportunities, access to technology and financing).

Based on the propositions of the theory and previous studies above, developed idea of the theoretical framework for this study (see Figure 1)



**Figure 1** Research Model

In figure 1 above appears, that there is a causal relationships between variables in this study, the external and internal of entrepreneurial intentions as the dependent variable or endogenous variable (result) while the independent variable or exogenous variables (cause) is a growth of business, where internal and external factors of entrepreneurial intentions supporting each other in influencing the growth of small business Dangke Therefore, we formulate and test the following hypothesis:

H1: Internal and external factors of entrepreneurial intentions influence directly and indirectly on the growth of small firm Dangke in the South Sulawesi Province.

To what extent is there a difference influence between internal and external of entrepreneurial intention to firm growth? It can be expected that individual runs a successful firms determined by motivation and goal to begin a business. if an individual begin a business just for additional source of family income (side work) and just for the fun, (s)he will have less willingness to pursue firm growth than someone who aims at making more money. Duchesneau and Gartner (1990) in an extensive field study of small firms in eight metropolitan centres in the southeast, central, and southwest Pacific regions of the United States. According to their findings, successful entrepreneurs were more likely to have been raised by entrepreneurial parents, and had prior start-up experience, had a personal investment in the firm. Indeed, Cassar (2007) shows that the value an entrepreneur places on financial success is a key determinant of growth preferences, intended venture size and achieved growth. Also, striving for independence is negatively related to intended employment growth. According to Autio (2005) high-expectation entrepreneurs are found to be more often motivated by a business opportunity (as opposed necessity motivated) than low-expectation entrepreneurs. Verheul and van Mil (2008) investigates the determinants of the ambition to grow among Dutch early-stage entrepreneurs (nascents and young business owners), find that fear of failure and entrepreneurial self-efficacy are important factors explaining growth ambition. Starting a business because of perceiving and exploiting a business opportunity (as opposed to starting a business out of necessity) is an important driver of growth ambition for business owners. We formulate and test the following hypothesis:

H<sub>2</sub>: There was no difference influence between the internal and external factors of entrepreneurial intentions to the growth of small firm Dangke in the South Sulawesi Province.

## **Research Method**

### ***Research Design***

According to the context of the purpose of research, this study is an explanative research (explanatory survey research) that seeks to explain the influence of internal and external factors on the growth of small firm Dangke in the Enrekang District. According to Cook and Campbell (1979) explanative research can be used to develop and refine the theory, and has the credibility to measure, test the effect of one variable to another variable by using inferential statistical analysis (inductive) because of the research was conducted through field data collection, the research method used a method of explanatory survey.

### ***Time and Location of Research***

Data collection of research conducted on small firms of Dangke in the Enrekang District of four months started from May till August 2011. During the data collection, the researcher acted as a force directly to the field of observation, so it is possible to fulfill the list of questions in the questionnaire completely and available data / information that is obtained from the questionnaires. In addition, it can collect more valid information and sharpen the overall analysis.

## **Operationalization of Variables**

- The growth of small firms Dangke is growth aspirations of entrepreneurs or owner of small firm Dangke. Growth aspiration is measured by willingness of an entrepreneur/owner firm to increase as larger as the firm size with increasing the amount of employee and sales in five years future, in accordance the firm potency (ordinal scale)
- External factors are contextual environment factors that isn't under control by entrepreneurs themselves that stimulate them to start up a business and make it to growth.. Indicator used is the government's support in creating new entrepreneurs, the availability of market infrastructure, availability of technology and skilled manpower, availability of raw milk buffaloes, the availability of machinery and equipment, availability of skilled labor, market opportunities (ordinal scale )
- Internal factors are the internal environmental factors that are within the control of individual entrepreneurs that stimulate them to start up a business and then make it to grow Indicator used is the availability of initial capital to start up a business, the desire for independence, moral support from family, the role models of successful entrepreneurship, and relevance of working experience with business Dangke (ordinal scale)

## **Sampling Methods**

The population of this study was small firms Dangke, with the criteria: had employees as much as 5-19 people had a net worth of at most 200.000.000 IDR, - excluding land and building of business premises; and had annual sales of 1 billion IDR (Director General of Small and Medium Industries, 2010). While the population target was small firm that has been operating for at least 3 years. The sample size is determined iteratively using the formula of Cohen (1969) in the Al Rashid (1994) as follow: For first iteration using formula:

$$U_p = \frac{1}{2} \ln \left( \frac{1 + \rho}{1 - \rho} \right)$$

$$n = \frac{(Z_{\alpha} + Z_{\beta})^2}{(U_p)^2} + 3$$

For second iteration and so forth using formula :

$$U_p = \frac{1}{2} \ln \left( \frac{1 + \rho}{1 - \rho} \right) + \frac{\rho}{2(n-1)}$$

$$n = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{(U_p)^2} + 3$$

Description:  $\rho$  is the smallest value of correlation coefficient among the variable causes (Xi) with variable result (Xj) that is in path, n = the sample size will be sought with the iteration technique,  $Z_{1-\alpha}$  = konstanta obtained from table distribution norms,  $Z_{1-\beta}$  = konstanta obtained from table distribution norms,  $\alpha$  = Error type I, and  $\beta$  = Error type II

By taking the value of confidence level (one-way test), test power, and the value of  $PX_iX_j$  ( $\rho$ ) = 0.36; obtained a minimum sample size in the third and the fourth iterative by 137 busines units, which is the minimum sample size that should be taken from the population. The sampling technique used is Stratified Random Sampling in proportion to the distribution of samples according to age of the firms as follows:

No.	The Age of the firm (year)	Total of Business Sample
1	3-8	41
2	9-14	38
3	15-20	25
4	21-26	19
5	> 26	14
Total		137

The selection of the sample respondents in each stratum performed randomly and all respondents were owner of the small firms. That autonomy as a decisive factor for growing business, male and females, and aged between 22-60 years with an average of 40 years

## Procedures of Data Collection

Type of data collected in this study was the primary and secondary data. Primary data was collected by direct interviews with the entrepreneurs/owners of the firm selected as a sample by using a list of questions that have been provided. The primary data collected include: the number of employee, a net worth, annual sales, net income from the year 2007-2010, year of intention, initial capital, growth aspirations, motivation to begin a business, availability of market infrastructure, raw materials, machinery and equipment, skilled labour, market opportunities, etc. Secondary data such as policy and local government program for Dangke small firm development, development of buffalo population and production, etc that obtained from various sources or agencies associated with this study such as the Department of Cooperatives and SME Development, Department of Industry and Commerce, the Central Bureau of Statistics, Department of Planning, and Department of Animal Husbandry and report the results of several previous studies relevant to the study to be conducted.

## Data Analysis Methods

Before the questionnaire is used, we tested the validity using the correlation of product moment correlation to determine the ability of the questions in the questionnaire items able to measure the variables under study, and test reliability using the Spearman Brown test to determine the extent of the questionnaire can be trusted (Singarimbun and Effendi, 1989).

Because of the being tested variable is a variable that has a causal relationship, then to detect a clear effect relationship between variables was used path analysis (causal modelling or path analysis (Dillon and Goldstein, 1984). To remind that the data collected are qualitative (data ordinal), and test equipment used is a path model that requires interval minimal data, then the ordinal research measurement are transformed into interval data through the method of successive intervals (Al Rashid, 1993) as follow :

- to consider each questions item.
- for each item counted frequency answer ( f ) , some of the respondents had a score of 1,2,3,4,5.
- determine the proportion (p) by way of dividing the frequency by the number of respondents
- to calculate cumulative proportion .
- to calculate Z value for each cumulative proportion obtained by using Z table Z,
- to determine the value of the scale (scale value) for each Z value with the formula :

$$\text{Scale value} = \frac{(\text{density.at.lower.limit} - \text{density.at.upper.limit})}{(\text{area.underupper.limit} - \text{area.under.lower.limit})}$$

The data were analyzed using SPSS-X Statistical Package for the Social Sciences. Because of this research problems were causal relationships (internal and external factors of entrepreneurial intention), then to analyze influence of these factors on small business growth, therefore, it's used path analysis or *causal modelling* (Chun Li, 1981).

## Results and Discussion

Testing the validity of questionnaire data both initial and final questionnaires for each item question, we obtained r tabulated > r table, with the confidence level of 0.95, the initial questionnaire r tabel = 0.496 and = 0.845 r table for final questionnaire. We then performed reliability tests using the Spearman Brown test with RI value of 0.988 obtained. Given these tests, we believe that all the questions on questionnaire are valid and reliable for the



research.

To determine the extent of internal factors of entrepreneurial intention (X1) and external factors of entrepreneurial intention (X2) influence the growth of small firms Dangke (X3), then statically test using path models as represented bt the structural equation follows:

$$X_3 = P_{X3X1}X_1 + P_{X3X2}X_2 + P_{X3U3}U_3$$

Where :

$P_{X3X1}$  = path coefficient from internal factors

$P_{X3X2}$  =path coefficient from external factors

$P_{X3U3}$  = path residue

With the operational hypothesis are :

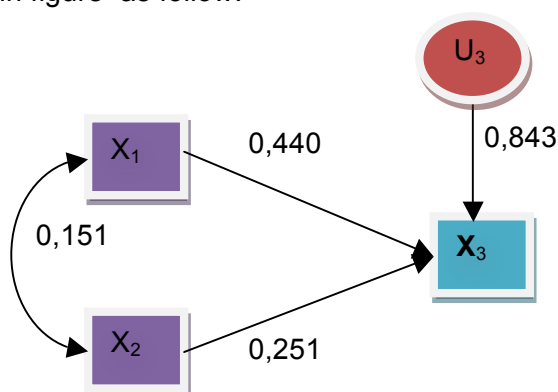
$H_0 : P_{X3X_i} \leq 0$  versus  $H_1 : P_{X3X_i} > 0$ ;  $i = 1$  and  $2$ .

To prove this hypothesis, an analysis of research data and test results obtained are presented in Table 1. below.

**Table 1** Statistical Test Results of Path Analysis Effect of Variables  $X_1$  and  $X_2$  On Variable  $X_3$

structure parameter	of	Coefficient e	Effect (%)	t.Hit.	t.Tab.	Decision
X3 to X1		0,251	6,280	2,562*	1,665	H0 rejected
X3 to X2		0,440	19,321	4,493*	1,665	H0 rejected
				F.Hit.	F.Tab.	
R2 X3 (X1, X2)		0,289	28,939	15,475*	3,117	H0 rejected
Residu path		0,843	71,061	-	-	-

In Table 1 above, it appears that all path coefficients are significant either simultaneously or individually, so that the path diagram or structural equation has not changed. Thus, the hypothesis that the variables  $X_1$  and  $X_2$  have direct and indirect to the  $X_3$  can be accepted as true. Furthermore, the analysis in Table 1 above can be translated diagrammatically as shown in figure as follow.



**Figure 2** Path diagram of relationships between variables  $X_1$  and  $X_2$  Cause Effect With Variable  $X_3$

In figure above appears, that the path coefficients of both variables causes  $X_1$ , and  $X_2$  have a positive coefficient and the path leads directly and indirectly due to the variable  $X_3$ . Overall, it was at 71.061 percent of the total variation in the variable  $X_3$  that can be explained by the variable causes of  $X_1$ , and  $X_2$ . 5. These finding suggests that entrepreneurs of the small firms are driven by an interaction of internal and external factors that enables them to be successful in relation to growth. Similarly, Papzan, et al., (2008) examined factors determining the success of rural entrepreneurs in Iran found that there was a significant

relationship between independent variables, consisted of internal factors of entrepreneurial intention (need for achievement, internal locus of control, innovation ) and external factors of entrepreneurial intention (marketing and lack of bureaucracy) and the dependent variable (growth). Therefore , this finding is fairly contradictory to the statement of Davidsson et al. (2005) that internal factors of entrepreneurs seems positive for the business growth to a certain point, but then the external factors of entrepreneurs determine another point.

Based on the results of statistical testing and path diagram above, the influence of the variable causes of varibal result can be described as follows:

- Internal factors significantly influence the growth of small firms Dangke. This means, that the internal factor which motivate entrepreneurs to begin a business Dangke may be encourage self- efficacy of entrepreneurs to grow the firms. For instance, .the role model and working experience is a major source of self-efficacy (Davidson,1999). When an entrepreneur have a higher of self-efficacy, (s) he will feel have abilities and be optimistic to achieve succeed in the future growth the firms. On the other hand, internal factor may be acts as a reinforcement for external factor, When an enrepreneurs have higher of self-efficacy, s (he) will confidence on the abilities to get resources from the external. Indeed, Hisrich and Peters (1995), states that the factors that motivate and lead individuals to grow their business are influenced by background job, moral support from family, the desire for independence; and role model of successful entrepreneurs. In line with these results, Perren (2000) found that internal factors are an important factor that stimulates the motivation and the perception of entrepreneurial to grow.
- External factors significantly influenced the growth of small firms Dangke. This means, that the external factors stimulate enrepreneurs to begin a business Dangke may be also encourage optimistic and perception of entrepreneurs to grow their firms. On the other hand, external factor may be acts as a reinforcement for internal factors and encourage optimistic caused completly perception of entrepreneurs to the risk of growth. In line with these results, Mead and Liedholm (1993), found that the main reason entrepreneurs are reluctant to grow the business is the lack of access to funding, lack of market information, lack of appropriate technology, and lack of support from the government. The study by Liao et.al. (2003) on small business in Romania, found that entrepreneurs will expand the market if available physical facilities and infrastructure, technology, noted that financial services, and support from government programs
- In addition to factors influenced by internal and external of entrepreneurial intentions, growrh of small firms Dangke was also likely influenced other factors that are not included in the model. Its known that firm growth seem to have many antecedents, as mentioned Davidsson (1991) that growth ability, need and opportunity as determinants of growth motivation, which in turn explains actual growth. In addition, a number of characteristics related to the entrepreneur and the firm has been cited to be connected to growth. The characteristics of the resources have also been cited to be connected to firm growth (Sutton, 1997; McCloughan, 1995; and Dunne and Hughes, 1994).

Furthermore, in order to know which variable causes the second dintara the most influential, performed testing the influence of differences between variables X1 and X2 to X3, and the test results obtained show that the t-Hit. (1.273) <t-Tab. (1.665) (nonsignificant), meaning that the greatest error of 5% can be stated there was no difference in effect between the variables X1 to X2 to X3. Thus, the hypothesis that there was no difference in influence between internal and external factors of entrepreneurial intention on the growth of firms can be accepted. This means that entrepreneurs of small firm Dangke ware driven by a combination of internal and external factors that enables them to be successful in relation to growth.

To find out the cause of the variable which contributes the most dominant influence in determining the growth of the X6, we then performed an analysis of the contribution of the influence (total influence) given by each variable causes. Analytical results obtained are presented in Table 2

**Table 2** Contribution Effect of Causes Variable ( X1 and X2 ) on Variable Result (X3)

Effect Variable	Donations of Effect (%)			
	Direct	By X1	By X2	Total
X1	6,280	-	1,669	7,949
X2	19,321	1,699	-	20,990

In Table 2 appear that the variable X2 contributes a relatively greater influence (20.990%) than the contribution given by the influence of variable X1 (7.949%). This means that entrepreneurs of small firms Dangke have greater willingness to growth when external factors support them, for instance the availability of market infrastructure, technology, raw milk buffaloes, machinery and equipment, skilled labor, and market opportunities. These finding are consistent with the situation in a rural economy of Indonesia, lower farmer family incomes push them to be entrepreneurs, with local knowledge they processing their buffalo milk into high value-added products (Dangke). Similarly, Abdul Kader et al. (2009) found that the external factors are more dominant than the internal factors in contributing to the successful of business of the small rural entrepreneurs under the One-District-One-Industry in Malaysia. Indeed, Ahmed et. al. (2011) stated that external factors are considered the most important factors, because these are out of control of the individuals. The external factor have contributed a dominant influence can also be associated entrepreneurs attitude that will serves them well in areas seeking funds and supports, and to keep themselves motivated, these so-called "lacks" in them will be overcome with their proactive and self-starter personality (Che Rose, et al, 2006). Moreover, there may be no adequate resources for growth, or the expected increase in business risks may limit a firm's growth willingness. However, aversion to growth has been said to be the principal reason why most SMEs stagnate and decline (Clark et al., 2001).

## Limitation of the Research

Even though this study has tried to integrate the influence of internal and external factors of entrepreneurial intention on the growth of small business (Wijewardena and Tibbits, 1999; Liao et. al., 2003), We have identified the major weaknesses that limited of this research. First, this research cannot explain direct and indirect influences of entrepreneurial intentions in the variations of the firm growth rate. Second, this research cannot explain direct and indirect influences of entrepreneurial intentions on the firm growth for various of the social economic characteristics of entrepreneurs/firm owner, characteristics of the firms. According to Davidsson (1999) and Pasanen (2006), some social economics characteristics of entrepreneurs/firm owner (i.e., age, vicarious experience, gender, education, cultures and beliefs, current employment status), characteristic of firm (growth strategy, market share, asset,etc) are important factor for determining entrepreneurial intentions. Therefore, we recomend for future research might cover both variations of the firm growth rate and variation of the social economic of entrepreneurs/firm owner and characteristics of the firms, Third, this research cannot explain what predictors of internal and external factors of entrepreneurial intention that have much dominant influence on growth of small firms. Therefore, we also recommend for future research might cover use data analysis with factor analysis or structural equation model (SEM).

## Conclusions and Recommendation

Based on data analysis and discussion of these results, it can be concluded as follows:

- Internal and external factors of entrepreneurial intentions directly and indirectly influence the growth of small firms Dangke in South Sulawesi Province or in other words,

entrepreneurs of small firm Dangke are driven by an interaction of internal and external factors that enables the firm to growth.

- Although there is no difference in influence between internal and external factors on the growth of small firm Dangke in the South Sulaesi Province, however it shows that external factors had influence contribute a relatively dominant/greater than the internal factors.

For future reserch, we recomend researches to explain direct and indirect influences of entrepreneurial intentions in the variations of the firm growth rate, and for various of the social economic characteristics of entrepreneurs/firm owner, and characteristics of the firms. We also recomend to use data analysis with factor analysis or structural equeition model (SEM) to explain dominant predictor of internal and external factor of enrepreneurial intention that ifluence on the small firm growth.

In practical, we recomend the entrepreneur of small firms Dangke should be more responsive to external environmental factors in order to obtain adequate resources and be able to reduce the uncertainties of the external environment in growing the firms. For local government, we recommend they should be more focused on how entrepreneurs can be motivated and driven in growing the business. It could be through the providing infrastructure, providing funding, intoduction to simple technology, providing raw materials with better quality, supplying machinery and equipment that help producer in producing healthy Dangke. In addition, the local government also should prepare training for enterpreneurs as well as access to the bigger market opportunities.

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# Enhancing Company's Every Day logistics Using Cargo Loading Optimization

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One of the biggest problems for the daily logistics is the problem of optimal transport of material goods. Thousands of companies worldwide in many industries have to deal with this logistic problem every day. Taking into account that transport is one of the most expensive processes in every company, even the smallest optimization can produce a lot of financial savings. For companies that need to transport a lot of goods every day an enhancement in this process can be even more significant. The subject of this paper is optimizing the transport in terms of optimal packing/loading of goods into company's transport resources (space utilization). Almost every company now days use Enterprise Resource Planning (ERP) system as a primary driver of the processes in the company. These systems are very sophisticated in the fields of procurement planning and production planning. But the ERP systems do not offer a solution for packing/cargo loading optimization. On the other side, these systems offer a lot of information like orders that need to be delivered, the size, shape and fragility of the goods, transport resources that the company owns etc. All this information is needed to apply cargo loading optimisation technique in order to optimise the loading of goods. We propose implementation of a sub system for packing/loading optimization that can be plugged-in to an ERP system. The sub system uses all relevant information for deliveries and based on that information creates an optimized cargo loading schedule utilizing the available space in the most appropriate company's transport resources.

## Keywords

Cargo Loading Optimisation, Logistics Operations Improvement, Space Utilization, Transportation Optimisation

## 1. Introduction

One of the biggest problems facing the daily logistics is transport of material goods. This problem affects thousands of companies worldwide every day from different industries. If we take into account the costs arising from transport, even the smallest improvement of this process can produce big financial savings.

Optimization of transportation covers two aspects, such as picking the shortest route to be passed in order to make transportation to all locations to which it is needed and finding the optimal schedule for loading transport resources with material goods that need to be transported. Choosing the shortest path is well known problem that has a lot of appropriate algorithms for its optimal solution. On the other hand, the optimal placement of material goods in transport resources is a problem of optimal use of 3D space which is still not explored in detail yet. For this problem there are a number of algorithms that offer fairly good solutions [2,6,9,10,12,13,14,16,20,22,23]. However these algorithms are usually limited to simple forms of elements that need to be transported in the correct space and form in which to be accommodated [2, 3, 5, 14, 16, 17, and 18].

The topic of this paper is the exploiting the optimal use of 3D space in sense of optimal placement of a given number of elements in a given finite space and that way optimizing the loading of the transport resources. People look for a solution to this problem for a long time in the past. Apparently back in the sixties of last century [4] when there appeared the need for optimal utilization of space. Since then this problem is quite researched and thus proposed a number of techniques for its solution. However, optimizing the utilization of space is still a current research topic up until today. Proofs of this are the papers that are published in the last few years on this subject [1,4,6]. The fact that researchers are still working on finding more appropriate and more complete solution to this problem suggests that this is an area where there is room for further progress.

Optimization of space utilization in spite of what is applied during the transport of material goods, finds application in other areas of daily logistics such as storage in the warehouse, packaging, etc. [5]. By solving the problem of optimum utilization of space in transport resources offers a solution for optimal utilization of space in warehouses, selection of optimum packaging for products that certainly contributes to higher savings in the long run companies.

In Section 2 we describe the transport management and how our application fits in it. Section 3 describes in detail how our solution works and all the factors that are taken into account. Section 4 describes how this application can be integrated into an ERP system.

## **2. Transport management**

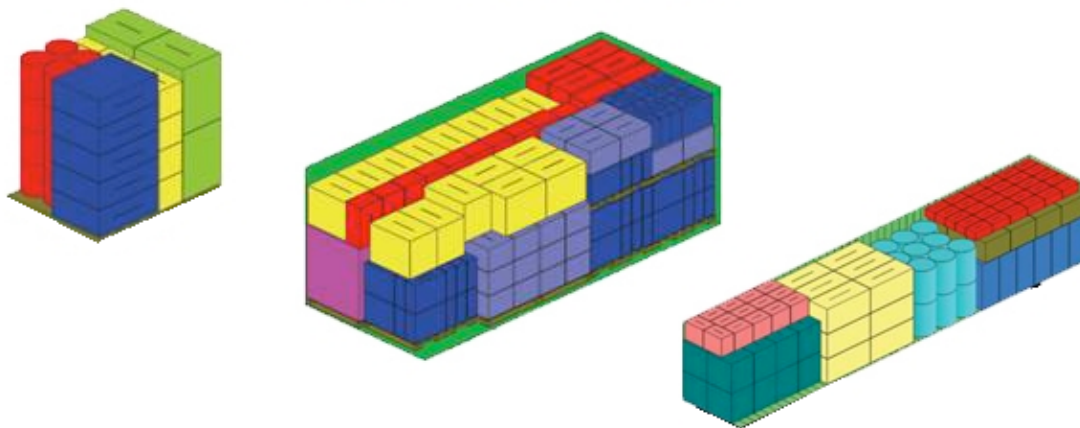
Transport of material goods, as a part of the company's logistic procedures, is an area that produces a lot of expenses. Transport management is very important in order to manage this area. As a part of the supply chain management, transport management plays an important role in the supply chain and deals with both inbound (procurement) and outbound (shipping) orders.

The term transport management is usually used to describe the process of finding the most appropriate route that need to be passed in order to deliver all the orders. But transport management also should deal with the process of optimal use of transport resources (use the most appropriate transport resource) and optimal loading of transport resources. This paper describes a way how to improve the transport management in the field of optimal use and optimal loading of transport resources. Consequently this improves the supply chain management and company's logistic procedures as a whole.

Improving the logistic procedures can create a competitive advantage over the other competitors on the market. The improvement on the transport management proposed in this paper reduces the time used to plan the transport and more important reduces the cost needed to carry out the transport. Both provide the company with financial savings and consequently with reduced cost for production of the company's products.

We propose improvement in the transport process by optimizing the cargo loading in the transport resources that are available to the company. Our application creates a cargo loading schedules that represent an optimal utilization of the available space. The outcome of the application is a 3D view of the schedule (Figure 1). Also we propose integration of this application into an ERP system as a separate module. In next sections we describe our system in more detail.





**Figure 9** Cargo loading - 3D view

### 3. Cargo Loading Optimization

The literature mentions several ways of solving the problem of optimal utilization of space in a number of specific cases that have reached the maximum utilization and offer an optimal solution. However, most of them are characterized by certain limitations that make these algorithms applicable to only a small number of real world situations. For example, the algorithms that offer a solution to the problem of optimal placement of elements in a given finite space assume that items should be stored in the form of a box [2,3,5,14,16,17,18]. In that case, when all elements satisfy this requirement, these algorithms offer optimal solution or a solution that is close to the optimal. But in the real world elements often are in the form different from the form of a box. In this case the optimum utilization of space is more complicated and should be done in a different way. The actual research on this subject offers some examples of solving the problem of optimal utilization of space when items should be placed in a form different from the shape of a box. In most of the cases the elements are in the form of a cylinder [8]. Thereby those algorithms offer a solution that has the ability to combine elements with the form of a box and elements with the form of a cylinder in finding the optimal combination that utilizes the space. These examples go one step forward because it offered the opportunity to use several different geometric shapes.

The main characteristic of most of the applications that solve the problem of optimal placement of the elements is to satisfy two main conditions. The first condition to be satisfied is the positioning of the elements in that way that does not exceed the space available for loading. The second condition is that the elements must not overlap each other. The applications that try to find the optimal solution are based mainly on these two conditions. However, when it comes to transport, a much larger number of factors affect the optimal placement of material goods such as restrictions on the rotating elements, vehicle stability, the grouping of elements in various stages of unloading, the complexity of the arrangement of the elements, limiting the maximum weight and fragility of items to be transported [1,4,21]. Some specific research and commercial applications for this purpose offer solutions that partially implement a fraction of these factors on decision making. Another feature that most studies do not take into consideration is the use of extra space that comes from elements that contain gaps [6,9], which certainly leaves room for further research in this area. The purpose is to implement all these factors that play an important role in creating the optimal solution. This will make a further step forward and offer a more complete solution to this real and daily logistic problem.

Cargo loading optimization problem in its most simple form can be seen as a problem of optimal placing a number of elements with different shape into a finite space. However, in a logistic world this problem is much more complex because the application must take into

account the transport resources available. Different transport resource has different transport cost and different transport space. Taking into account the different transport resources and allowing the application to decide which resource is most appropriate ensures that we will have the optimal solution.

Taking into account all previously described factors describe the task as a task of choosing the transport resource that fits the most and placing a finite set of different elements in an optimal way. In the real world the companies has delivery calendars that carry out information about planned deliveries on each day. In that sense the proposed solution need to create an optimal transport schedule day by day. Our proposal is to go further in this process. As we take into account the other factors, our application for cargo loading optimization takes into account the delivery calendar too. Instead of creating of a transport schedule day by day the application can reschedule the some of the planned transports for other day. This improvement will make the solution more complete and more accurate which means more optimal.

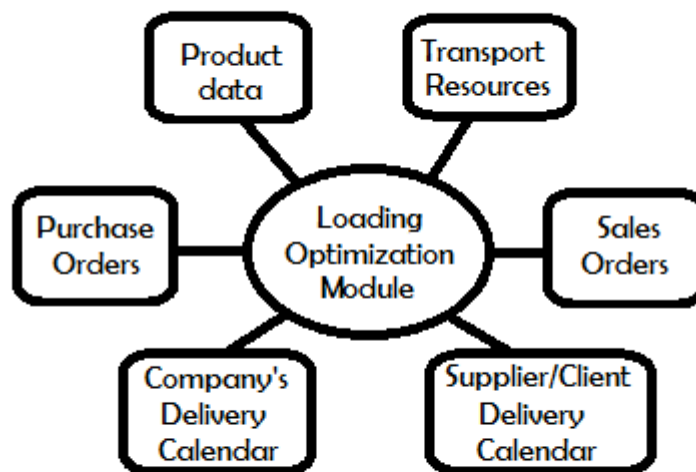
#### **4. Integrating into an ERP**

Almost every company now days use ERP system as a primary driver of the processes in the company. These systems are very sophisticated in the fields of procurement planning and production planning. Taking into account all this data, these systems could provide a lot of information like orders that need to be delivered, the size, shape and fragility of the goods, transport resources that the company owns etc. All this information is needed to apply cargo loading optimisation technique in order to optimise the loading of goods.

Although today's modern ERP systems offer a transportation management as a part of the supply chain management, this area does not provide appropriate tools for transport utilization as a whole. Having this in mind, this logistic subarea can be much more improved using an application that will deal with the transport issues. Our propose is to integrate the Cargo Loading Optimization module into the ERP system and use this module to plan the transport of the material goods that need to be delivered to or by the company. This module will use all the available data from all of the delivery orders and will plan the transportation.

For example, an ERP system can provide data about delivery time frame for every single order (usually this depends on the delivery calendars on both, the company and the client). Using this information, cargo loading optimization module can reschedule the delivery in order to utilize the transport. If we have planned deliveries on Tuesday, Wednesday and Friday on almost the same route with trucks that are not fully loaded, the module may reschedule the delivery order. The new delivery order will use grater trucks and will move the orders from Wednesday into other two days. This way instead of making three we can reduce it to two deliveries. Doing this we save the cost needed to make the delivery (cost for fuel, pay toll, etc.).

Our cargo loading optimization module uses all available data from an ERP system. The purchase and sales orders (inbound and outbound) will be used to make a list of all deliveries that need to be scheduled. Each delivery contains one or more different products with quantities respectively. An ERP system have the appropriate data for each product like dimensions of the product, how the product is packed, fragility of the product, weight of the product, how much weight the product can hold and so on. All this data is used by the module in order to fulfill the basic requirements of such a module like stability of the transport resource, maximum weight that the transport resource can carry out and to be sure that the products will not be damaged during the transport. Usually all the transport resources that are available are properly described in an ERP system. This data is used by the module in order to select the most appropriate transport resource (the transport resource with minimal cost). The data used by the cargo loading optimization module is presented on a Figure 2.



**Figure 10** Data used by Loading Optimization module

The delivery calendars represent a data that is available in the ERP systems. This data can be used in the cargo loading optimization to create more complete solution. As the ERPs offer this kind of data, we use this data to reschedule the deliveries in order to minimise the planned transport. Company's delivery calendar and supplier/client delivery calendars provides us with the information for the open days for each company. We combine this data with the allowed delivery time from the purchase orders and sales orders and compute the all possible days for delivery. Then the application schedules the order on the most appropriate date utilizing the transport resources.

## 5. Conclusion

Today almost every competitor in a given industry has the same technology to produce the goods offered on the market. The equal level of technology means that every competitor can offer the same quality of goods. In that sense, good logistic procedures established in the companies are crucial to have a competitive advantage over the concurrent companies. Well organized supply chain can produce a lot of financial savings which give us the option to have greater annual profit or decreased product price. In both ways the company achieve a competitive advantage over the concurrent companies. The improvement of the transport as a part of the supply chain is an improvement in the same direction. The transport, as one of the areas that produce high expenses, is an area that is worth to be improved. The Cargo Loading Optimization as a part of transport optimization can be integrated in an ERP system providing the system with a powerful tool for transport optimization that is missing as a built-in functionality.

We plan to improve this application by integrating with application for route planning. Both applications can be used separately but in order to be achieved the most optimal solution the systems must be integrated.

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# The Role of the Management Control Systems in the Small and Medium Enterprises

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**The analysis of the Management Control Systems (MCSs) in Small and Medium Enterprises (SMEs) is very scarce. Nevertheless, current economic requirements have caused a growing interest about the effects of MCSs. Our paper contributes to this literature applying a Cobb Douglas production function to analyse the role of MCSs on the results of reduced size companies. The model is tested on a sample composed by 4247 Spanish SMEs. Our findings show that the effects of using MCSs are not direct but they vary the elasticity of the productive factors in function of specific characteristics.**

## **Keywords**

Cobb Douglas function; Management control system, productive factors; Small and Medium Enterprises and Structural Break.

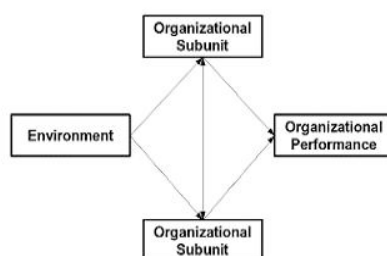
## **1. Introduction**

Last years, the traditional business management practices have been consecutively displaced by new management processes based on information. In this manner, the administrative principles, characterized by a static vision and a short time perspective and where the main variable is the economic result and the unique objective is the maximization of the profits, have been consigned to oblivion (Rhodes et al., 2010). Current organizational procedures are designed to adapt companies to more competitive modern environments. Under this new scenario, Management Control Systems (MCS) are useful tools to foster the understanding about the different business mechanisms and adopt strategic decisions based on global information (Bhimani and Langfield-Smith, 2007). The apparent important role of the MCSs has provoked a growing literature in this area (Bridgstock et al., 2010) in which reduced size companies are rarely considered. Because of the high weight of Small and Medium Enterprises (SME) in the productive systems, we wonder about the effects of the implementation of MCSs on the SMEs. The few studies focused on this topic (McMahon, 2001; Wijewardena et al., 2004; Jänkälä, 2007) have not obtained an agreed answer. The lack of consensus can be explained by the environmental diversity in the business universe which motivates the existence of different results conditioned upon the analyzed observations (Atkinson et al., 1997). In order to shed light on the function of the MCSs on reduced dimension companies, it is necessary to carry out additional empirical analysis (Urquía et al., 2011). This idea motivated the development of our contribution. We develop an empirical application in order to determine the effect of the MCSs on the Spanish SMEs. The fragility of the existing Spanish economy and the need of building a more competitive productive system to face this situation, give additional relevance to our study. We centre our research upon a representative sample of SMEs. The information is obtained from the Community Innovation Survey (CIS, 2007), developed by the Spanish National Institute of Statistics. Based on these data and on a Cobb Douglas production function, we propose different specifications in order to contrast the effects of the MCSs on the productive results of the SMEs. Our findings indicate that the implementation of MCSs boosts the productive

growth of these companies through the increasing in the different elasticities. This result delimit the concept of a MCS as an instrument to improve the well running of the firm through an adequate structuring of the productive resources. The rest of the paper is organized as follows. Section 2 reviews previous literature related to the effects of the MCSs on the SMEs. Section 3 describes the database and the variables. Section 4 develops the model we use in our analysis. Section 5 presents the main results. Finally, Section 6 concludes the study.

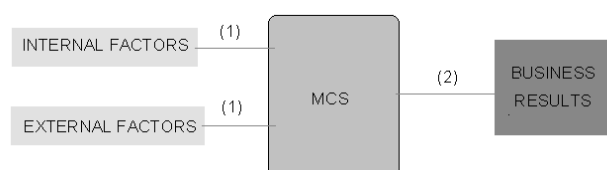
## 2. The Management Control Systems in Small and Medium Enterprises

The Contingency Theory is a behavioral theory which contends that there is no one best way for the administration of the firms: A particular organizational style that is effective in some situations may not be successful in others (Fiedler, 1964). Therefore, the ideal managerial style is contingent upon different external and internal elements, determined by the organizational subunits of the company (Khandwalla, 1972; Waterhouse and Tiessen, 1978) (Figure 1).



**Figure 1** The Contingency Theory. Source: Weill and Olson (1989)

The MCSs process the information of the firm to evaluate the behavior of different managerial resources (internal and/or external variables) and draw an efficient organizational structure (Anthony and Govindarajan, 2001, Bhimani and Langfield-Smith, 2007). The good performance of the MCSs requires a previous planning process in which the particular characteristics of the company have to be examined (Jänkälä, 2007). The size of the business plays a fundamental role in the strategy of incorporation of the MCSs (Donaldson, 2001). In this context, developed studies focused on SMEs are scarce. This is explained by the generalized belief that these companies do not require complex mechanisms to be organized (Simons, 2000). The scant number of results based on reduced size firms can be grouped into two categories (Figure 2).



**Figure 2** The studies' objective of the papers which analyze MCS's implementation in SMEs. (1) Category 1.  
(2) Category 2

The first sort of studies examines the external and internal factors which condition the implementation of the MCS in the company. In this case, the MCS is the result of the analysis. The second category of analysis is focused on the effects of the implementation of MCSs on the results of the SMEs. Under this perspective, we find the study of McMahon (2001) which analyzes the effects of the inclusion of MCSs on the business growth on a

sample composed by industrial SMEs. This study concludes that the implementation of MCSs does not exert a clear positive influence on the business growth. Wijewardena et al. (2004) consider the budgetary planning and control development effects, through the MCSs, on the SMEs results. The findings of this study highlight that processes, planning and control; exert a positive and significant effect on the sales growth. Jänkälä (2007) studies the effects of the implementation of MCSs on the results of SMEs. This author obtains that the subsample of companies which have implemented MCSs does not present better results than the other subsample without MCSs. Regarding the Spanish case; we find the study proposed by Urquía et al., (2011). The aim of this study is to contrast the effects of the application of MCSs on the productivity of Spanish SMEs. They do not find a significant relationship in their study. According to them, this lack of significance is explained by the complexity in the productivity definition, considering the incorporation of new technologies.

### 3. Empirical Analysis

#### 3.1 Database and the Sample

The source of information used in this analysis is the Community Innovation Survey (CIS) annually developed by the National Institute of Statistics. This database facilitates micro firm information about the innovative processes of the companies (R&D/ other innovative activities) for the referenced year. Besides, it allows us to know the interrelationships between innovative processes and the business technological strategy, the influencing factors on the innovative capacity and the economic profitability. Because of the compulsory character of this survey, the answered rate is very high (99% approximately). We have available information for the surveys corresponding to the years 2006 and 2007. These surveys collect biannual information for some variables related to general characteristics of the firm (the number of employers or the capital investments). Besides, some questions are formulated under a dynamic perspective asking for a fact over the biannual temporal period: *Over the current period: have your company include...?*

In order to build our sample, we select the companies for which we have available information in both surveys. Afterwards, we apply a double filtered process. Firstly, we select small and medium size companies. With this aim, we use the variable *dimension or business size* provided by the CIS questionnaire. This variable defines the business size in function of the number of employers. Based on this question and on the definition of SME proposed by the European Commission (2005), we choose companies with less than two hundred fifty workers. Secondly, we undertake a filtered process to drop the outliers of the sample. Concretely, we apply an univariant procedure, computing the average and the standard deviation for the different variables and eliminating the observations which are not included in the interval defined by the average value plus/minus three times the corresponding standard deviation (Hair, 1999). Finally, we get a sample composed by 4247 Spanish SMEs. Table 1 and Table 2 show the composition of the sample in relation to the application of MCSs for the year 2007<sup>50</sup>.

Regarding the distribution of the sample by size (Table 1), our findings indicate that almost a quarter (24.3%) over the total of the sample corresponds to SMEs with MCSs. Mostly of them are medium size companies (19.90%).

In relation to the composition of the sample by productive sectors (Table 2), the industrial sector has the higher proportion of companies with MCSs (62.76%). The more important weight corresponds to the high-medium technological subsectors (19.14%).

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<sup>50</sup> Results for the year 2006 are analogous. Besides, the sample distribution by size and the productive sector is similar to the offered by the Official Status Reports elaborated by the National Institute of Statistics (INE, 2007). The only difference is found in the number of micro firms. This dissimilitude is explained by the building of the CIS survey.

**Table 1** Sample distribution by business size over the total (%)

	WITHOUT MCS	WITH MCS
<b>MICRO-FIRM</b>	0.4804	0.1044
<b>SMALL</b>	16.5831	4.2815
<b>MEDIUM</b>	58.6466	19.9039
<b>TOTAL</b>	75.7101	24.2899

**Table 2** Business distribution by productive sectors over the total sample of each category (%)

<b>AGRICULTURE</b>	0.0000
<b>INDUSTRY</b>	62.7660
Extractives-Chemistry(1)	8.5106
Pharmacy- Metal(2)	17.0213
Informatics products- mechanics- engines(3)	19.1489
Furniture and other productive activities related to water and energy(4)	18.0851
<b>BUILDING</b>	4.2553
<b>SERVICES</b>	32.9787
Trade- Communication and information	24.4681
Financial and administrative activities	8.5106
<b>TOTAL</b>	
Low technology. (2) Low-Medium technology. (3) Medium-High technology. (4) High technology	

### 3.2 Model Specification and Description of the Variables

We consider the neoclassical Cobb Douglas production function with Hicks-type neutral technological changes (Hicks, 1932), following the expression (1).

$$Y_{it} = AK_{it}^{\alpha_t} L_{it}^{\beta_t} e^{\gamma_t I_{it}} \text{ with } \alpha_t, \beta_t, \gamma_t > 0; \forall t \quad (1)$$

Where  $Y_{it}$  is the output for the company  $i$ , with  $i = 1, K, N$  in the temporal period  $t$ , with  $t = 1, K, T$ .  $K_{it}$  And  $L_{it}$  represents the traditional productive inputs, capital and the labour, respectively.  $I_{it}$  is the innovation variable, represented through the input perspective which is based on the internal R&D.  $A$  is the constant term. The coefficients  $\alpha_t$  and  $\beta_t$  measure the corresponding output elasticities with respect to capital and labour respectively. Finally, the parameter  $\gamma_t$  evaluates the effects of the innovation activities on the production. In order to get an expression for the productive growth rate of the firm  $i$  in  $t$  we undertake several transformations on (1). The first step into this procedure is to compute the production variations with respect to each productive factor.

$$\frac{\Delta Y_{it}}{Y_{it}} = \frac{\alpha_t AK_{it}^{\alpha_t-1} L_{it}^{\beta_t} e^{\gamma_t I_{it}}}{Y_{it}} \Delta K_{it} \Rightarrow \frac{\Delta Y_{it}}{Y_{it}} = \alpha_t \frac{\Delta K_{it}}{K_{it}} \quad (2)$$



$$\frac{\Delta Y_{it}}{Y_{it}} = \frac{\beta_t A K_{it}^{\alpha_t} L_{it}^{\beta_t-1} e^{\gamma_t I_{it}}}{Y_{it}} \Delta L_{it} \Rightarrow \frac{\Delta Y_{it}}{Y_{it}} = \beta_t \frac{\Delta L_{it}}{L_{it}} \quad (3)$$

$$\frac{\Delta Y_{it}}{Y_{it}} = \frac{\gamma_t A K_{it}^{\alpha_t} L_{it}^{\beta_t} e^{\gamma_t I_{it}}}{Y_{it}} \Delta I_{it} \Rightarrow \frac{\Delta Y_{it}}{Y_{it}} = \gamma_t \Delta I_{it} \quad (4)$$

Taking into account previous expressions (2-4), the growth rate of each company  $i$  in  $t$  is defined as:

$$\frac{\Delta Y_{it}}{Y_{it}} = \alpha_t \frac{\Delta K_{it}}{K_{it}} + \beta_t \frac{\Delta L_{it}}{L_{it}} + \gamma_t \Delta I_{it} \quad (5)$$

Expression (5) can be approximated through the logarithmic transformation generating the following equation (6)<sup>51</sup>.

$$\ln y_{it} = \alpha_t \ln k_{it} + \beta_t \ln l_{it} + \gamma_t \Delta I_{it} \quad (6)$$

$$\text{Where } y_{it} = \frac{Y_{it}}{Y_{it-1}}; k_{it} = \frac{K_{it}}{K_{it-1}}; l_{it} = \frac{L_{it}}{L_{it-1}}$$

With the aim of estimating the equation (6), we define the output variable ( $Y_{it}$ ) as the turnover of each company  $i$  in each temporal period  $t$ . The labour productive factor ( $L_{it}$ ) is measured as the corresponding number of employees and the capital ( $K_{it}$ ) is approximated through the data of investment in capital goods based on the expression (7)

$$I_{i,t} = K_{i,t} - K_{i,t-1} \quad (7)$$

From this equation, the capital growth value ( $k_{it}$ ) can be determined as follows in (8):

$$k_{it} = \frac{K_{it}}{K_{it-1}} = \frac{K_{it} + K_{it-1} - K_{it-1}}{K_{it-1}} = \frac{I_{it}}{K_{it-1}} + 1 = \frac{I_{it}}{\sum_{j=1}^t I_{it-j} + K_0} + 1 \quad (8)$$

Where  $K_0$  is the initial capital value<sup>52</sup>.

The internal R&D is calculated applying the perpetual inventory model (Gumbao et al., 2010) (9):

$$RD_{i,t} = RDE_{i,t} + (1 - 0,15)RDE_{i,t-1} \quad (9)$$

Where  $RDE_{i,t}$  represents the R&D expenditure of the firm  $i$  in the period  $t$ . The specification (9) assumes that R&D expenditure influences on R&D activities with a one year temporal lag. This effect decreases over time at a rate of fifteen per cent each period. In this way, the R&D expenditures are transformed into a stock magnitude (Tseng, 2008). Table 3 presents the Pearson correlation coefficient among the productive factors variables.

In addition to the variables directly related to the production function, we also build several control factors which reduce the heterogeneity in our analysis. Concretely, we include the size and the productive sector. The first of them is defined in function of the European Classification of SME (European Commission, 2005). In this sense, a micro-firm is a company with less than ten employers. A small size company, a firm with a number of employers between eleven and fifty and a medium size company is a business with more

<sup>51</sup>  $\ln(1 + x) \approx x$

<sup>52</sup> The lack of available information requires the assumption of initial capital equal to zero. In this way, the final numerator of (8) is the amount of investment in capital goods in each year and the denominator is the accumulated sum of investment derived from the existing database.

than fifty workers. Based on these definitions, we generate the following dichotomy variables (expressions 10-12).

**Table 3** Correlation coefficients among variables

	<i>l</i>	<i>k</i>	$\Delta I$
<i>l</i>	1	0.212* (0.000)	0.041* (0.008)
<i>k</i>	-	1	0.045* (0.003)*
$\Delta I$	-	-	1
(*)Significant at 5%. P-value in brackets			

$$Micro_i = \begin{cases} 1 & \text{if the firm } i \text{ is Micro size} \\ 0 & \text{in otherwise} \end{cases} \quad (10)$$

$$Small_i = \begin{cases} 1 & \text{if the firm } i \text{ is Small size} \\ 0 & \text{in otherwise} \end{cases} \quad (11)$$

$$Medium_i = \begin{cases} 1 & \text{if the firm } i \text{ is Medium size} \\ 0 & \text{in otherwise} \end{cases} \quad (12)$$

The variable representative of the productive sector is determined taking into account the National Classification of Economic Activities (NACE) (see Table 4).

**Table 4** National Classification of Economic Activities (NACE)

<b>Agriculture (NACE 01,02,03)</b>		
<b>Industry</b>	Extractives-Chemistry (CNAE 05,06,07,08,09, 19)	(1)
	Pharmacy- Metal (CNAE 21, 22, 23, 24 y 25)	(2)
	Informatics products- mechanics- engines (CNAE 26, 27, 28, 29 y 30)	(3)
	Furniture and other productive activities related to water and energy (CNAE: 31, 32, 33, 35, 36, 37, 38 y 39)	(4)
<b>Building (NACE 41, 42 Y 43)</b>		
<b>Services</b>	Trade- Communication and information (CNAE 45, 46, 47, 49, 50, 51, 52, 53, 55, 56, 58, 59, 60, 61, 62, 63)	
	Financial and administrative activities (CNAE: 64, 65, 66, 68, 72, 69, 70, 71, 73, 74, 75, 77, 78, 79, 80, 81, 82, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96)	
Low technology. (2) Low-Medium technology. (3) Medium-High technology. (4) High technology		

From this classification, we define the following variables (expressions 13-18)

$$Ag_i = \begin{cases} 1 & \text{if the main productive activity of the firm } i \text{ is the Agriculture} \\ 0 & \text{in otherwise} \end{cases} \quad (13)$$

$$Ind1_i = \begin{cases} 1 & \text{if the main productive activity of the firm } i \text{ is low – medium tech manufacturing} \\ 0 & \text{in otherwise} \end{cases} \quad (14)$$

$$Ind2_i = \begin{cases} 1 & \text{if the main productive activity of the firm } i \text{ is high – medium tech manufacturing} \\ 0 & \text{in otherwise} \end{cases} \quad (15)$$

$$Build_i = \begin{cases} 1 & \text{if the main productive activity of the firm } i \text{ is the Building} \\ 0 & \text{in otherwise} \end{cases} \quad (16)$$

$$Serv1_i = \begin{cases} 1 & \text{if the main productive activity of the firm } i \text{ is Service(Communications / Transport)} \\ 0 & \text{in otherwise} \end{cases} \quad (17)$$

$$Serv2_i = \begin{cases} 1 & \text{if the main productive activity of the firm } i \text{ is Service(Financial / Others)} \\ 0 & \text{in otherwise} \end{cases} \quad (18)$$

In order to evaluate the effects of the implementation of MCSs, we only have the variable  $MCS_{it}$ . Its definition is based on the following CIS question:

*Over the current period (2007-2005 or 2006-2004): have your company included new manager control systems to improve the usefulness or the exchange of the information, knowledge and skills or to collect external information to your company?*

The variable  $MCS_{it}$  has the value of one if the answer is affirmative and zero in otherwise. We would like to highlight that the CIS questionnaire does not give information about the using of MCSs by the companies but it exclusively indicates if the firm has implemented or not MCSs over the analyzed period. In order to get additional information about the usage of MCSs, we display a contingency table for the years 2006 and 2007.

**Table 5** Percentage of SMEs which have implemented MCSs over the total

		Year 2007	
		Without MCS (0)	With MCS(1)
Year 2006	Without MCS (0)	70.31	6.77
	With MCS (1)	5.40	17.52
<b>TOTAL</b>		<b>75.71</b>	<b>24.29</b>

These results indicate that a 24.29% of the companies which compose the sample has MCSs in 2007 (6.77% of them have been implemented in 2007 or during the two years before). From this information, we define the variable  $AMCS_{it}$  which values one if the company has MCSs in  $t$  and zero in otherwise. Therefore,  $AMCS_{it}$  measures the accumulative effect of  $MCS_{it}$ <sup>53</sup>.

### 3.3. Estimation Process

Table 6 shows the estimation results for the production function with different modifications in order to test the effects of MCSs on the productive growth.

**Table 6** OLS regression of the model (6) with/without structural broken and MCSs (Year 2007)

<sup>53</sup> In order to build this variable, the disposal of information, relative to the implementation of MCSs, is limited to the period 2004-2007.

Variable		Model 1	Model 2 Structural broken	Model 3 Structural broken and MCSs
Explicative Variables	$\alpha_t$	0.1908* (0.000)	0.1571* (0.000)	0.1836* (0.000)
	$\beta_t$	0.2687* (0.000)	0.3940* (0.000)	0.4071* (0.000)
	$\gamma_t$	0.1332 (0.331)	0.1123 (0.642)	0.006 (0.836)
Control Variables	Micro	-	-	-
	Small	-	-	-
	Medium	0.0267* (0.000)	0.0264* (0.000)	0.0262* (0.000)
	Agr	-	-	-
	Ind1	-	-	-
	Ind2	0.0345* (0.000)	0.0337* (0.000)	0.0336* (0.000)
	Building	0.0374 (0.140)	0.0419** (0.095)	0.0408 (0.105)
	Serv1	0.0176* (0.002)	0.0175* (0.019)	0.0188* (0.004)
	Serv2	0.0163* (0.047)	0.0151** (0.065)	0.0144** (0.078)
Structural broken in the productive factors	$\alpha'_t$	-	0.2183* (0.000)	0.2471* (0.000)
	$\beta'_t$	-	0.1947* (0.000)	0.1533* (0.000)
	$\gamma'_t$	-	0.035* (0.022)	0.0277* (0.043)
The effects of the implementation of MCSs on the production model with structural broken	$\alpha''_t$	-	-	-0.0745 (0.296)
	$\beta''_t$	-	-	-0.1391 (0.102)
	$\gamma''_t$	-	-	-0.0498 (0.319)
	$\alpha'''_t$	-	-	0.0882** (0.089)
	$\beta'''_t$	-	-	0.2056* (0.005)
	$\gamma'''_t$	-	-	0.0252** (0.068)
F test		190.351* (0.000)	148.141* (0.000)	97.000* (0.000)
J-B Test		0.928* (0.000)	0.374 (0.891)	0.332 (0.913)
LR-test (vs Model 1)		-	77.874* (0.000)	94.575* (0.000)
LR-test (vs Model 2)		-	-	25.802* (0.014)

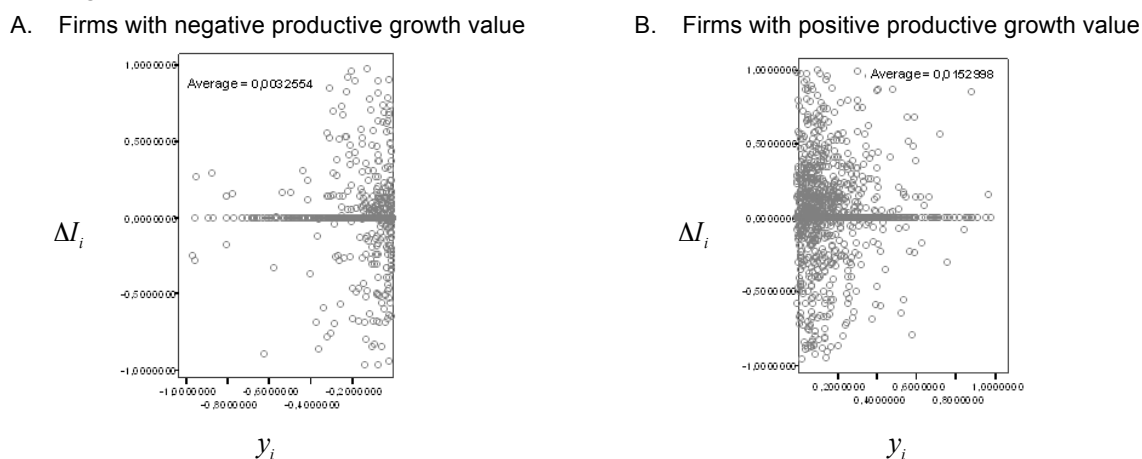
(\*) Significant at 5%. (\*\*) Significant at 10%. The omission of some sectors and size categories avoid multicollineality problems. .

The Model 1 (Table 6) corresponds to the estimation of the following equation (19)

$$\ln y_{it} = \alpha_t \ln k_{it} + \beta_t \ln l_{it} + \gamma_t \Delta I_{it} + \text{control var}_{it} + \varepsilon_{it} \quad (19)$$

These results provide the following conclusions. Firstly, the coefficients for the productive factors labour and capital are positive and significant and their elasticity values are consistent with that obtained in other studies for the Spanish firms (López-Sánchez et al., 2006). Secondly, the innovation coefficient ( $\gamma_t$ ) is not significant. Thirdly, we get that the size and

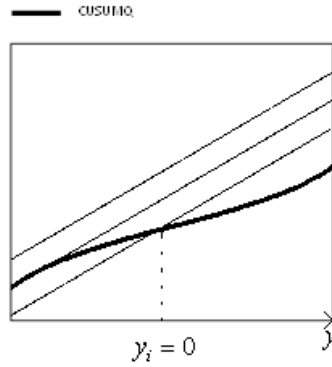
the productive sector, are both significant and positive. Concretely, medium size companies present increasing returns to scale (Huergo and Jamandreu, 2004). Besides, we get a positive effect on the productive growth for the firms specialized in high technological subsectors (Mate et al., 2009). The post estimation proofs of the Model 1 indicate that the model is globally significant (F-test=393.475\*). The Jarque Bera test rejects the null hypothesis of normality in the residuals. The lacks of significativity in the variation of innovation variable ( $\Delta I_{it}$ ) and the normality in the residuals could be indicating possible errors in the estimation process, provoked by the omission of relevant information. In order to contrast this hypothesis, we develop a Scatter plot in which the innovation<sup>54</sup> value for each company is represented differencing between positive and negative productive growth values. Figure 3 illustrates these results.



**Figure 3** Scatter plot of the innovation values differencing between positive and negative productive growth values (Year 2007)

Previous figure highlights the existence of two subsamples with different behavioral patterns. The subsample composed by firms with positive production growth rates presents a higher average (0.0152) than the subsample of firms with negative growth rates (0.0032). Computing the t-Student test (t-test=1.853\*) we get that the difference is significant. In order to provide more consistent results, we apply the square CUSUMQ test. This tool allows us, not only contrast the existence of a structural break into the model, but also find the breaking points values without any a priori information requirement. The square CUSUMQ test computation is based on the square sum of the accumulated residuals in each temporal state (Greene, 2007). In our empirical application, we represent the different square sum of the residuals for the different productive growth values in ascending order (Figure 4). In addition, we draw the fluctuation bands from which the breaking points in the variable are detected (Harvey, 1990). In this way, the square CUSUMQ points which positively or negatively surpass the fluctuation bands are the breaking points in the distribution.

<sup>54</sup> Scatterplots present analogous results when the others productive factors (capital and labour) were represented.



**Figure 4** Square CUSUMQ test in the residuals of the Model (19)

In our case, we detect a structural breaking point where the productive growth is equal to zero. The Model 2 of the Table 6 introduces the structural break into the productive growth model as follows in (21)<sup>55</sup>.

$$\ln y_{it} = \alpha_t \ln k_{it} + \beta_t \ln l_{it} + \gamma_t \Delta l_{it} + \alpha'_t dv_i \ln k_{it} + \beta'_t dv_i \ln l_{it} + \gamma'_t dv_i \Delta l_{it} + \text{control var}_{it} + \varepsilon_{it} \quad (20)$$

Where  $dv_i$  is a dichotomy variable defined as (21) for each firm  $i$

$$dv_i = \begin{cases} 0 & \text{if } y_i \leq 0 \\ 1 & \text{otherwise} \end{cases} \quad (21)$$

The estimation results of this model show an interesting conclusion in relation to the innovation factor. In this sense, we find that the development of innovative activities only exerts positive effects on the company when the firm presents positive growth rates ( $\gamma'_t$ ). The value of this coefficient is not very high (0.035). The scarce effect of the innovative activities on the SMEs could be explained by the low investment in R&D activities in Spain, motivated by the high risk associated to R&D investment projects. Besides, the lack of a direct relationship between the achievement of the projects and the productive growth of the companies could be additional causes to clarify this outcome (Maté-García and Rodríguez-Fernández, 2008). The post estimation proofs of this second model indicate that the normality problems were solved. The LR test, which allows us to select the more adequate model, concludes about a best fit of the Model 2 in comparison to the previous Model 1. The last step in our analysis is to determine the effects of the implementation of MCSs on the productive growth. With this aim, we consider the following Model 3 specified in (22). This model includes the dichotomy variable AMCS representative of the application of MCSs.

$$\begin{aligned} \ln y_{it} = & \alpha_t \ln k_{it} + \beta_t \ln l_{it} + \gamma_t \Delta l_{it} + \alpha'_t dv_i \ln k_{it} + \beta'_t dv_i \ln l_{it} + \gamma'_t dv_i \Delta l_{it} + \\ & + \alpha''_t AMCS_{it} \ln k_{it} + \beta''_t AMCS_{it} \ln l_{it} + \gamma''_t AMCS_{it} \Delta l_{it} + \alpha'''_t AMCS_{it} dv_i \ln k_{it} \\ & + \beta'''_t AMCS_{it} dv_i \ln l_{it} + \gamma'''_t AMCS_{it} dv_i \Delta l_{it} + \text{control var}_{it} + \varepsilon_{it} \end{aligned} \quad (22)$$

The fourth column of the Table 6 presents the estimation values for the Model 3. These results show that the effect of the using of MCSs on the productive growth is not always significant but it is depends on the productive characteristics of the SME. Concretely, the using of MCSs increases the elasticities of the productive factors for those companies presenting positive growth rates, while it is not effective for those firms with negative rates. The largest positive effect corresponds to the capital factor. This finding is related to the positive effects of the MCSs in the design of adequate organizational programs to manage capital investments and direct the generated flows (Anthony and Govindarajan, 2001,

<sup>55</sup> We do not include the variable  $dv_i$  as an additive dummy variable in the model because of the production model definition (6).

Bhimani and Langfield-Smith, 2007). For the labour and the innovation productive factors, the result is less marked. For these productive factors, the effectiveness of the MCSs requires the readiness of the employees and supervisors to face the management environments. Therefore, it is a more complex process. Finally, the post estimation proofs indicate that model is globally significant and the residuals follow a normal distribution. The LR test is positive and significant (25.80) indicating the best fit of the Model 3 in comparison to the previous models.

## 4. Conclusions

This paper provides empirical evidence about the effects of the using MCSs on the productive growth of Spanish SMEs. The lack of observed studies in this context and the absence of a consensual result justify the development of this study. In comparison to previous contributions, we cluster the companies in function of their productive characteristics. Our findings conclude that that the usage of MCSs is not significant for all the SMEs but only for those with positive growth rates in production. The positive impact is realized through the increasing in the elasticities of the productive factors. The capital factor is the productive resource more positively affected by the using of MCSs. According to our results, the lack of previous conclusive findings in this area is explained by the heterogeneity of the analyzed samples. In our case, differences in productive rhythms of the SMEs condition the successful of the using of MCSs. From a theoretical point of view, the implementation of MCSs requires a previous planning process which takes into account the external and internal *contingencial* factors characteristics of each company. The successful of the MCS in the management will depend on this process. Therefore, MCSs have not to be considered as a *panacea*, valid for all the SMEs, which boost the results of the company to the highest tops. The MCS has to be exclusively considered as a mere management tool which could improve the good working of the company under an adequate planning process. This study presents some limitations which could be considered as future research. Firstly, our research does not include dynamic in the impact of the implementation of the MCSs on the SME. In this sense, the implementation of MCSs has not to present instantaneous effects on the results of the company but some adaptive period could be required to get significant results. Therefore, further studies, with information relative to a longer temporal period, are needed. Secondly, we consider the results of the company in terms of productive growth but previous studies have considered alternative measures of output as, for example, the profitability (Jänkälä, 2007). Additional studies are needed to contrast the sensibility of these results under different output measures. Finally, the scarce literature requires the development of additional empirical applications in order to extract some generalizations about the effects of the MCSs in function of the characteristics of the companies.

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# The Implications of Foreign Investment on the Growth and Development of Domicile Enterprises as a Factor of Regional Development

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Transition process means, among other things, opening economy in developing nations for foreign capital inflow, which has been important in the process of privatisation. Transition situation in Serbia is characterised with some specific features which are seen as the result of many years' sanction through stagnation, decline, even the break of some economic elements. After the long time of isolation a small number of once successful companies survived. Because the insufficient power companies were able to retake previous positions on domestic and foreign market, they needed "injection" to recover in present privatisation process. Foreign investments had an important role in privatisation process, whose effects are present in growth and development of privatised companies as well as economy as a whole. Making conditions for foreign investment is crucial for improving companies and economy for a long period of time. The aim of this paper is to show the positive impact of foreign investments on development of enterprises and economies in transition countries and to show what is required to establish specific criteria that a country or a company has to fulfil in order to be attractive to foreign investment. In this analysis, it should not be forgotten that there is a strong competition between countries in the region in attracting foreign investments, because they act as the driver of every economy at both micro level and in the case of the enterprise that operate in the post(transitional) economy.

## Keywords

Foreign investment, growth and development of companies and the national economy

## 1. Introduction

The transition process in post-socialist countries has brought many changes including the opening of the economy in the direction of foreign capital inflows. Socialist countries were closed to capital inflows. In addition to opening markets in the formal sense, the country undergoing the transition process must harmonize laws and regulations in order to facilitate the inflow of capital and thus make the country attractive for investment.

It was only in the early 21st century when Serbia was affected direct investments although its socialist system collapsed in the 1990s. The reason for this lies in unregulated legislation and high political risk of the country.

Foreign investment can be defined as investments by investors that are residents of one country in the resident (company) of another country, whereby a long-term cooperation is established to achieve common goals. [7] Foreign direct investment is an opportunity to developing countries to achieve external growth, and domicile countries should have tendency to use domestic raw materials and local labour force. Hiring additional labour increases the level of employment at the national level. In this way, through external growth and development of an enterprise there is growth and economic development.

If a country was able to attract foreign capital, it must first create a favourable investment climate. The investment climate exists if there are stable economic conditions, political and social stability, the government with positive attitudes to foreign investments, appropriate foreign trade, customs and foreign currency regulations for investors, developed infrastructure including communications and energy provision system, and adequate labour in both qualitative and quantitative sense. Due to the global financial crisis and reduced interest of foreign investors, in the first six months of 2009 the net value of foreign investments was only 853.8 million euros according to the National Bank of Serbia. The total gross inflow of foreign capital reaches 907.4 million euros, whereas the outflow due to the withdrawal of foreign capital was 55.1 million euros and the investment of domestic capital in other countries was the remaining 43.2 million euros. [9]

## **2. Growth and Development of SME**

The reality showed that the path towards the development of post-socialist countries is very slow because there are many obstacles that must be overcome, such as institutional, legal and labour obstacles. Faster growth and development of SME can be achieved solely through the support of foreign capital. Investment in SME may be achieved through direct investment, portfolio investment, financial investment and the like. [3] The practice of the Republic of Serbia showed that in today's economic conditions direct investments occupy the dominant position. However, due to the global economic crisis, the amount of foreign investments dramatically fell so the countries that are potential areas of investment should take greater efforts to attract investment.

A new model of economic growth and development in the next decade requires the creation of more attractive economic environment, abandoning consumer spending and directing to investing and export-oriented economic growth. [2]

Two basic ways of entering foreign investment through the privatization process include strategic and financial investments. [1] Strategic investments mean those coming from the same business area with the primary intention to promote performance of the holding company. Financial investments include the purchase of shares of companies with the aim of taking yield, either in the form of dividends or capital gains. The previous experience with foreign investment leads to the conclusion that, regardless of the business area of the successful company, financial investments are more frequent than strategic investments. In contrast, strategic companies are present in the case of less successful companies. Foreign direct investments take the function of the key developing factor of global economy and, along with trade; they are the basic mechanism of globalization of world economy, i.e. globalization of companies, especially in the development of transition countries.

These measures and policies would be, primarily, to reduce and eliminate all forms of administrative barriers and other regulatory constraints that inhibit the development of small and medium enterprises. We need to adopt better and more effective legislation, to establish through them and the general institutional framework that will help strengthen small and medium enterprises, to encourage innovation and investment in the

economy. Such an economy should be based on knowledge, research and development, with the state to be realized and other activities that contribute to raising the competitiveness of enterprises in an economic environment that is open for investment and where there is free competition.

The essence of external development of SMEs is based on the intention to create conditions for establishing the business environment for more effective generation, implementation and economic valorisation of innovations within the institutional structure of the overall socio-economic system. This means the application of a series of practical measures and policies implemented by public institutions in order to create a favourable business environment and to encourage establishing new business and improving the existing ones. These measures and policies should, primarily, reduce and eliminate all forms of administrative barriers and other regulatory constraints that hinder the development of small and medium enterprises. We need to adopt better and more effective legislation and to establish through them the general and institutional framework that will strengthen small and medium enterprises, to encourage innovation and investment in the economy. Such economy should be based on knowledge, research and development, and the government should organize other activities that will contribute to raising the competitiveness of enterprises in the economic environment that is open for investment and where there is free competition.

Among a number of advantages offered by foreign direct investment in the development of SME, technological development is one of the crucial strengths. Foreign investors bring not only capital but also the production and marketing knowledge (know-how), which can be transferred to the rest of the economy.

Foreign investment can contribute to the transfer of modern technologies in different ways. Direct way is through daily contact with foreign experts, consultants and managers. Attracting the most advanced technology, there is direct education of the workforce to use technology and apply knowledge for the use and maintenance of necessary equipment.

It is necessary to form their own research centres, hi-tech parks and incubators. There is the possibility of foreign investment based on the investment of knowledge, while the resident country would hire highly-educated staff. Thus new technological knowledge is transferred to the domestic economy.

Technology and knowledge transfer is achieved not only at the level of SME, but also at the broader economic level. In practice, there is general agreement that high technology and commercial use of scientific knowledge is the key factor for industrial and economic development.

### **3. Conditions for Attracting Direct Investments**

It is not enough just to understand the crucial importance of foreign direct investment for growth and development of SME (in the narrow sense) and the country (in the broad sense), but it is also necessary to take concrete measures to attract them, because there is high competition among countries. It is necessary to answer the question of what will make "our" country and "our" company more competitive and conducive for investments in comparison with our competitors.

The Development Strategy and Policy of the Republic of Serbia from 2011 to 2020 Analysis states that the most important factor is creating market environment in order to attract foreign investors. This influence of economic environment is given in the table below:

The improvement of the environment for investment has the aim to attract large scale of foreign direct investment. Therefore it is necessary to establish an open market economy and healthy environment, conducive to foreign investments and the start-up of local production, employment, introduction of new technology, etc. The reforms to be implemented should be without administrative delay at registration, employment, export, the provision of

the necessary legal protection and the like. In addition, it is assumed that there is the existence of a transparent legal framework and efficient financial system.

**Table 1** The influence of economic environment on the competitiveness of the economy [6]

	<b>Push motives (push)</b>	<b>Pull motives (pull)</b>
Political influence	Unstable political situation, restrictive legislation, the dominant anti-business culture, credit limit, grey economy and unregulated market	A stable political situation, liberal legislation, dominant business-oriented culture, the growth of credit, regulated market
Economic influence	Poor economic conditions, low potential of growth, high operating cost, mature market, small domestic market	The good economy, high potential of growth, low operating costs, market development, opportunities for real estate investment, large market, a favourable exchange rate, depressed stock prices
Social influence	Negative social environment, unfavourable demographic trends, population stagnation and decline, the growth of social benefits	Positive social environment, positive demographic trends, population growth, reduction of social benefits
Cultural influence	Unknown cultural milieu, heterogeneous cultural environment (small and hostile segments)	Well-known reference points in the cultural milieu, attractive composition of cultural values, innovative business culture, fostering corporate culture, homogeneous cultural environment (friendly segments)
Competitive structure	Hostile competitive environment, high levels of concentration, saturation of the market supply, unfavourable operational conditions	Market niches, ownership of capacities, the possibility of expansion through copying, favourable operational conditions

The government should encourage and support the implementation of all transition and reform processes that are used for activating the development potential of the country - human, material and natural - so that Serbia might become attractive for faster development and investment.

Encouraging faster development of entrepreneurship should be supported through the promotion and establishment of new businesses, developing human resources for competitive SME sector, various forms of SME financing, the development of competitive advantage of SME in export markets and the development of encouraging environment for SME, increased employment, especially of highly-skilled workers and more balanced regional development. The Government of the Republic of Serbia has defined the key areas of competitive advantages of Serbia in attracting foreign investments, which are reflected in the following: [5]

- General benefits that exist in the Republic of Serbia for foreign investors:

- Sites at the Corridor 10, which connects Europe with the Near East and Mideast;
- Central European Free Trade Agreement - CEFTA, with the market comprising 60 million people;
- Free Trade Agreement with the EFTA countries,
- Free Trade Agreements with Belarus and Kazakhstan;
- Free Trade Agreement with Turkey;
- Free Trade Agreement with the Russian Federation;
- Unemployed, well-educated and affordable labour;
- Simplified regulations for international trade and foreign investments;
- Shortened procedure for establishing a business - 15 days.
- Low tax rates
- Special tax incentives:
  - For investments over USD 7.5 million and 100 employees there is no income tax in the next ten years;
  - Loans intended for investment, the maximum of 10 years and a 20%-tax deduction;
  - Tax benefits for new employees;
  - The loan in the amount of 40% of the investment value for investments in fixed assets;
  - Exemption from income tax in the period of five years for the income from concessions;
  - Exemption from income tax for the investors who invest in vocational training, professional development and employment of the disabled;
  - Two-year loan for undeveloped areas;
  - Non-returnable grants from the funds for the development of agriculture, ecology, environment protection, scientific research, etc.
- Financial incentives
 

The total funds that can be assigned are determined according to new job openings in the period of three years, and these are for investment in the manufacturing sector:

  - from 4,000 to 10,000 euros in devastated areas and areas of special interest,
  - from 5,000 to 10,000 euros in automobile, electronic and IT and telecommunications industries and in the areas of special interest,
  - from 2,000 to 5,000 euros in other regions of the Republic of Serbia.

For investment in the sector of services that might be the subject of international trade ranging between 2,000 and 10,000 euros per one new job opening in the period of three years.

- Benefits of business according to the Law on Free Zones

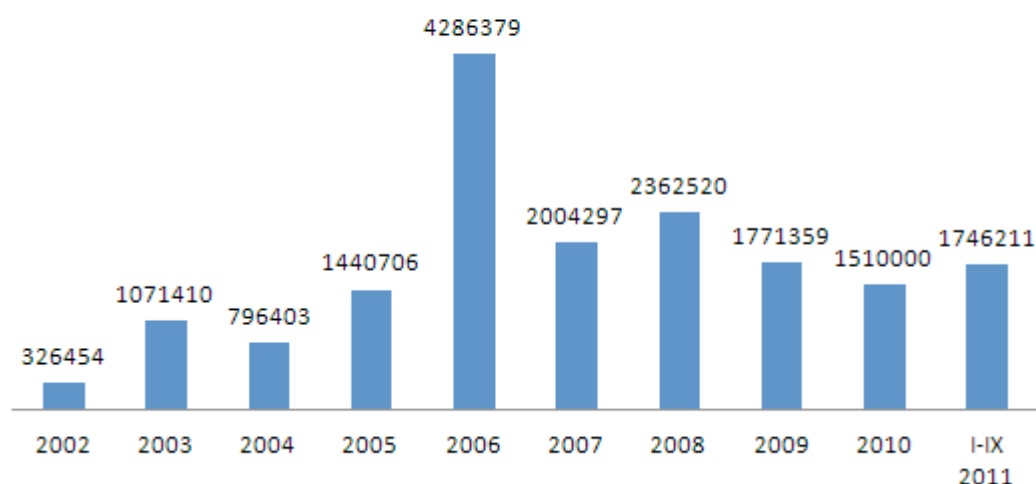
Free zones are the first open window for transition economies that is conducive to foreign investments. They provide special privileges and incentives at the local and national levels, such as business enterprises without import duties, taxation, land use under favourable terms. These benefits can significantly influence the decision of investors to place the capital in the country.

## 4. The Position of Foreign Direct investment in Serbia

Foreign direct investments in Serbia have been mainly conducted through the purchase of companies in the privatization process, while the so-called Greenfield investments are not fully represented. Unfortunately, the inflow of foreign direct investment in Serbia has so far been predominantly motivated by buying local monopolies or oligopolies in the areas of finance, production of cement, cigarettes, energy, retail and the like.

Since 2002 there has been a growing trend of foreign direct investment with variations that are characteristic of all transition countries caused by the characteristics of the institutional

environment. According to data for the first three quarters in the year 2011 there are foreign direct investments amounting to 1,329.7 million euro.



**Figure 1** The level of investment in Serbia in the period between 2002 and 2012 in thousands of dollars [11]

On 31 March 2011,[9] Serbia's international investment position (IIP) was negative at EUR 25,110.5 mln (preliminary data). In first quarter, negative IIP rose by EUR 287.1 mln or 1.2 pp. The share of negative IIP in GDP<sub>2</sub> fell by 0.3% – from 85.6% at end-2010 to 83.5% in first quarter. Foreign assets stood at EUR 15,400.5 mln, down by EUR 546.9 mln net. Foreign liabilities amounted to EUR 40,511.0 mln, down by EUR 259.8 mln net. A change in IIP of EUR -287.1 mln was a result of non-resident investment in Serbia exceeding resident investment abroad by EUR -740.2 mln (of which direct investment amounted to EUR -272.4 and portfolio investment to EUR -467.8 mln) and a reduction in reserve assets by EUR -82.6 mln. On the other hand, a neutralising effect of increased foreign capital inflow on negative IIP was provided by positive net changes in other investment of EUR 535.7 mln.

Resident direct investment abroad amounted to EUR 2,949.5 mln, down by EUR 17.5 mln (positive transactions of EUR 18.8 mln were neutralised by negative valuation changes of EUR -36.3 mln).

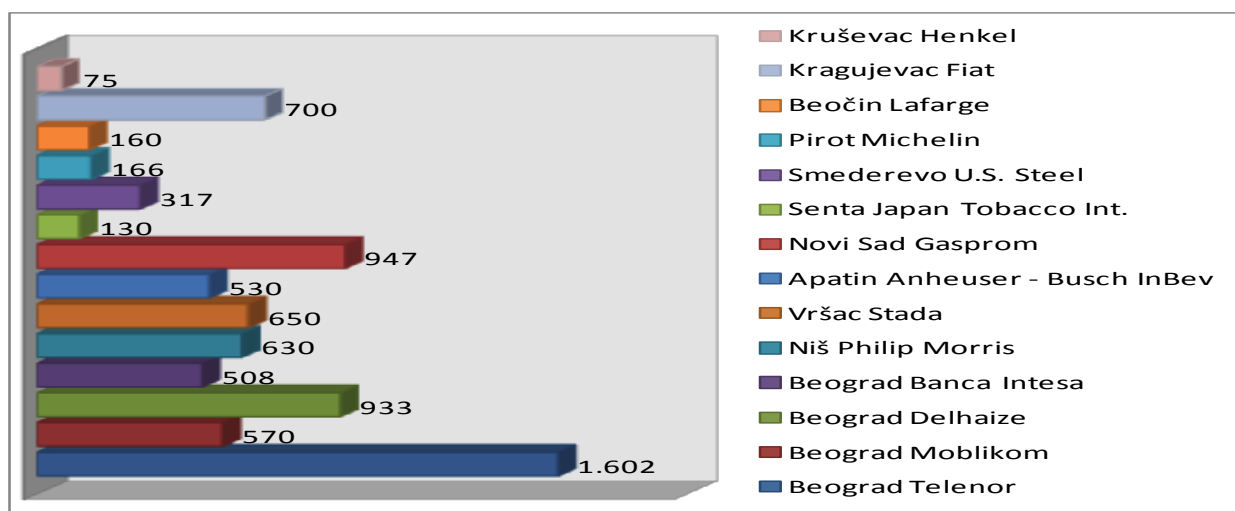
**Table 2** Serbia's International Investment Position as at 31 March 2011 [9]

	(EUR mln)		
	ASSETS	LIABILITIES	BALANCE
<b>1. Direct investment</b>	<b>2,949.5</b>	<b>16,035.4</b>	<b>-13,085.9</b>
1.1. Share capital	2,949.5	13,088.7	
1.2. Other capital	0.0	2,946.7	
<b>2. Portfolio investment</b>	<b>73.7</b>	<b>1,852.2</b>	<b>-1,778.5</b>
<b>3. Financial derivatives</b>	<b>n/a</b>	<b>n/a</b>	
<b>4. Other investment</b>	<b>2,458.2</b>	<b>22,623.5</b>	<b>-20,165.3</b>
4.1. Other capital	0.0	0.0	
4.2. Currency and deposits	2,147.3	568.9	
4.3. Credits	164.4	21,528.6	
4.3.1. National Bank of Serbia	0.0	1,541.7	
4.3.2. Public sector	0.0	6,175.7	
4.3.3. Banks	134.1	4,383.7	
4.3.4. Other sectors	30.3	9,427.6	
4.4. Financial leasing	0.0	0.0	
4.5. Insurance and pensions	0.0	0.0	
4.6. Trade credits and advances	146.4	92.3	
4.7. Other receivables/liabilities	0.0	0.0	
4.8. Special drawing rights		433.6	
<b>5. Reserve assets</b>	<b>9,919.1</b>		<b>9,919.1</b>
<b>TOTAL (1+2+3+4+5)</b>	<b>15,400.5</b>	<b>40,511.0</b>	<b>-25,110.5</b>

Source: National Bank of Serbia.

Observed by sectors according to the NBS data for October 2011, the highest amount of foreign direct investment is in trade (600.1 million), manufacturing industry (320.2 million),

financial intermediation and insurance activities (168.9 million euros), real estate (105.2 million), tourism (88.86 million), construction (69.4 million), information and communications (67.1 million), mining (52.6 million), transport (30.2 million), professional, scientific and innovative activities (24.6 million) and others. Investments in agriculture and fisheries are somewhat lower than in the previous year and amounted to 5.4 million euros. Since 2001, Serbia has grown into one of the emerging investment locations in Eastern Europe. Up to now, FDI inflow into the country has exceeded EUR 15.2 billion, while Serbia has attracted over EUR 6.8 billion of foreign direct investment in the past three years. The list of leading foreign investors is topped by world-class companies such as FIAT, Telenor, Stada, US Steel, Michelin, Gazprom, Siemens, and many others. According to the most recent report by the Economist Intelligence Unit, Serbia is ready to make the most significant improvement in its business environment in the region of Eastern Europe between now and 2013.[10] Serbia offers vast investment potential. Each region, with its unique opportunities, represents a welcoming environment for future investors.



**Figure 2** The structure of foreign investors in 2010 in Serbia [10]

## 5. Conclusions

In addition to understanding the importance of foreign direct investment, it is necessary to take concrete measures to create a favourable climate for investment. Serbia is facing stiff competition in the exercise of its policy of attracting foreign investment since most countries did much more significant progress in terms of overall economic reforms over the past 10 years, and many of them have already established the base of foreign investors. Many neighbouring countries have established strong investment promotion agencies, which greatly contribute to attracting foreign direct investment.

As a result of the global economic crisis and reduced foreign investor interest, the level of foreign direct investment has declined substantially. In addition to business risks resulting from a chain reaction crisis, Serbia has faced significantly increased political risk, which leads to further deterioration of conditions for foreign investors. Namely, the practice of investing in developed countries has shown that they avoid investing in countries with high political risk, since they are unpredictable or less predictable than other risks and losses based on the political risks are high.

Serbia Investment and Export Promotion Agency (SIEPA) takes measures to facilitate the inflow of foreign capital and the export of domicile manufacturers, but in times of crisis and high risk can greatly affect the country's increasing attractiveness for investment.

The advantages of the Serbian market in relation to other countries in attracting foreign investment lie in high-quality human resources. Serbian Government and Ministries are taking significant measures to improve regulation and create a climate for investment, and small and medium enterprises should recognize the benefits of foreign investment and use the benefits they provide and thus to contribute to the growth of the overall economy of Serbia.

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# Growth and Development of the Small and Medium Enterprises in the Function of the Economic Recovery of Serbia

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In the period after 2000, Serbia has started economic development through reforms, attracting foreign direct investments and developing entrepreneurship. World economic crisis came into Serbia with a delay, but in addition to deficiencies of economy in the process of transition. Practically, small and medium enterprises are largest in every European country, and they are the base of the economy. The key determinant of small and medium enterprises is that they can easily adapt to change and to adopt technological innovations. Development opportunity of Serbia represents the sector of small and medium enterprises. New job opportunities, increase of the standard of living and economy recovery of Serbia depend on the number and success of small and medium enterprises. Serbia must have a strong, export-oriented sector of small and medium enterprises if it wants to have a competitive economy in the international market. Also, increasing the number of exporting small and medium enterprises is a necessary condition for dynamic growth and development of the economy. The aim of this paper is to present the current position of the small and medium enterprises sector and possible directions of development in the function of the economic recovery of Serbia.

## Keywords

Development, Economic Recovery, Economy, Serbia, SMEs

## 1. Introduction

At the beginning of XXI century, Serbia has begun the process of transition, which is still ongoing. A key feature of economic development of Serbia in the transitory period is that its growth is based more on domestic consumption and imports, mainly due to privatization of income and borrowing from foreign sources than on the reforms and competitiveness. Serbia's economy is characterized by many macroeconomic imbalances. Underdeveloped domestic supply, primarily because of the delayed transition, slow and inconsistent process of privatization and the unfavorable investment climate, then high unemployment of workable population and excessive salaries paid in relation to the targeted inflation and productivity growth significantly reduce the international cost competitiveness of firms. Oversized public sector is spending and redistributing public resources, saving too little and underinvesting in developing of the country. Additional burden for the Serbian economy is the global economic crisis and the present national crisis. Development strategy of the Serbian economy in the future needs to be focused on rapid economic growth, low inflation and stability. Achieving of

these goals involves the sustainable rate of real GDP growth with employment growth and productivity increase, reducing inflation and reducing the account deficit. The small and medium enterprises have a key role in implementing a set of macroeconomic goals that need to improve the competitiveness of Serbian economy in the international market.

## **2. Macroeconomic Environment as a Limiting Factor of Small and Medium Enterprises**

Development priority of the first rank for Serbia should be the creation of a modern, European and competitive market. This is also one of the key principles of EU integration. In relation to the period before the year of 2000, Serbia has expressed commitment to the implementation of legal and economic reforms and has made progress in creating a favorable business environment.

The first decade of this century will remain in the history because of a number of changes whose significance goes beyond all previous changes made in the economic development of Serbia. However, the general slowdown of growth of Serbian economy in recent years will likely embedded a deeper and more lasting mark to the present stage of development than any changes. Achieved positive results at the beginning of the third millennium are attributed to a number of changes, although realistically they should be attributed to extremely low starting base. In the last decade of the millennium, the economy of Serbia was significantly ruined. The legacy of the previous period represents an impassible obstacle to any significant increase in economic activity. Serbia is a country of late transition that began since the year of 2000. The ten-year decline in living standards prior to the transition and the lack of political consensus on the sheer substance of the reform package are the basic characteristics of transition in Serbia. The following table display will best indicate the performance of the Serbian economy, because it shows the basic macroeconomic indicators. By analyzing the basic macroeconomic indicators, in a very clear way, we can see the level of development of Serbia in the new millennium. Given the fact that the very low starting base, for reasons already known, since the year of 2000. Serbia has achieved significant growth in GDP. The presented data show that the Serbian economy recorded a GDP growth, namely after 2001. a remarkable growth was recorded, and in 2008. the highest value of GDP was reached with over 32 billion euros. The period after 2008. due to the effects of the global economic crisis, and from the more pronounced domestic crisis, was marked by a decrease in GDP, which in year 2009. had a value of about 29 billion euros. Due to present economic recovery in 2011. the GDP had a higher value compared to year 2008. Economic growth in Serbia in the period after year 2000. was characterized by growth rates that are lower in comparison with the rates of inflow of funds from abroad and increased indebtedness. However, this is important progress when observing the previous period. Serbia is strongly affected by the global economic crisis. After nearly a decade of growth present, in 2009. a fall in GDP of 3.5% was recorded. In 2010. a slight economic recovery was seen, with GDP growth of 1%. In 2011. the GDP growth was 2%, but many structural problems are still present.

During the watched period the average growth rate of GDP was 3.5%, which is not sufficient for the current level of performance of the Serbian economy. The best example for the GDP growth rate and that it is not sufficient for the recovery of Serbian economy is that the level of the economy in 2009. has reached about 79% of GDP from the year 1990. The effect of the crisis, global and domestic, has sharpened all the key business problems of Serbian economy - insolvency, bankruptcy of a large number of companies and canceled privatizations. Significant reduction in domestic and foreign demand, limited and difficult access to funding sources, reduced foreign investment and inflow of funds from donations and remittances and the decline of purchasing power, have influenced the negative results of the Serbian economy in the current period. Since the beginning of the transition period to the beginning of the economic and financial crisis, Serbia has achieved relatively high growth

rates of GDP per capita. The lowest level of GDP per capita achieved was in 2001. when it was 1709 Euro, the highest level achieved was in 2011 when it was 4.543 Euro. Global and domestic crises had an impact on the level of GDP per capita, which was reduced in comparison to the year 2008 and in 2010. it was 3896 Euro.

**Table 1** Basic macroeconomic indicator in Serbia from 2001. - 2011

indicator	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GDP, mil. €	12.8 21	16.0 28	17.3 06	19.0 26	20.3 06	23.3 05	28.4 68	32.6 68	28.8 83	29.0 24	32.9 93
GDP per capita, €	1.70 9	2.13 7	2.31 3	2.54 9	2.72 9	3.14 4	3.85 7	4.44 5	3.94 5	3.98 1	4.54 3
GDP – growth rate	5,3	4,3	2,5	9,3	5,4	3,6	5,4	3,8	- 3,5	1,0	2,0
inflation, %*	40,7	14,8	7,8	13,7	17,7	6,6	11,0	8,6	6,6	10,3	7
Unemployment rate, MOR	/	/	/	19,5	21,8	21,6	18,8	14,4	16,9	20,0	22,9
Export in mil. €	1.92 2	2.20 2	2.44 1	2.83 2	3.60 8	5.10 2	6.43 2	7.42 9	5.96 1	7.39 3	7.00 2
Import in mil. €	4.75 9	5.95 7	6.58 6	8.62 3	8.43 9	10.4 63	13.9 51	16.4 78	11.5 05	12.6 22	11.6 82
Deficit in mil. €	- 2.83 7	- 3.75 5	- 4.14 4	- 5.79 2	- 4.83 1	- 5.36 0	- 7.51 9	- 9.04 9	- 5.54 3	- 5.22 9	- 4.67 9
Foreign debt in mil. €*	10.9 68	9.40 2	9.67 8	9.46 6	12.1 96	14.1 82	17.1 39	21.0 88	22.4 87	23.7 86	23.8 43
SDI in mil. €	184	500	1.19 4	774	1.25 0	3.32 3	1.82 1	1.82 4	1.37 3	860	1.22 7
Value of € in correlation to dinar.	59,7 8	60,6 6	65,1 3	72,7 0	83,0 0	84,1 0	79,9 6	81,4 4	93,9 5	103, 04	100, 60

Source: <http://www.mfin.gov.rs/UserFiles/File/tabele/2011%20decembar/Tabela%201%20Osnovni%20makroekonomski%20indikatori.pdf>, [www.nbs.rs](http://www.nbs.rs)

Most countries in transition have achieving macroeconomic stability as one of the key problems. Serbia is among the countries that have a problem with rising inflation. The highest level of inflation was in 2001 when it was 40.7% and the lowest level was achieved in 2006. and 2009 when it was 6.6%. The last year ended with inflation at 7%. The presented data lead us to a conclusion that inflation is a chronic problem of the Serbian economy. The burning issue of the Serbian economy in the transitional period is the unemployment problem. The drastic decline in economic activity and the lack of labor market from the past have influenced the escalation of the problem. The presented data clearly show us that unemployment reached the highest level in 2011 with 22.9% and the lowest level was in 2008. when it was 14.4%. The reduction in economic activity after 2008 had a negative impact on unemployment. The increase in unemployment is proof that the crisis is not yet over. Serbia, like many countries in transition is highly dependent on imports. A significant limitation of the Serbian economy in the international market is a constant presence in the trade deficit with foreign operations: foreign trade deficit is present in all years during the watched period. The lowest level recorded was in 2001. when it was around 2.8 billion Euros and the highest level was in 2008. when it was 9.8 billion Euros. In recent years there has been a reduction in balance of payments deficit, but not as a result of performance

enhancement, but the reduction of foreign trade due to the global economic crisis. The economic development of countries in transition involves an increase in foreign debt, in order to promptly adapt to market economies. Serbia's foreign debt is very dynamic and significantly increased in the period. From the level of around 11 billion Euros as it was in 2001. it reached in the year 2011. the level of just under 24 billion. With this level of crisis it is expected from indebtedness of the economy and citizens to significantly increase, which should result in a higher rate of economic growth. However, that didn't happen in the economy of Serbia, so it is reasonable to ask a question of if rationality can be used for the borrowed funds. Also, logically, the question of whether Serbia has approached a critical point of highly indebted funds and the possibility of returning the borrowed funds. The environment for attracting foreign direct investment is still not favorable, which did not lead to a significant inflow of the same. After 2000. an increase in FDI inflows is present in Serbia, which is mainly based on the accelerated process of privatization. The largest inflow of FDI was realized in 2006. and amounted to over 3 billion Euros, primarily due to the privatization of "Mobtel Serbia." After 2006. there was a drastic reduction of investment which is the cause of the presence of the ongoing global and domestic crises, but also because of the practically completed privatization. In future the key issue will be how to make Serbia attractive to the higher levels of FDI inflows. After a turbulent start, the transition in Serbia has slowed, and sometimes stopped. While some segments of the transition progressed a lot, some are still not far from the start. All in all, a pretty bleak picture. Faith in the rapid recovery after year 2000. was unrealistic. Serbia is an example that even in the economy the law of gravity can be applied: the height of GDP can be lost easily but difficult to regain. Serbia today is characterized by a small number of entries of new companies, a slight increase in new, productive employment, large budget transfers, substantial subsidies, extensive state intervention and the high business risks. Serbia is still a society in which the search for rent is a very profitable business. In the future it is necessary turn the existing economic policy around, so that a serious debt crisis wouldn't surface. One of the main pillars of the world economy, especially those in transition, are small and medium enterprises. It provides most jobs and creates new ones, give the largest contribution to added value, turnover, profit, and in most developed economies and contribute to exports too.

### ***1.1 Small and Medium Enterprises and Economic Recovery of Serbian Economy***

The small and medium enterprises (SMEs) are the backbone of economic development of Serbia and, with SDI, has great significance for economic and social progress, give a decisive contribution to balanced regional development. In addition, this sector is a stable source of employment and has a social and cohesive role, especially in underdeveloped areas that are of interest to multinational companies. Small and medium enterprises, according to EU criteria, The New SMEs Definition - User guide and model declaration, Official Journal of EU, European Commission, May 2003 are defined as following:

- medium enterprise is one that has 250 employees, and is not part of any larger organization or a chain with an annual turnover of less than 50 million euro or balance sheet of less than 43 million euro (with a guarantee of independence that allows corporations to own more than 25% of the company);
- a small business is one that has up to 50 employees, annual turnover of up to 10 million and the balance sheet of 10 million Euro;

The SME sector allows the developing of the entrepreneurial climate, which is a prerequisite for progress in the international environment. The main characteristic of entrepreneurship in the modern business conditions is reflected in the innovative activities which create the conditions for technological development, the formation of flexible organizations and employment increase. An innovative approach to business is an advantage to SMEs, and is

based on the flexibility and ability to take risks, and in addition SMEs can easily spot the change and take advantage of them, thus creating business success. SME development is one of the key development issues in each economy. Many developed countries in the world owes its success to the SME sector, as evidenced by the following data according to Đorđević D., Small and medium enterprises, KAS, Belgrade, 2001, page 4:

- In the European Union over 350 thousand new companies are established a year, of which about 70% of are micro firms and employ about 27% of all employees;
- On the European market, in the SME group, over 100 million people are employed;
- In the USA and European countries whole regions are formed, whose economy is based mainly on small and medium enterprises, for example. Italy (Venice, Giulia, Emilia Romana), Germany (Porurje, Wittenberg Baden, Bavaria), USA (California). These regions grow faster than the average national economy.
- Micro entrepreneur is one that has up to 10 employees and turnover less than 2 million Euro.

In year 2008 The EU adopted the Small Business Act (SBA)<sup>3</sup>, which all EU member states have accepted as a turning point for sustainable economic development. A key belief was that the SME sector is the backbone of a society and a kind of defense against the global process of domination of transnational companies. By adopting the SBA in the EU it made progress in reducing bureaucratic procedures and by applying the best practices in the SME sector, through clusters, incubators... Member states have visibly improve the business environment of SME sector development. However, despite the present trend of growth, the sector continues to grow more slowly than the present growth of this sector in the USA.

Republic of Serbia drafted in 2003. The strategy for development of Small and Medium Enterprises and Entrepreneurships for the period from 2003. to 2008. and in such a way joined all EU member states that have already adopted this strategy. "The main task of the Strategy for Development of Small and Medium Enterprises and Entrepreneurships in the Republic of Serbia is to create a framework for creating a sustainable, internationally competitive and export-oriented sector of small and medium enterprises and entrepreneurship (hereinafter referred to as SME sector) in the period of the next five years and thus provide economic and social prosperity for the Republic of Serbia, which is reflected in:

- increasing the living standards and reducing the difference between average incomes in the Republic of Serbia and the European Union,
- the significant rise in employment,
- stronger and more balanced regional development,
- strengthen international trade ties, especially with the European Union,
- Increasing the funds available for other social sectors, especially education, health and pension funds, according to The Government of the Republic of Serbia, Strategy for development of small and medium enterprises and entrepreneurs 2003. - 2008. , Belgrade, 2003. page 3
- SMEs play an important role in the economy of the Republic of Serbia, especially if we consider participation of this sector in:
  1. Total number of enterprises (99.8%) and employees (65.5% in the SME sector about 149 thousand new jobs were opened since 2004. to 2007.);
  2. Trade (67.6%), in the gross domestic product (about 36%), gross value added (GVA - 58.3%), profitability (38.6%) and productivity in business;
  3. exports (50.2%), import (64%) and investments (51.2%) in non-financial sector;

Micro enterprises are dominating in the SME sector with a share of 95.6% total and employ almost 50% of the total number of employees, according to The Government of the Republic of Serbia, Strategy of Development of Competitive and Innovative Small and Medium Enterprises 2008. - 2013. page 3.

All that was said above does not mean that there are no development problems in the SME sector. They are reflected in the fragmentation of businesses, low competitiveness, lack of diversity of financial markets, inadequate structure of the labor market, unfavorable regional distribution, administrative barriers and the like. The present reforms after year 2000 Influenced the improvement of business environments, but it is still not enough to fully accommodate the needs of rapid development of market economy. The liberalization of markets has increased presence of imported products, where local companies and their products are generally not competitive in either price or quality. The competitiveness of Serbian companies is mainly associated with the export of cooperative services, with the use of imported technology. Present low competitiveness of the SME sector continues to hamper its dynamic integration into the international market.

The Government of the Republic of Serbia in 2008 Implemented the Strategy for competitive and innovative SMEs from 2008. - 2013. which is an integral document that comprehensively defines the priorities of SME development policies and instruments to achieve them. Successful implementation of these strategies should contribute to achieving the following results:

- A number of new companies,
- Dynamic transformation of micro into small enterprises and the small into medium enterprises,
- Increased exports, increased employment,
- Significantly improve the trade balance,
- More balanced regional development,
- And thus the increase in living standard.

Republic of Serbia provides technical and financial support to entrepreneurs in the SME sector through various institutions. In the framework of financial support we distinguish: credit and grants. Institutions that provide loans are the Fund for Development of the Republic of Serbia and the commercial banks. Grants and technical resources can be obtained from: Ministry of Economy and Regional Development, the National Agency for Regional Development, Agency for Foreign Investment and Export Promotion of the Republic of Serbia, the National Employment Service, Ministry of Agriculture, Trade, Forestry and Water Management, other ministries, as well as foreign donors.

The work with the Innovation Fund began in 2011 (more at: [www.inovacionifond.rs](http://www.inovacionifond.rs)) whose main goal is to through programs of finance contribute greatly to the development of more innovative activities, particularly the establishment of new and strengthening of existing companies, better positioning of Serbian innovative companies in the venture capital markets, attracting foreign direct investment in research and science. The work on opening of the Development Bank is present, whose main goal is to increase production and exports. Although many economists believe that its opening is over a decade late, while it's opening in the present circumstances is a failed investment. The state is currently trying to mitigate the problems of insufficient funding through incentive credit lines to start a business, investment in disadvantaged areas, by promoting tourism and catering services. There are subsidies for self-employment and equipment. A significant part of implemented subsidies used for the loan approval for elimination of consequences of the economic crisis refers to the small and medium enterprises and entrepreneurs (SMEs) (more at: [www.merr.gov.rs/sr/c/resori/bespovratna-sredstva-za-klastere-i-mala-preduzeca/522](http://www.merr.gov.rs/sr/c/resori/bespovratna-sredstva-za-klastere-i-mala-preduzeca/522)).

National Agency for Regional Development implemented a program to support for successful businesses and entrepreneurs to strengthen competitiveness. Similar incentives are approved by the Agency for Foreign Investment and Export Promotion (more at: [www.siepa.gov.rs](http://www.siepa.gov.rs)) in support of the internationalization of SMEs, and the Agency for Insurance and Export Financing (more at: [www.aofi.rs](http://www.aofi.rs)) finances export transactions and insurance claims. Innovators and clusters are supported financially through the delegated ministries. Problems of numbers and inconsistencies of regulations and standards will be

resolved during the implementation of regulatory reform strategy. The first steps in that direction were made. During the registration with the Serbian Business Registers Agency (SBRA) the tax identification number (TIN) is obtained at the same time and the time to start the business activity is shortened. In the future it is necessary to use many measures to enable more rapid and better development of SMEs that is, like the whole society, in the period of transition. The entire front of activities to improve the business environment in Serbia is started. The SME sector has been recognized as one of development priorities. In this context, we can say that the prospects of this sector are easily predictable. It is necessary to establish a greater number of companies, which would contribute to higher exports, which would be reflected through the significant improvement in the trade balance of Serbia. This would consequently contribute to increased employment, particularly for highly qualified and productive workforce, as well as balanced regional development. Of particular importance is the combination of economy and science in order to significantly increase the innovative potential of SMEs.

## Conclusion

In the period after 2000 Serbia has changed five governments, each of which is at least declaratively aimed at development of a vibrant domestic private sector. A strong private sector development was based on the use of small and medium enterprises as a key factor for economic recovery of Serbian economy. Several important core strategies adopted in the past account for this, which, unfortunately, remained only on paper. The transitional period of Serbia, according to their capacities, and with tremendous support from donors, is marked by a commitment to establish an effective process for SME development policy-making, as well as the necessary instruments for its implementation from national to local levels. Small and medium enterprises are the main carriers of each country's development. In the last period it is evident that the number of SMEs is increased and that they became more competitive. Small and medium enterprises are oriented to smaller areas of the market and thus to certain consumers. They are more adaptable to change, more quickly recognize and respond to potential opportunities, and potential threats. Improving competitiveness of SMEs, particularly in times of recovery from the effects of the global economic crisis in Serbia necessarily has to be seen as a solution to the long-term economic growth, and not as part of the problem. It is necessary to apply the principles of SBA in the economic policy, especially given the fact that Serbia's economy is made up from 99.9% of small and medium enterprises. The development of SMEs, with the present investment, and on the basis of that an increase in exports and employment should be a key priority of economic development of Serbia towards EU integration.

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# Women Entrepreneurship in Montenegro – Some Relation to the Informal Economy

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Although it is not immediately apparent, society in Montenegro is a patriarchal and traditional one. Women are perceived primarily as daughters, wives and mothers. Although many of them are educated and work, their professional prospects are somewhat more limited than those of their male counterparts. Throughout the years, and especially after gaining the independence in 2006, business environment in Montenegro has improved. Since the end of the Balkan wars, the country has been undergoing an economic crisis, and gender issues were not in the focus. However, as the situation begun to improve, gender issues including women entrepreneurship became relevant for both ordinary people and policy makers. While institutional framework has been built, more is to be done to strengthen the women in their daily lives. Women make up 51% of the population of Montenegro. In the same time, data is confirming their disadvantaged position on the labour market. They are less economically active; less employed; and more unemployed compared to their male counterparts. In such circumstances, women entrepreneurship grew as a reaction to the necessity. The paper reviews traditional role of women in Montenegrin society, motives for their economic activation and their experiences once they get involved in business, providing recommendations for various stakeholders on what can be done to unleash women's entrepreneurship in the country. Also, the paper reviews links to informal economy and incentives for women not to register their business activities.

## **Keywords**

Women Entrepreneurship, Informal Economy, Government policies on entrepreneurship

## **1. Introduction**

Recent economic development of Montenegro has been characterized by high growth rates, which stopped by economic crisis. Since last quarter of 2008 when global crisis felt in Montenegro, macroeconomic indicators are confirming downturn of economy alarming all institutions and private sector to react and overcome the crisis with less damage possible. It means that all resources should be activated while future growth must ground more on internal than external factors (foreign direct investments), as it was the case before 2008. One of valuable resources, as has been proved worldwide are women. Still, Montenegrin society is traditional and patriarchal one, which prevents, to the certain level, faster involvement of female population into economic activity. Though that changes through the time, significant efforts need to be done to fully deploy the potential of women.



## **1.1 Montenegrin Economic Outlook**

Economic progress of Montenegro which happened in last several years, especially after regained political sovereignty (May 2006), and just before the global economic crisis, came due to comprehensive reforms in monetary (at the end of 1999) and fiscal policy (since 2004), as well as related policies of free capital movements and privatization of financial system. Transition process started in early nineties but was interrupted by international sanctions introduced against Federal Republic of Yugoslavia (FRY). Due to such circumstances, economic development slowed down with increasing informal economy contribution to GDP, as well as hyperinflation, which characterized that period. Introduction of Deutsche mark as legal tender in Montenegro in November 1999, and later on Euro (in January 2002) was very important step in further realization of the transition in Montenegro by which basis for other institutional and economic changes, was settled. Euro introduction resulted in disclosing all distortions of the system, including those from the socialist time. On the other hand, trade and investment flows became simpler, easier and followed by lower transaction costs. Strong currency influenced decreased inflation rate (from 120% in 1999, to 4.3% in 2004), which stabilized through the time and was solely dependent from the oil price at world market and the policy of electricity price restructuring.

The Montenegrin economy has acquired the structure of a modern service economy driven by the tertiary sector as 72.5% of the workforce was employed in the service sector in 2008, 25.8% in manufacturing and only 1.7% in agriculture mining and forestry. Small and medium enterprises (SMEs) comprise the backbone of Montenegrin economy, representing 99.8% of all registered businesses and approximately 60% of national GDP. Micro companies (up to 10 persons) prevail in number (77% of total), followed by small (9.6%) and medium-sized enterprises (2.8%).

Global economic crisis caused mostly similar problems in Montenegro as in other countries in the region: decreased economic activities, decline of consumption and imports, which influenced on significant decrease of the tax revenue in the state budget. Montenegrin economy has grown in the period from 2006 until 2008 in average 9%. That GDP growth rate came from continuous increasing demand from FDI, tourism, construction, banking sector. Very dependent on import and export of goods and services trade exchange, Montenegro started facing the crisis by the end of 2008 reaching 5.7% decrease in real GDP for 2009 [1], compared to 4.2% decrease in EU. In terms of its structure, Montenegrin economy is based more on services (respective share in GDP amounts to 59%), then industry and agriculture (9.5% and 8%, respectively). Economic downturn affected industry, trade, traffic and construction. Still, Central Bank of Montenegro estimations recording the GDP growth rate at level of 0.5% in 2010.

## **1.2 Demographics**

Montenegro is located in South Eastern Europe and has a population of about 625,000 [2]. Its territory is about 13,812 square kilometres and the population consists of a majority of Montenegrin (44.98%), along with Serbs (28.73%), Bosnians (8.65%), Albanian (4.91), Muslim (3.31), Croats (0.97%) and others (based on the 2011 census). Having in mind often qualification that Montenegro represents melting pot of various ethnic groups and religions, the majority of the population belongs to the Orthodox Christian tradition (Montenegrians and Serbs).

## **1.3 Women in Montenegro**

According to the 2011 census, women make up 50.6% of the population in Montenegro. On average, women are older then their male counterparts (38 vs. 36 years), and in the same time make 56% of moving population. Life expectancy at birth among women is higher 76.1,

compared to men in Montenegro (71.2, data for 2008), while average age at first marriage increases through the time (from 22 in 1960, to 25.9 in 2008). Though they gain better education, traditionally, women in Montenegro earn less than men (average earnings of women to average earnings of men in September 2009 amounted 86.2%) [3].

All former socialist countries, including Montenegro, characterized higher level of economic activity of women. However, during the transition this changed resulting in lower economic activity of women being less paid in the same time. In addition, one can notice higher employment of women in less profitable sectors, while managing positions and entrepreneurial activities dominate among male population.

### **1.3.1 Employment**

Data is confirming a disadvantaged position of women on the Montenegrin labour market. Namely, 42.9% of women (against 57.8% of men) are economically active; 34.4% of women (against 46.7% of men) are employed; while unemployment rate is almost equal and amounts 19.8% among women compared to 19.2% among men [4]. Possible explanations for these gaps may be extensive maternity leave regulations in the labour law (e.g. one year paid maternity leave), the lack of available part time jobs (only 4.5% of all jobs are part time) and insufficient child-care facilities. However, there are no gender specific labour market measures or gender mainstreaming policies in place. Women also face obstacles when starting businesses. They have less access to loans and micro-credits because they lack the required guarantees; only 1% of real estate owners are women [5].

### **1.3.2 Business Ownership**

There is no adequate statistics reflecting the business ownership from gender perspective in Montenegro. Around 27% of all enterprises established since 1997 are women-owned as compared to just 5% in 1990. Recent research is showing that 30% of companies in Montenegro are driven by women [6], though higher percentage of registered companies have woman as an Executive Director. In general, women establish micro companies, usually only with one or two companies, growing slowly. Home remains the main business location, not only for financial reasons but also to remain close to the family and children.

### **1.3.3 Legislative Environment**

Reform process in Montenegro primarily introduced new business laws and improved business environment. There is no specific legislation fostering women self-employment. Just recently, initiatives supported by international development organizations (i.e. UNDP, EC, the World Bank) focused access to capital for women entrepreneurship.

## **2. Relevance of Entrepreneurship**

Entrepreneurship is increasingly recognised as an important driver of economic growth, productivity, innovation and employment, and it is widely accepted as a key aspect of economic dynamism: the birth and death of firms and their growth and downsizing. As firms enter and exit the market, theory suggests that the new arrivals will be more efficient than those they displace. Existing firms that are not driven out are forced to innovate and become more productive in order to compete. Many studies have given empirical support to this process of "creative destruction" first described by Joseph Schumpeter [7].

Entrepreneurship is seen as the engine of the economic growth in each country, contributing significantly to national competitiveness. The literature increasingly puts forward the idea that

entrepreneurship thrives in countries that have an “entrepreneurial culture”. Consequently, 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 [8]. While entrepreneurship is becoming crosscutting issue of government policies, it has been proven it requires some factors to take off. Those factors include at minimum: demography, referring primarily to young and/or expanding population; adequate economic order (economic freedom, favourable tax system, education, participation of women etc.), and entrepreneurial framework conditions (access to capital, information technology etc.). Still, without the conducive environment, entrepreneurs will at best operate their businesses in the informal economy, while at worst they will not bother opening a business at all. Consequently, it is very important for the overall country’s development to deploy policies aimed at reducing business barriers, simplifying business registration process, etc. in order to support entrepreneurship development and its growth.

## **2.1 Women Entrepreneurs**

Despite being very important, entrepreneurship has traditionally been associated with men, despite the rapid increase in women’s business ownership. According to the Global Entrepreneurship Monitor (GEM), in 2010, 104 million women in 59 economies, which represent more than 52% of the world’s population and 84% of world GDP, started and managed new businesses. These women entrepreneurs made up between 1.5% and 45.4% (case of Ghana) of the adult female population in their respective economies. Another 83 million women across those regions ran businesses they had launched at least three and a half years before. Together, these 187 million exemplify the contribution women make to worldwide entrepreneurship and business ownership. Still, in only one out of these 59 economies did more women participate in entrepreneurship than men [9]. Other various surveys and analysis confirm that when women do not participate equally in entrepreneurship, society loses out on the value that can be created by half its population. Interestingly, compared to the country’s competitiveness level, women in factor-driven economies feel better about launching its own business endeavour - 19.9% of women surveyed, compared to 9.7% in the efficiency driven economies, and 3.9% in the innovation-driven economies. Intriguingly, the lowest proportion of women entrepreneurs in the efficiency-driven group of countries (where Montenegro belongs) is found in Eastern Europe.

### **2.1.1 The motivation behind being an entrepreneur**

Despite the enormous cultural and environmental differences, the factors pushing individuals to start their own businesses around the world are very similar. The top motivational factors are: lack of job satisfaction, desiring independence, economic necessity and opportunity. Still, reasons for being self-employed differ depending on the country’s development – countries with better quality standards have entrepreneurs emerging not primarily from necessity reasons. According to a Eurobarometer survey from 2004, the primary reasons for being self-employed in EU-25 were: personal independence, self-fulfilment, interesting tasks, no need to adapt to an environment and possibility to create own environment (93% of respondents), while the second most often given reason was the prospect of a better income (23%) [10].

According to GEM 2010, women are most often motivated by necessity across all economic development levels, a trend that declines as economies develop. Through the time, necessity has declined as a motivating factor for women more extensively than for men in the efficiency driven economies.

Women become business owners for a variety of reasons. The majority are in the “push” group, in which women have no choice but to start their own business as an alternative to being unemployed, as opposed to the “pull group” where women become entrepreneurs out of a wish for independence. This is the case in Montenegro: women often decide to start a business to increase family (primary) income (36.6%), and to find employment (28.5%) while 23.6% of them wanted to be in a managerial position.

Once women become entrepreneurs they are surprisingly similar. According to a survey sponsored by IBM, women business owners in 16 countries share a number of characteristics, and they also share similar concerns. Although they face numerous challenges, most of them are optimistic about the future of their businesses.

One of the researchers found women business owners share many qualities regardless of where they were from:

- Risk taking propensity
- High energy level
- Personal motivations
- Married, first born
- Self employed father
- Social adroitness
- Financial competence
- Interpersonal skills
- General business management skills [11].

### ***2.1.2 Women Entrepreneurship and Informal Economy***

Every society, regardless of the level of socio-economic development, a form of social structure, or the dominant social and religious environment, is faced with the problem of the informal economy. The informal economy is one of those phenomena that are difficult to "catch" - cleverly escapes as research instruments, and tax authorities.

While Montenegrin economy faces a number of challenges, such as massive and inefficient administration, inadequate supply of infrastructure, access to financing, corruption and misbalance of the workforce supply and demand, one of the serious aspects of economic activity in Montenegro is the size of the informal economy, which remains large. According to a 2005 survey, the share of the informal economy in Montenegro was about 25% - 30% of the registered GDP; some economic sectors are more prone to informal activities than others, such as retail (38.1%), agriculture (18.2%), catering (19.1%), construction (10.8%) and transport (9.6%) [11]. Since 2005, when this survey was conducted, through reforms of various administrative services, as well as by completing the regulatory reform, the informal economy has been reduced. However, the recent global crisis imposes new challenges creating the incentives for flourishing of unregistered business activities.

There are three main schools of thought relevant for the definition of informal economy [13]:

- The dualists: the informal economy is a separate marginal economy not directly linked to the formal economy, providing income or a safety net for the poor (ILO 1972).
- The structuralists: the informal economy is subordinated to the formal economy. In order to reduce costs, privileged capitalists seek to subordinate petty producers and traders.
- The legalists: informal work arrangements are a rational response by micro-entrepreneurs to over-regulation by government bureaucracies [14]

In terms of entrepreneurship activity, the informal economy, it is largely characterised by:

- Low entry requirements in terms of capital and professional qualifications.
- A small scale of operations.
- Skills often acquired outside of formal education.
- Labour-intensive methods of production and adapted technology.

As they are often pushed to the economic activity, and willing to remain connected with the families and children, women entrepreneurs often started their activities informally. Women's share of informal economy employment worldwide has remained between 60 and 80%. Moreover, the number of females in the labour force is continuously on the rise and women in the informal economy most probably number much more than reflected in available statistics. They comprise most of the unpaid labour, are often home-based workers, and thus fall easily through gaps in enumeration as data and statistics on household level is still difficult to measure. If productive but unpaid work is performed, these women are to be included in the informal economy workforce. Another important aspect of women's and girl's high participation in the informal economy is that they lack the right to own and inherit property of any kind in many countries. This obstructs women even more from the so-called formal economy, as they do not have any assets to use as security for credits, etc. [15]

### ***2.1.3 Women entrepreneurship in Montenegro***

Majority of countries record higher numbers of men entrepreneurs than women. Still, there are countries where women entrepreneurship is considered to be the most dynamic economic activity:

- USA: women own 38% of all registered companies (8 million firms), that employ 27.5 million people and make \$3.6 trillion annual sales;
- Japan: 23% of private companies have been established by women;
- China: women established more than 25% of companies since 1978.
- Germany: women established 1/3 of all new jobs since 1990, exceeding 1 million jobs
- Hungary: since 1990, women founded more than 40% of all new jobs
- European Union: 1/3 of new ventures are established by women.

In Montenegro, inadequate attention given to the phenomena of women entrepreneurship is confirmed by lack of any statistics. However, few organizations are set up in order to support women in business (i.e. Committee for women entrepreneurship within Montenegrin Chamber of Commerce, as well as the Association Business Women, under the auspice of Union of Employers etc.). Recent UNDP study showed that unemployed women in Montenegro are worried if they will be able to take care of their households in case they start their own business - 40%, while 34% considers they would have to invest much more efforts to achieve the goals compared to their male counterparts. What women lack the most in order to start their own business are funds and favourable finances (loans). Other obstacles are lack of knowledge and support to develop business plan, support in acquiring and furnishing business premises, inadequate tax exemptions in the first years of business development, poor business contacts and lack of information related to business registration. Potential women entrepreneurs mainly think about modest business plans. They play without taking risks, choose known and businesses already developed at the market, primarily close to their families. They are oriented to domestic, local territory. Planned businesses do not request big investments, but also cannot bring significant profits neither can develop significantly in the future. They are also aware that their business idea is not unique as that there is vast competition. Not only that they enter entrepreneurship arena modestly, but potential women entrepreneurs do not have the ambition to significantly develop the business in the future. They mainly plan to work alone, or hire one more employee. In order to take lower risk in financial terms, they even plan to start their businesses informally, while it becomes more successful. Consequently, profitability expectations are also modest: the

business should provide decent living standards to the family or simply to satisfy needs of the family budget.

The majority of women-owned businesses in Montenegro have traditionally been in the stereotypically feminine fields of services and retail. Also, those businesses employ small number of employees. As research showed, once they are in business, women entrepreneurs do not feel any kind of discrimination, in contrary. A case study based research concludes that despite the differences, the women in business in Montenegro face many similar issues. Business owners of both sexes in Montenegro today must deal with complicated bureaucracy, administrative barriers and other obstacles that appear to be gender neutral. Some of challenges facing women entrepreneurs in Montenegro are typical of those faced by women all over the world, while other are found in transitional economies. Still, it is interesting that in other transitional countries, women agree that they also have to deal with discrimination, while in Montenegro women interviewed did not do so [15].

### 3. Conclusions

In Montenegro, as in other countries possible:

- Men make up the major share of entrepreneurs in the country;
- The majority of women become entrepreneurs because of “push” factors, and a large number of them work in the grey economy;
- Most women still own businesses in services or retail, although they are starting to enter less traditional fields;
- Women struggle with a number of gender-neutral issues, however, they also face similar gender-specific problems, including external issues such as lack of access to capital and self-imposed issues such as low self esteem because of a lack of managerial experience [16].

In general, business environment in Montenegro is becoming more favourable for entrepreneurs. Once they are up and running, women entrepreneurs feel equal to their male counterparts. They are more devoted, hard working and respect business ethics. The question remains: how to get them more involved?

Based on the literature review and findings of the various studies, in the context of Montenegrin society, it seems important to continue and foster:

- Promoting women entrepreneurship and improvement of women position in the society in general;
- Listen to the voice of women entrepreneurs;
- Promoting women entrepreneurial networks as well as successful women entrepreneurs as role models;
- Permanent monitoring and analysing of achieved results.

It is necessary that the government and private lending organisations become aware of economic potential of women. It would be worthwhile for them to concentrate on this sector and support them by allowing women access to training and financing, which should help them build better businesses, adding to the tax base and building up the private sector.

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# Information Asymmetry in the Software Market: a Failure of the Intellectual Property System

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The software market is a market in which the primary market value of the goods results from the information the goods contain. Given the intangible nature of software it is important on the one hand property to be established on it and on the other consumers to be able to recognize an opportunity to satisfy their needs with a particular software solution. Users can not assess the usefulness of software before actually consuming it. Consumers rely more on critical analysis and evaluation from third parties and other secondary sources of information in forming their decision for purchase rather than on information from the manufacturer himself. The intellectual property (IP) system offers protection of software and in terms of property rights it provides software developers with a wide range of possibilities of usage and excluding third parties from using the software without permission granted. The IP system also requires a commitment by the developers to reveal in depth the characteristics of the solution, in order that this solution to be used as prior art, and for the creation of new and better software, when software is protected by a patent in particular. Access to this information is free and users can benefit from it fully at any time – understanding software functionality and deciding if it can satisfy their needs or not. The intellectual property system is supposed to balance the interests of different stakeholders – developers and users. However we consider that there is serious misbalance of interests that leads to various problems, one of the most serious of which is the information asymmetry on the software market. Information asymmetry is an intrinsic characteristic of the software market and is present in every type of transaction. The problems of the existence of asymmetric information in the market of software, respectively of the fact that software manufacturers have product information, which buyers do not have, can be viewed in several ways: This is a prerequisite to purchase a lower quality product by the consumer; This is a prerequisite for the formation of prices of products that do not correspond to their value and are much higher. Usually the software pricing policies are unclear to users and they are unable to determine why the price they are offered is such. Similar software solutions are available in very large price range and the user has no real expectations how much to pay for certain types of software; it is difficult to determine whether a price is high or low; This is a prerequisite for software manufacturers to bear a higher risk of developing software products since imperfections and errors in software can easily be attributed to bad faith use by the user.

## **Keywords**

Information asymmetry, intellectual property, software market



## **1. Intellectual Property on the Software Market**

Intellectual property (IP) has become one of the major issues of our global society, especially as the world moved toward a knowledge economy. How we regulate and manage the production of knowledge and the right of access to knowledge is at the center of how well this new economy works and of who benefits.

What intellectual property is, we already know. We know that software is intangible and being intangible it is a part of the system of protection, since the creators should “own” what they have created. From this ownership, certain consequences flow and we are made aware of the fact that we cannot just copy or buy a copy of their works without consideration of their rights. Each time we use such “protected” items, a part of what we pay goes back to the owners as recompense for the time, money, effort and thought they put into the creation of the work. The IP system offers two possibilities for protection of software: under the copyright or the patent law. Both copyright and patent protection give software developers an exclusive right to make use of software, and by doing so, limit, for a specified duration, the possibilities of using the software by others. In return for this exclusive right, the patent system has a second function. It requires the creator to disclose to the public the patent information about the special knowledge or the resulting newly-developed technology, i.e. software. Thus for both the developer and the public there is a cost and a benefit. The public has the benefit of the inventive technology and the creator has the benefit of an exclusive monopoly for a limited period of time. The second function of the patent system is often underestimated. If we consider the number of patents and the resulting products and technology, which are available, it is evident that there are millions of existing sources of patent information. This disclosure of patent information to the public is one of the foundations of the patent system, from which continuous development of technology and economic growth of local industries should spring.

There are numerous researches and analyses for the pros and cons of each type of protection. Furthermore there are serious questions as to why software needs such form of legal protection at all and opinions, that all software should be open source. This research paper will not consider either of these areas of discussion. What we will focus on is the essence of the IP system and how it balances the interests of different stakeholders. In terms of software we consider that there is serious misbalance of interests that leads to various problems, one of the most serious of which is the information asymmetry on the software market.

## **2. Is the Software market a Market?**

Before reaching the question as to why the IP system fails to balance the interests of all stakeholders on the software market, we would like to make a brief notion about the nature of this market. The economic theory considers a market to be a set of economic relations between entities, arising in connection with the movement of goods and money, based on mutual consent, equivalence and competition. Often in the transactions on the software market one side (the user) is put in a situation, in which he either must buy the software as it is offered from the manufacturer or to leave the transaction. So the moment of consent and agreement between the parties with respect to the purchase of software is missing. The user must buy a product that he has not seen, has not tested and has a functionality, about which he can only speculate on the basis of information provided by the manufacturer (and actually it may be missing). This is the case for example in the so-called click-wrap and shrink-wrap licenses. It is questionable also whether on the market of software there is competition - whether the user has the option to buy the same software from other market participants, under different conditions. Another specific of the software market is that software is subject to intellectual property protection and having an intangible nature it may be regarded as a set of content, objective form of the content (carrier or medium, in which it is materialized) and

the rights to dispose of the content, which are subject of licensing. The social contract providing monopoly rights for a limited period of time for the creators of intellectual products occurs at a time very different from the information age we live in today. These three elements of intellectual property rights historically were identified in one final product that consumers used, and it was not a problem with respect to their inability to copy the product in large quantities and carry actions with it, infringing the rights of the authors. Today, however, the possibility of reproduction of digital products, at almost zero cost makes owners distinguish these three elements and "sell" only part of the "product" on the market, namely the right to limit the usage. Thus the license outlasts the carrier of the object; the content easily evolves; it can also be exploited, allowing companies to take advantage of a public long used to own its goods and which now has no ownership at all.

There is no primary and secondary market for software. The value of the good stays the same no matter how many people used it before you. Imagine buying a used car on the price of a new one. Of course with time software manufacturers will provide upgrades to make the consumer feel he is using "obsolete" and outdated version of his product. But why is the product obsolete: just because there are new operation systems not running it anymore? Furthermore the end user licensing agreements (EULA), which accompany software bundled with new computer, prohibit selling the unused licenses without the computer. The consumer can sell the monitor, the keyboard, etc. just not the software, because, as according to the court ruling in one of the recent software cases Apple vs. Psystar, the user of the software is "licensee" and not "owner" and his options to use the software are very restricted.[1,2]

### **3. Information Asymmetry on the Software Market**

Information asymmetry is an intrinsic characteristic of the software market. The problems of the existence of asymmetric information in the market of software, respectively of the fact that software manufacturers have product information, which buyers do not have, can be viewed in several ways:

- This is a prerequisite to purchase a lower quality product by the consumer, since he is often unable to determine by himself if a software solution is good or bad. The software market is a market, in which the primary market value of the goods results from the information the goods contain. Given the intangible nature of software, the user can not assess its usefulness before actually consuming it. Consumers rely more on critical analysis and evaluation from third parties and other secondary sources of information in forming their decision for purchase rather than on information from the manufacturer himself. This is good for the software developers who do not suffer the consequences from a misunderstanding of the product information from the consumer since they are not the ones who provided it. Furthermore whether software is good or bad is a question not that simple.
- This is a prerequisite for the formation of prices of products that do not correspond to their value and are much higher. Usually the software pricing policies are unclear to users and they are unable to determine why the price they are offered is such. Similar software solutions are available in very large price range and the user has no real expectations how much to pay for certain types of software; it is difficult to determine whether a price is high or low;
- This is a prerequisite for software manufacturers to bear a higher risk of developing software products since imperfections and errors in software can easily be attributed to bad faith use by the user;
- Users are prone to illegal use of software, since they do not understand fully the legal parameters of the deals. One of the key findings of the 2010 Global Software Piracy Study of Business Software Alliance (BSA) was that many PC users lack a clear

understanding of whether common ways of acquiring software are legal or illegal, especially in high-piracy markets. [3]

#### **4. The Failure of the Intellectual Property System with Regard to Software**

The reasons why we speak about failure of the IP system in terms of software protection and misbalance of the interests of the different stakeholders on the software market, because of which information asymmetry arises, can be summarised as follows:

- The patent system fails to provide the necessary information to the customer.

When we speak about information asymmetry we speak about disparity of the level of information each party in the transaction has. In order for the problems with information asymmetry to be solved the information needs to be revealed. And the question is which information? If there is unexploited value, buyers and sellers have an incentive to find ways to capture that value. So what makes the software valuable? Simple as it is: value is in the eye of the beholder. It might be many things: shorter time to perform tasks, possibility to solve problems, ease of use, etc. Developers see that as functionality. But according to a research, performed by Standish Group in 2002, in one typical software solution 7% of the functions are used always, 13% often, 16% from time to time, 19% seldom and 45% never.[4]

So, on the one hand we have the software developers trying to make software with more and more functions and customers on the other, not using them. So developers fail to signal the functionality of the software to the buyers, in the best possible way. If the customers understood the full functionality wouldn't they use it? One will say there are manuals how to use the software. And there are of course, but first they are not always provided with the software and second if the people actually read them would we have expression as "read the freaking manual" (RTFM). Which brings us to the main question: what kind of information should be revealed? Apparently customers do not want to hear about functionality, they want to hear about productivity, effectiveness and problems solved. But if a seller tries to market his product in such a way, there will always be the question how credible that information is, which is related of course with reputation and image of the company. What if there was a third party, credible enough, which can provide that information and furthermore free of charge for the customer?

A patent gives an inventor an exclusive right to make use of software, and by doing so, limits, for a specified duration, the possibilities of using the software by others. In return for this exclusive right, the patent system requires the creator to disclose to the public the patent information about the software. The patent system requires the disclosure of information to be made not only in terms of description of functionality of the invention (software), but also in terms of problems solved and effects produced. So this information can be used by the customer to see what kind of problems the software solves and based on that the customers can make his decision for purchase. Furthermore the patent document has the following distinct features: it provides details of the invention, including information on how the reader could carry out the invention; it describes the invention claimed in essence identifying the legal scope of the patent right; and it identifies the inventor and the patent owner (which are sometimes different entities) and any other legal information, which could be of help when one wants to commercially use the invention. So the customer should be able to understand the legal scope of using the software.

- Patented software is not offered to the market as a distinguished product, as other patented products as medicines, or particular technology.

Marketing software as a protected intellectual product can help software publishers on the one hand to maximize their profits, offering it at higher prices, and on the other hand reduce also the pirated use of their software. The number of patent applications with regard to

software related inventions in the European patent office shows a steady trend, even increasing in the last 10 years, which means that companies are definitely interested (see Table 1) [5].

**Table 1** Patent applications filed before the European patent office 2001-2010 by technological field

Field of technology		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Electrical engineering	Electrical machinery, apparatus, energy	6630	5791	6201	6342	6590	7064	7271	8121	7782	8241
	Audio-visual technology	5086	4627	5452	6349	6799	6577	6134	5793	4741	5151
	Telecommunications	5889	5117	5317	5581	5633	5740	6117	5963	4497	4391
	Digital communication	3126	3257	3921	4388	4856	5367	5815	6362	7153	7959
	Basic communication processes	1552	1359	1491	1406	1389	1398	1243	1249	1031	1129
	Computer technology	7185	7610	8338	8874	9034	8796	8703	9198	8013	8257
	IT methods for management	19	64	62	100	507	1052	1125	1158	1190	1173
	Semiconductors	2533	2091	2591	2686	2862	3146	3194	3598	2958	3714

If protected software was marketed as a distinguished product on the market would not customers buy more of it even if it is sold at higher prices? The answer is yes, they would, as there are many examples from other industries. If so, why owners of software patents do not market their products in this way? The answer to this question however is not that simple. It could be because they know buyers would not “read” that information as desired and would not take the higher price. It could be because “software patent” is still a dirty word for most of the customers. However the 2010 Global Software Piracy Study of BSA highlighted few very important issues with this regard: public opinion strongly favours intellectual property rights (seven PC users in 10 support paying innovators for their creations to promote more technology advances); PC users around the world recognize licensed software to be better than pirated software, with 81 percent saying it is more secure and reliable.[3] If we believe the figures software publishers should pay attention on this feature, when marketing their products.

Software companies devalue their own products to establish market share or destroy competitors (predatory pricing problem). Because of the elastic value, one software company can undersell its competitors by wrapping products together and selling them cheaper (bundling), giving products away until their competitors are bankrupt (dumping), changing elements which break competitor’s programs (monkey-wrenching), and offering buybacks of competitors licenses (slamming).[6]

No matter what the licensing policy a company uses is, the price of the software remains unclear for the customer. Even experts say that “valuing intellectual property is an interesting mix of art and science,” (Brian W. Napper, a partner in Intellectual Asset Management Consulting at Deloitte & Touche in San Francisco). Some practitioners even call it “the fudge factor”, which apart elements like the total costs involved for development, the hourly rate, hours worked on the project, the value of a similar product plus an undetermined percentage based on the new product’s uniqueness, a client’s expected use and number of users, include also: what the market will bear; how desperate is the client; how many alternative solutions are there; what is the client’s budget, etc.

Or may be the reason why software developers do not market their products in this way is because customers do not believe that patented software is better than the software, which is not protected. Why does not the system prove that protected software is of high quality? This is yet another argument for the failure of the IP system.

- Patented software is not regarded as better or as software of higher quality compared to not protected solutions.

The question with the quality of the software brings us to what is good and what is bad software. It is more than obvious that the user/stakeholder and the developer have different notions about it and different methods how to differentiate good and bad software product.

An end-user primarily makes his assessment based on his ability to use the software product to accomplish the task he wishes to accomplish with the software product. This in itself is interesting, because from an end-user perspective, the software product that does the best job at helping him accomplish his task, may be priced too highly for him to afford, or be too hard to learn, or not work on his system - thus making it "bad" in his eyes.

On the other hand, a stakeholder may view a software product as good if it generates sufficient revenue or publicity, if it reduces costs, if it optimizes processes, even if it referred to generally as "low quality" product.

Since the patent system has very strict requirements about the novelty, applicability and innovative character of the software and these requirements should be met if a software developer wants its product to be protected we may say that if a software solution is protected then the problems it is told to solve are really solved, thus making the software good product. Furthermore if one software product is protected and third parties are excluded from the possibility to use it, these parties are urged to develop their own solutions (to protect eventually), which must go one step further than what already exists, thus providing more value for the customer. The fact that customers do not regard protected software as "better" compared to not protected software could mean that the requirements of the patent system are not adequate with regard to software. Possible reasons for that could be that: abstract algorithms can be described in so many ways; jargon and lack of tangible components can make a routine software idea sound technical; it is impossible for a patent examiner to judge obviousness, since software developers use so many ideas during their work that only a small percent ever get submitted to the patent office or otherwise published.

## 5. Conclusions

Information asymmetry creates number of problems on the software market related to quality of product, risk of adverse selection, piracy and considering the characteristics of the intellectual property system it seems that there is a possible solution in hand.

But the intellectual property system fails to balance the interests of software developers and customers, thus failing to provide a solution for the information asymmetry on the software market. Patent protection for software is inadequate since the patents so far prove to be used mainly as instrument in lawsuits rather than incentive for innovation and factor for welfare. Customers do not rely on the information in patent documents to understand what software does and how it can solve particular problem. They rely more on third parties assessments of the quality of the software. Furthermore they do not recognize patented software as quality software, despite of the heavy requirements a software invention should meet in order to be protected.

The patent system does not play a significant role in the market success of protected software either, thus not allowing creators to form prices of software, which on the one hand could maximise their profits and on the other leave the customer with the clear understanding of why he pays the price and how it is formed.

What to say about copyright protection – it is even more inadequate. On the one hand all software is subject of protection; there are no clear requirements of the level of creativity put in the software in order for it to deserve this protection and customers are very well aware of that. On the other hand the scope of rights is so unclear that it is no surprise most of the customers do not understand which use of the software is legal and which is not. The term of protection is long, which might be good for software developers, but considering the fast changing technological field it reasonably puts the question is it really necessary.

So what is the solution? First of all we need credible data of how information asymmetry influences trade on the software market. Then we will have to search for ways to solve the problems it creates. The intellectual property system offers such a possibility. But in order for this possibility to be truly a possibility and a solution, the system must change. This change should be in a direction to really balance the interests of creators of software, customers and society as a whole. May be we should opt for sui generis protection of software with specific requirements for the innovative character of the software solutions, not binding them with hardware, with specific scope of legal protection, defining what one can and cannot do, and not interpreting existing scope of rights with regard to software.

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# Significance of Internal Audit for the Success of Small and Medium Enterprises

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Continuous changes of environment lead to the need of constant changes and adaptation of enterprises. In such conditions, survival especially of small and medium enterprises and their successful business decision-making depend on the availability of opportune, reliable and accurate information. Internal auditing contributes to the quality of management process and achievement of enterprises' aims. However, correctly structured function of internal audit can significantly contribute not just to provision of enterprises' compliance to the request of internal and external regulation and good business practice, but also to operational superiority of enterprises. Internal audit supplies management with analyses, advice, information, helps management to form effective internal control, to effectively manage risk, to determine the most important activities and aims of enterprise, etc. Organisational structure of internal audit, its position in enterprises and its reporting lines significantly determine effectiveness of internal audit and thus successfulness of enterprises' business results. In this paper we will examine activity, organisation and reporting lines of internal audit function in order to perceive significance and contribution of internal audit to the achievement of good business results and creation of sustainable competitive advantage of small and medium enterprises.

## Keywords

Internal audit, organisation of internal audit, reporting lines of internal audit

## 1. Introduction

The objective of this paper is to assess activities, organization, and reporting lines and reaction to the function of internal audit, or in other words, to assess the importance of its proper functioning for achieving good performance of companies. It should be noted that properly structured function of internal audit has a significant contribution to achieving operational superiority and establishing a sustainable competitive advantage of companies, especially of medium and small enterprises, primarily because of their scarce resources.

Internal audit provides the management with necessary information, analyses, advice, and enables them to effectively manage risk, helps them to effectively run the enterprise and thus achieve the set goals and good business results.

In the first part of the paper there is the theoretical basis which allows the reader to understand what an internal audit is, which the basic activities of internal audit are, and what ways of organizing internal audit are available. The second part refers to the consideration of

development, the most important activities and reporting lines and reaction to internal audit. At the end of the paper there is a brief overview of the research on internal audit, its activities and structuring on the global level.

## **2. Activities, legal positions and method of organizing internal auditing**

### ***2.1 The definition of internal auditing and its activities***

A good starting point for the research on internal auditing is its definition given by The Institute of Internal Auditors – The IIA: “Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organization's operations. It helps an organization accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes.”[1]

Initially, internal auditing was engaged in the audit of the accounting function of the company in which it had been established. The spectrum of internal auditing activities has been expanded over time, primarily because of the environment in which enterprises operate, and which is characterized by processes such as globalization, the application of new technologies and processes, diversification of production, decentralization, and so enlarging the company. Therefore, companies are now faced with constant changes, challenges and growing competition and having the management of the high quality means the basis of their survival. Properly designed and positioned, and properly completed internal audit function contributes significantly to the successful management of the company and achieving its objectives.

There is a wide range of services provided by internal auditing, and according to Dušan Milivojević these services include: [2] auditing of financial statements and systems of internal accounting control, auditing of consistent application of policies, plans and procedures, performance auditing that examines economy and efficiency of business processes and auditing of effectiveness in achieving programme results in comparison with the established strategy and aims.

Through the audit of financial statements and system of internal accounting control, internal auditors provide assurance to managers that the information which their decisions arrive at are relevant and reliable, whereby the risk that managers take in decision-making and defining problem-solving activities is reduced.

Another service provided by internal auditors relates to the consistent application of policies, plans and procedures, laws and regulations, and it serves as the basis of survival of all businesses. The importance of regulatory compliance is particularly high in sectors such as banking, insurance, health care, but not negligible in other activities.

Performance auditing focuses on understanding and evaluating the rationality, efficiency and effectiveness of implementation of tasks in all business functions in order to increase profitability and maximize the well-being of the organization.

The fourth type of services provided by internal auditing relates to the management auditing. It examines how the company is run and provides the management with the information necessary to understand the risks facing the company and make a good business decision.

Indeed, the internal audit activities vary considerably and depend on the size and structure of a particular company, the position of internal audit in the enterprise structure, internal normative regulation of internal audit and the requirements set by the management of companies.



## ***2.2 Professional and legal position of internal auditing***

Internal auditing is based on and must comply with the legal regulations, professional regulations and internal regulation of the company.

The development of professional regulation in the field of internal audit was most significantly influenced by the Institute of Internal Auditors, which is an international body dedicated to the progress of internal auditing as a profession and the continuous development of internal auditors as professionals. It was established in 1941 in the United States and now has almost 170,000 [3] members. The main contribution of the Institute to the development of internal audit is to formulate and publish standards that prescribe how to conduct internal audit. Standards are the criteria for evaluation and measurement of internal audit in a business entity, and are intended for the presentation of the practice of internal auditing as it should be. [4] In addition, the Institute is known for its work related to research projects, conferences, seminars, publishing activity as well as the certification of internal auditors.

In Serbia, internal audit is governed by the Law on Business Companies and the Law on Accounting and Auditing. According to the Law on Companies [5], limited companies and public limited companies may determine (and listed companies must determine) with their founding act or statute their internal auditor, supervisory board or board of auditors. According to the Serbian law, internal auditing, therefore, is not mandatory within the real sector, but is developed as the need for the company, because "the establishment of special internal audit department is the best way to contribute to the following: improving the system of internal control, making proper business decisions by management, shortening time of external audit, and thus lowering costs and increasing the effectiveness of internal assessment system." [6] According to the Serbian Law on Banks and the Decision on the basic principles of organization and operation of internal audit of banks and other financial institutions, internal auditing is mandatory in banks and those banks that are entitled to conduct international payment transactions are required to form a separate organizational unit which will be responsible for the internal audit of the company and will run by the internal auditor.

## ***2.3 Ways of organizing internal auditing in the enterprise***

The organizational structure of internal audit, its position in the company and lines of reporting significantly determine the effectiveness of internal audit. Organization of internal auditing changes and promotes in line with the changes of the conditions in which enterprises operate. In addition, the organizational structure of internal audit of the specific company is influenced by other factors, such as the size of the company, internal audit regulation, requirements set by the management and the like.

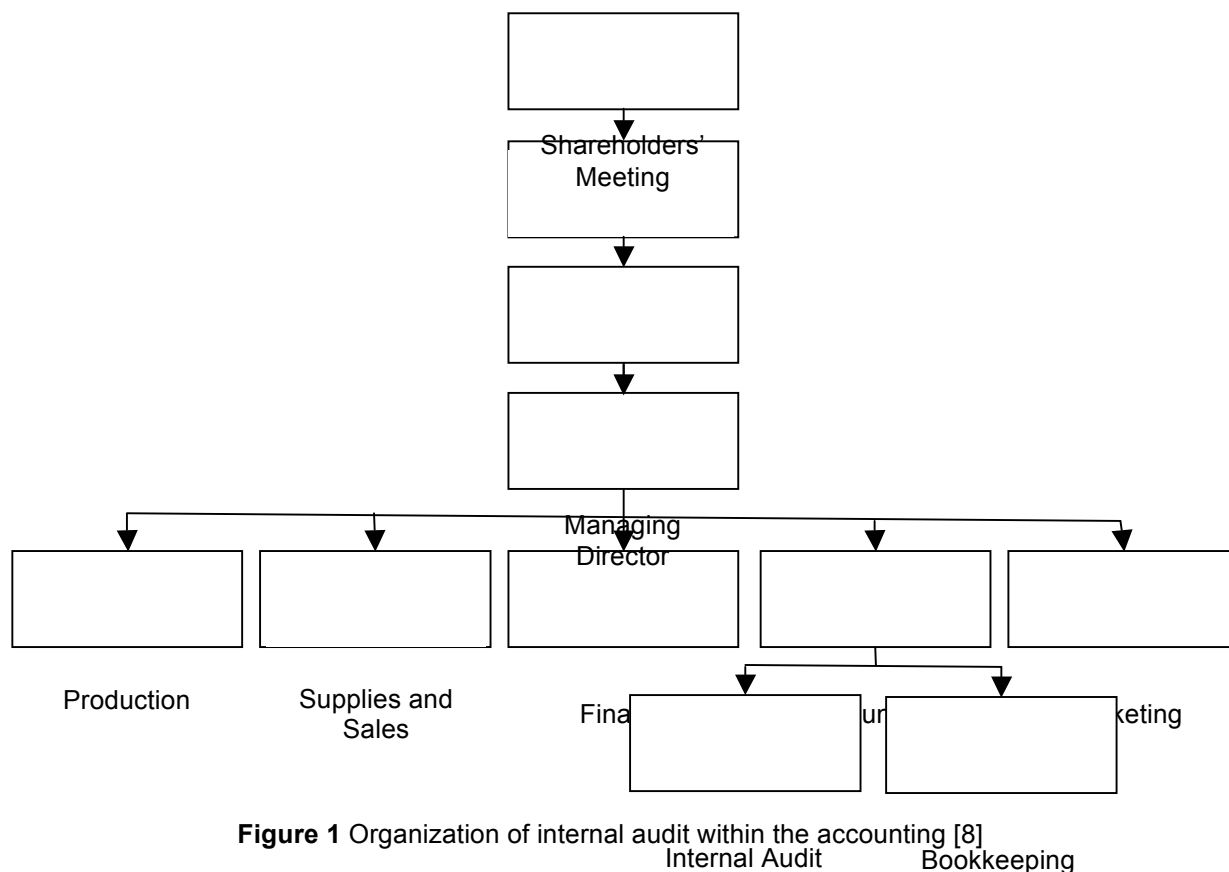
According to the business area which is covered by auditing, internal auditing may be organized within: [7]

- The accounting unit,
- The finance,
- The independent unit related to the board of management.

Provided that internal audit is organized within the accounting, it examines the accounting data and financial reporting, i.e. it reviews the accounting.

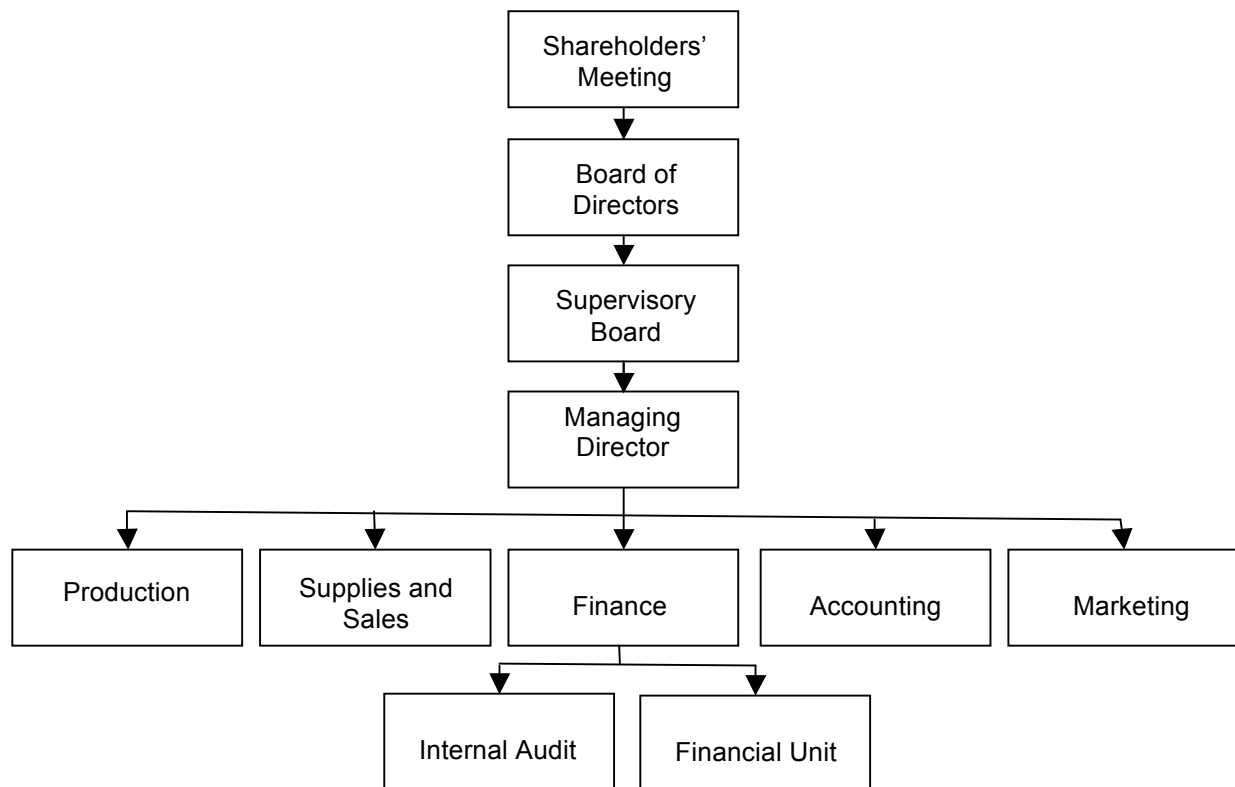
It should be noted that in such cases, internal auditing cannot be conducted above the level at which it is located, or cannot be conducted within other functions in the company, such as production, marketing, etc. Such organized, internal audit is within the responsibility of the accounting manager. If the accounting manager appoints and dismisses the head of internal audit, controls the budget and determines the goals and objectives of internal audit, their impact on the objectivity and independence of the internal audit could be substantial.

In such conditions it is not difficult to put pressure on internal audit to accept the dubious practice and issue a favourable report for the management of the company. It is advisable, therefore, that in cases where the internal audit is organized within the accounting, internal audit manager reports to a hierarchical level that will ensure proper consideration of the report, which is at least one level above the one at which the audit is performed. The model of internal auditing within the function of accounting is one of the first models and is now largely obsolete.



**Figure 1** Organization of internal audit within the accounting [8]

After separation of the function of the finance from the accounting, and in an effort to overcome the disadvantages of the models of internal audit within the accounting, a new internal audit model is invented, according to which internal auditing is placed in the function of finance. Given that finances are present in each segment of the company, internal audit framework is extended to all functions of the company and includes the entire organization of the company. The model requires that the internal audit is within the responsibility of the head of the sector in which it is located, and the head of the sector reports to the director of the company. In this way internal audit is organizationally separated from other sectors and departments and has a much higher level of independence.



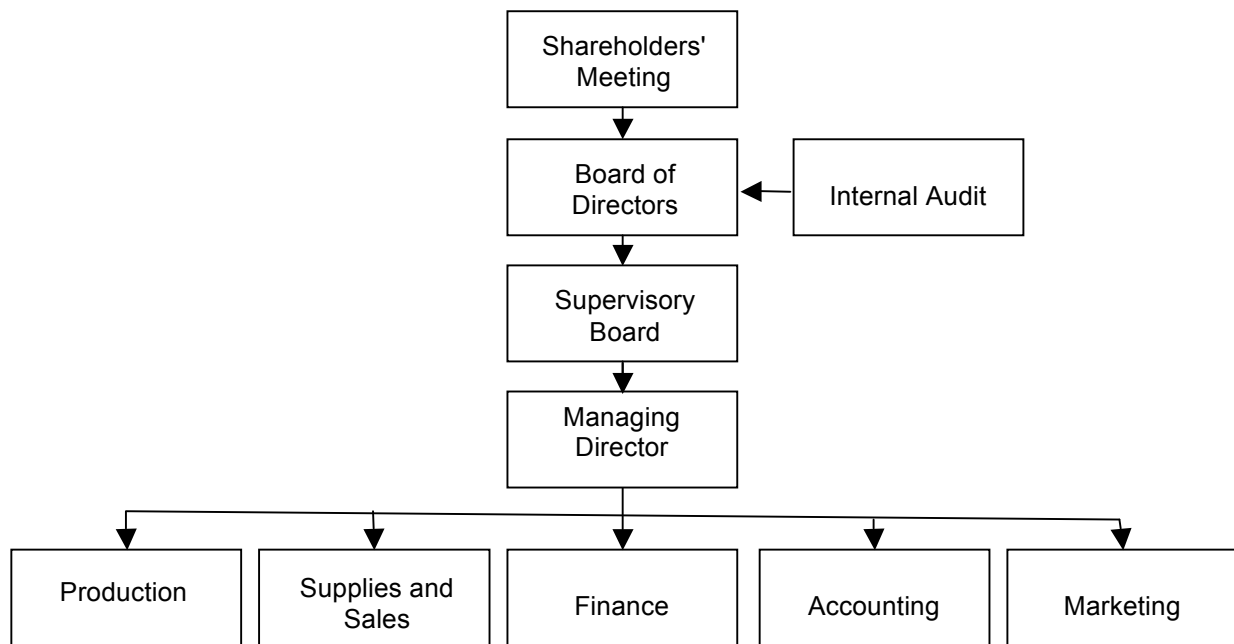
**Figure 2** Organization of internal audit within the finance [9]

The third way of organizing internal audit involves the formation of internal audit as an independent organizational unit, which reports to the board, supervisory board or a special audit committee. Such organized, internal audit is not influenced by the executive management of the company, whereby its independence and objectivity are guaranteed.

The audit committee has a supervisory function and is established as part of corporate governance, a process that is the basis for the protection of shareholders. It should be noted that the importance of the audit committee in recent years has increased due to the occurrence of large corporate failures and financial scandals.

According to the Serbian Law on Business Companies, supervisory board or audit committee must have at least three members, and the number of members must be odd. Article 331 of the Law stipulates that the internal auditor and audit committee members are appointed from the independent members of the board, and if there are no such members or there is the insufficient number of them, the missing number is chosen by the shareholders' meeting and on the basis of a special decision of the founder or the founding act.

The task of the audit committee is to examine the functioning of the internal audit, its programmes, organization, the coordination between internal and external audit, and the use of internal audit in order to review the business performance of enterprises. [10] The audit committee receives information and available resources from the executive management, but must maintain independence from the management in performing its duties and functions in order to protect the interests of shareholders and other interest groups and contribute to a strategic decision-making process of the enterprise.



**Figure 3** Organization of internal audit as an independent organizational unit [11]

#### ***2.4 Recommendation of the Institute of Internal Auditors (The IIA) concerning organization of internal auditing***

According to International Standards for the Professional Practice of The IIA, the internal audit unit should be independent and free from other influences in determining the scope of internal auditing, execution of work and reporting results. [12] Ideally, the internal audit unit shall report to the senior management or at least the level of organization which allows the internal audit to carry out their duties.

The Institute of Internal Auditors distinguishes functional and administrative reporting of internal audit. According to the IIA, it will be ideal if the chief audit executive functionally reports to the audit committee, board of directors or equivalent, to ensure the independence and objectivity of internal audit and prevent abuse of the executive management. The Institute believes that in this case, the audit committee should have the ultimate authority over the scope, coverage and results of internal audit. Similarly, the board should approve the Internal Audit Charter, adopt the plan and approve significant changes in the internal audit plan, appoint or dismiss the chief audit executive, determine fees and possibly adjust the salary of the chief audit executive, etc. Administrative line of reporting<sup>56</sup> should go to the chief executive officer or other executive directors with sufficient competence to provide adequate support to the internal audit unit in their everyday activities. [13] The head of the internal audit should be in direct communication with executive and line management and to have adequate and timely flow of information relating to the activities and plans of the company.

Finally, it should be noted that the adequacy of lines of reporting in a particular organization depends on the customary practice of each country, the characteristics of the organization itself, such as size, complexity and the fact if the company is public or private.

<sup>56</sup> Administrative reporting includes budgeting and management accounting, human resources administration, including evaluation and compensation of employees, internal communication and information flow and administration of internal policies and procedures of the organization.

### 3. Internal auditing worldwide

In 2010, The Institute of Internal Auditors conducted the research on the status of internal audit in the world based on 13,582 companies from 107 countries. The results of this research were published in five different reports. One of these five reports is Characteristics of an Internal Audit Activity. [14] Among other things, this report indicates the most important activities and lines of reporting of internal audit, a brief summary of its findings will be given in the ensuing discussion.

According to this study (Table 1) 88.9% of the companies worldwide believes that the most important activity of internal audit is operational audit. Then there are audits of compliance with regulatory code requirements (75.1%), auditing of financial risk (71.6%), investigation of fraud and irregularities (71.2%) and evaluating effectiveness of control systems (68.8%).

**Table 1** Internal audit activities (ongoing situation)

Internal audit activities	Percentage	Ranking
Operational audit	88.9%	1
Audits of compliance with regulatory code requirements	75.1%	2
Auditing of financial risks	71.6%	3
Investigation of fraud and irregularities	71.2%	4
Evaluating effectiveness of control systems	68.8%	5
Corporate governance reviews	44.5%	13

Source: IIA Research Foundation. Characteristics of an Internal Audit Activity – The IIA's Global Internal Audit Survey. 2010; 24.

According to the 2010 research, 70% of the surveyed companies had the audit committee. The research results indicate that 43% of the participants reports to CEO, whereas 34% reports to the audit committee or equivalent.

There are differences among regions concerning the body to which the internal audit reports.

**Table 2** CAEs Administrative reporting by regions

	Africa	Asia/ Pacific	Europe/ Central Asia	Latin America/ Caribbean	Middle East	USA and Canada	Western Europe
Audit committee	29%	30%	25%	50%	67%	41%	29%
Legal counsel	1%	1%	2%	1%	0%	6%	3%
CEO	55%	53%	55%	37%	32%	21%	51%
Chief Financial Officer	5%	7%	4%	2%	0%	23%	10%
Chief Operating Officer	1%	2%	4%	0%	0%	1%	2%
Chief Risk Officer	3%	3%	1%	2%	0%	2%	1%
Controller	2%	1%	0%	1%	0%	2%	0%
Other	4%	3%	9%	7%	1%	4%	4%

Source: IIA Research Foundation. Characteristics of an Internal Audit Activity – The IIA's Global Internal Audit Survey. 2010; 34.

Table 2 indicates that chief audit executives in the regions of Africa, Asia-Pacific, Western Europe, Europe and Central Asia often report to the CEO, while in Latin America, Middle East, The United States and Canada the internal audit usually reports to the audit committee.

Further investigation of the CEO administrative reporting indicates that there are differences from one industry to another. For example, in the case of 39% of the respondents working in banking, insurance and other forms of financial industry, internal audit reports to the audit committee, while the percentage of companies involved in transportation, communications, sales of electricity, gas and utilities is only 12%. In banking, insurance and other forms of financial industry, 4% of the respondents report administratively to the CEO.

### 3. Conclusions

It is not necessary that the individual is the manager of a company to realize the size and speed of change typical for today's business world. More frequent scandals, fraud and a lack of business ethics result in new laws imposed by the regulator (e.g. 2002 Sarbanes-Oxley Act in the USA). Additional requirements of legislation, associated with the development of technology, information technology, globalization, enlargement of capital, increased competition and the like, result in new challenges and threats for companies on the one hand, and opportunities on the other hand. Each of these phenomena leads to the need to establish the internal audit of the company, because the internal audit is critical for good corporate governance, risk management, effective internal control, efficient operations, etc.

The organizational structure of internal audit, its position in the company, and lines of reporting have a critical role for the effectiveness of internal audit. Internal audit must meet the needs and interests of a large number of stakeholders, such as the audit committee, board of directors, executive management, owners, analysts, regulators, external auditors, etc. Clearly, internal audit does not fit all interested parties and in most cases or it is reported to the executive management or audit committee. If the internal audit reports to the audit committee, internal audit function is organizationally independent from management and its independence and objectivity are secured. If, on the other hand, the internal audit is favoured by the management its function may be impaired.

As the most dominant form of organization of the company in market economy is stock company, which is characterized by separation of ownership and management of the company and where there is a need to protect the interests of shareholders, it could be concluded that the formation of the audit committee to which the internal audit reports is a better organizational solution of internal audit.

It is clear that internal audit is of the key importance in the analysis of risk management, control of the company, provision of information and advice to the management. It is even more clearly that small and medium enterprises, which have limited resources must effectively manage their business and cannot afford wrong assessment and inadequate policy decisions because for them the wrong decision often means bankruptcy. It is, therefore, properly structured internal audit function of the highest importance for survival and successful performance of these enterprises.

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# Entrepreneurship in the Informal Sector as a Form of Labour Market Adjustment – the Case study of Macedonia

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The past two decades Macedonia has gone through the process of transition which is still shaping the social, political and economic ambience in the country. The initial transitional recession has inter alia manifested salient effects on the labour market performance. Macedonia is among rare countries, where the unemployment rate during the whole period of transition hovers above 30%. Even though there is some criticism regarding the accuracy of the Macedonian unemployment rate estimated by the Labour Force Survey it is still evident that we are facing an odd phenomenon. By using the Keynesian terminology, the Macedonian labour market experiences a suboptimal equilibrium assumed as a state where significant part of resources are not utilised or underutilised. We argue that this suboptimal equilibrium to great extent is result of the alternative labour market adjustment mechanisms that mitigate the high and sustained unemployment. These mechanisms cushion the social implications of unemployment by absorbing a part of unemployed workforce and/or providing additional incomes for households that enables their basic subsistence. One form of adjustment mechanism among the unemployed workers is the employment in the informal sector that provides the necessary income support for the households. Generally, the informal sector in transition countries is marked by a number of peculiarities which make informality in transition distinct from that observed elsewhere. Although, the informal economy may take different forms and is difficult to measure it is characterised by strong entrepreneurial dynamism. In this paper we will make an attempt to identify the profile of the unemployed workers that undertake various forms of entrepreneurial activities in the informal sector. For this purpose we will use results from the survey carried on a representative sample of registered unemployed workers in Macedonia. Furthermore, we will estimate an econometric model that will assist in the process of identification of relevant factors that influence the entrepreneurial activities in the informal sector. Finally, we will formulate appropriate policy measures that will target the informal sector in order to provide the necessary conditions for transferring the informal businesses to the formal sector of the economy.

## Keywords

Labour market, entrepreneurship, informal sector



# 1. Introduction

The past two decades Macedonia has gone through the process of transition which is still shaping the social, political and economic ambience in the country. As a part of South-Eastern Europe, the Macedonian economic growth is constrained by the general regional predispositions, which amongst other things are determined by the political instability of the region. Hence, the economic performance of the South-Eastern European countries (SEECs) has not been strong enough compared to Central-Eastern Europe countries (CEECs), which already take part of the European Union. In this sense, Macedonia and other SEECs, are known as 'lagging reformers' with regard to completion of the reforms in all spheres of the society.

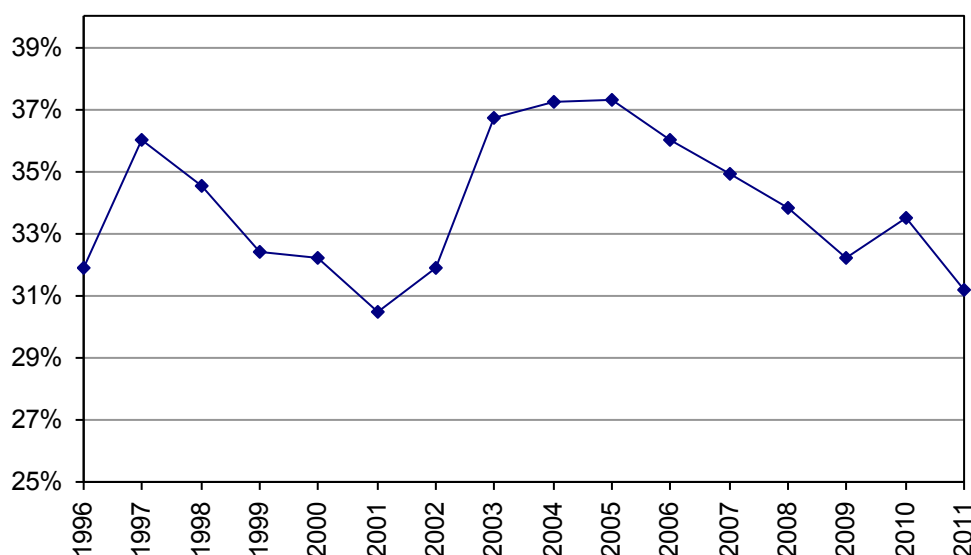
The transitional process as a multidimensional phenomenon has affected every domain of the political, economic, and social life in the country. In the economic sphere, transition has been characterised by a change in the ownership of capital, liberalisation of goods and capital markets, liberalisation of the foreign economic relations, radical change in the role of the state in the economy, and the creation of a less regulated labour market. In the sphere of social life, transition has led to rising poverty and income inequality, a weakening of the middle class and social exclusion of vulnerable social groups. Politically, the transition has been accompanied by the creation of a democratic society, differentiation of power into legislative, executive and judicial branches, the creation of a pluralistic political system and implementation of public and democratic elections [1].

The initial transitional recession has inter alia manifested salient effects on the labour market performance. Generally, the transitional reforms initially had negative effects on labour markets, which were manifested in declining participation rates and in persistent high unemployment. The processes of ownership restructuring and sectoral reallocation assumed a large-scale transformation of state owned firms into privatised ones and, a reallocation of a substantial part of the labour force from the manufacturing and agricultural sectors towards the expanding service sector [2]. The experience in almost all transition countries, including Macedonia shows that the creation of new jobs in the emerging private sector was not initially strong enough to absorb the mass of workers laid-off from the restructured state-owned firms. At the same time, the mismatch between the skill requirements of newly created jobs and effective skills owned by the workers has become a substantial problem [3]. Consequently, the labour markets in early transition became less dynamic with a relatively stagnant unemployment pool leading to increases in unemployment and especially long-term unemployment [4]. The initial 'transitional unemployment' differed in several aspects from other types of unemployment in that it was characterised by pronounced labour market segmentation, long average duration of unemployment and a low probability of exiting unemployment into employment [5].

The aim of this paper is to assess the entrepreneurship in the informal sector as a labour market adjustment mechanism in transition countries and particularly to investigate the case of Macedonia. For this purpose we will use the empirical results from a survey of registered unemployed workers. To our knowledge this is the first study addressing this issue in Macedonia that will shed light on the role that entrepreneurship in the informal sector plays on the Macedonian labour market. In this context, in section 2 we first present the general labour market trends in Macedonia. Next, in section 3 we will define the concept of entrepreneurship in the informal sector as a form of labour market adjustment mechanism. The empirical assessment of the entrepreneurship in the informal sector in Macedonia will be subject in section 4. Finally, in section 5 we will conclude and formulate suitable labour market policies that target the unemployed population involved in various forms of informal entrepreneurial activities.

## 2. Macedonian Labour Market Performance

In order to investigate the features of the Macedonian labour market during transition, it is appropriate to divide the transitional period into two sub-periods. The first period encompasses the transformational recession from 1990 to 1995, with the second period starting immediately thereafter and lasting until the present. The changes of the unemployment rate in relative terms during the business cycle are rather small, which reflects the depressed characteristics of the Macedonian labour market [6]. The dynamics of the unemployment rate in Macedonia for the period 1996-2011 is shown on Figure 1.



**Figure 1** The unemployment rate in Macedonia 1996-2011

*Source: Macedonian Statistical Office, 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. During the period 1996-2003, the Macedonian LFS was conducted on a yearly basis, whereas since 2004 it is conducted as a continuous survey throughout the year with quarterly processing of data. For the period prior to 1996 we can explore labour market trends based on the number of registered unemployed workers. According to both sources of data we can generally distinguish several features of Macedonian labour market presented as follows.

First, during the initial phase of transition, the labour force participation and employment rates fell for most of this period, while the unemployment rate steadily increased. These trends are in line with the normal labour market patterns found in the CEECs i.e. declining employment under the initial shock of recession and subsequent persistence of sluggish demand for labour.

Second, the mature phase of transition is characterised by broad stability in all three rates. However, we can observe recessions in 2001 (primarily caused by the already mentioned political instability) and in 2009 due to the global economic crisis. The downward trend in the unemployment rate was broken and unexpectedly remained high for several years due to the lack of job creation in the formal part of the economy [7]. Only recently, there are some positive signs of a slow recovery and the possibility of renewed decreases in unemployment.

Third, the Macedonian labour market is affected by strong segmentation, meaning that certain social groups such as youths, less skilled workers, and women, face a higher risk of unemployment and inactivity than the rest of the labour force. As a consequence, the high Macedonian unemployment rate has enormous social implications such as rising poverty, income inequality and social exclusion of deprived social segments [8].

Fourth, long-term unemployment prevails over the short-term unemployment implying likelihood of possible 'discouraged workers' phenomenon. For instance, long-term unemployment accounts for almost 80 percent of total unemployment [9]. Long-term unemployment has significantly contributed to an erosion of skills and motivation of unemployed workers, making them less employable over time [10]. 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 inactivity. After remaining unemployed for a long period of time, a considerable part of unemployed workers stops looking for jobs and quits the labour force.

Fifth, the sectoral reallocation of labour has been characterised by a significant increase of subsistence agriculture and other non-standard forms of employment at the expense of rapid shrink of employment in industry. These trends in employment by sectors indicate that in Macedonia new jobs are not predominantly created in the more productive industries and service sector, but rather in agriculture and low productivity services. The increase in the share of employment in agriculture suggests that this sector has become a buffer for some people who have lost their jobs in the state-owned industrial enterprises [6].

Finally, given the rigidities in the standard adjustment through employment and wages, less traditional (in the western context) labour market adjustment mechanisms may play a more significant role. Among the alternative labour market adjustment mechanisms in SEEC we particularly distinguish the non-participation, emigration and employment in the informal sector of the economy.

### **3. The Entrepreneurship in the Informal Sector as a Form of Labour Market Adjustment**

Having in mind the multitude of different approaches, defining the informal economy is not a simple task. There are various terms that are used in order to denote the informal sector such as: informal, hidden, underground, parallel, black, unofficial, unrecorded, shadow, grey, dual, and so forth. Despite existing nuances in the meaning of the above terms, we will assume that more or less they concern the same issue. However, in this analysis, for convenience we adopt the term 'informal' as the most appropriate and frequently used in the case of transition economies, because it indicates its specific nature in providing employment and alleviating poverty [11].

Generally, there are two distinct approaches to the formulation of the informal sector. The first is called 'definitional' and considers the informal economy as unrecorded economic activity. The second approach, called 'behavioural', considers the informal economy as an explicit change in the behaviour of economic agents in response to institutional constraints. According to the most commonly used definition, the informal economy encompasses all unregistered economic activities that contribute to officially calculated or observed Gross National Product [12]. In this context, the informal entrepreneurship is defined as involving somebody in starting a business or is the owner/manager of a business who participate in the paid production and sale of goods and services that are legitimate in all respects besides the fact that they are unregistered by, or hidden from the state for tax and/or benefit purposes [13].

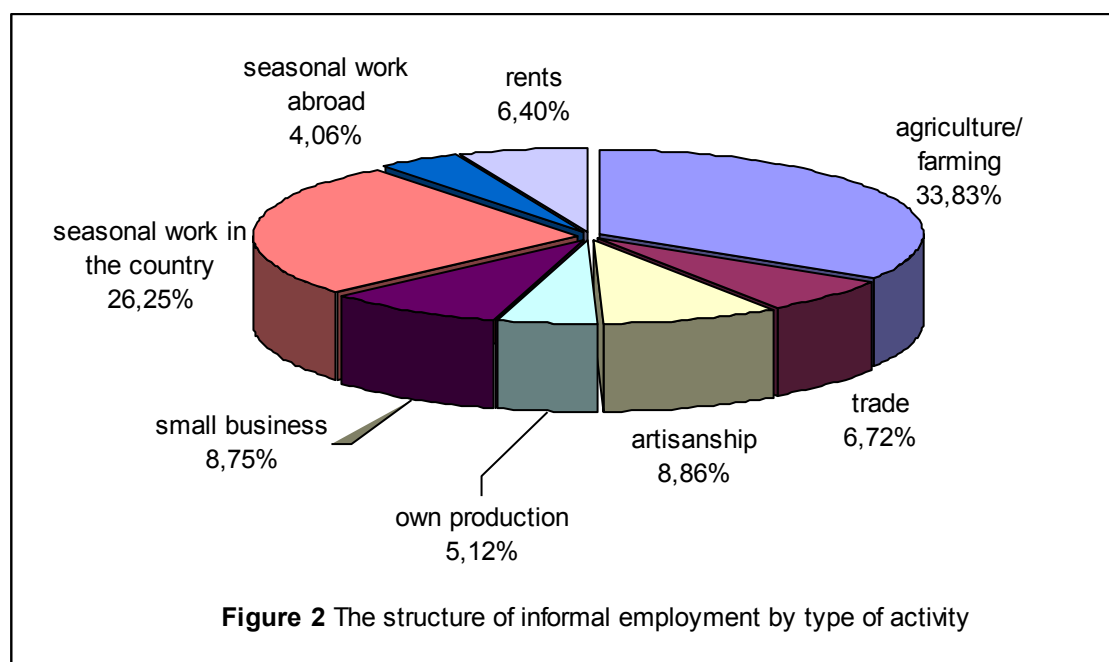
Research on the informal economy has identified a number of factors that influence the size and structure of the informal sector. As summarised by Schneider and Enste [14], the main cause of a flourishing informal economy is the burden of tax and social security contributions, intensity of regulation, and the disincentive effects of social transfers. All these factors create a tax wedge, which consist of the difference between the total cost of labour and after tax earnings. The greater is this difference, the higher will be incentives to operate in the informal sector. Moreover, in developing and transition countries there exist peculiar factors that can cause a large informal economy such as poverty and social exclusion. In these countries,

due to the low level of wages and social protection such as unemployment benefits and pensions, informal and household production can arise as potential survival strategies for marginalised and socially excluded segments [15]. Besides this, the informal sector can be viewed as an opportunity for undertaking various forms of entrepreneurial activities [13], [16].

#### 4. Empirical Assessment of the Entrepreneurship in the Informal Sector

To our knowledge, in Macedonia there is a lack of consistent cross-section data about the entrepreneurship in the informal sector as a form of labour market adjustment mechanism. In order to estimate to what extent the unemployed workers are prone toward the employment in the informal sector we have designed and carried out a survey based on a representative sample of registered unemployed. The survey was conducted during a reference period from mid October to mid November 2011. The sample size is 2300 unemployed workers selected randomly in each of 30 centres of the Employment State Agency (ESA) all over the country. Moreover, the geographical distribution was maintained by selecting from each centre a proportional number of respondents with respect to the total number of registered unemployed workers in that centre.

In our empirical analysis 38,3% of the surveyed unemployed workers declared that earn income from various types of additional activities that are informal by nature, while half of them declared that other household members also perform such types of activities. With respect to this, we argue that in depressed labour markets which lack job creation in the formal sector, informal employment helps people to enter the workforce by offering an alternative to unemployment or inactivity and, prevents a further decline in living standards. The structure of employment by type of informal activity is shown on Figure 2.



From Figure 2 it is evident that majority of the unemployed workers are engaged in subsistence activities such as agriculture, farming and seasonal work in the country that together represent about 60%. On the other hand, the entrepreneurial activities such as running own business, artisanship or own production and trade are represented to lesser extent. Therefore, we can conclude that most of the unemployed workers that operate in the informal sector are usually low skilled or unskilled and perform labour-intensive operations. The above argument is in line with the sectoral reallocation in Macedonia during transition,

according to which the share of employment in subsistence agriculture demonstrated a significant rise. Nevertheless, this should not be a general conclusion for the productivity in the informal sector, since in this case we do not include the informal activities performed as a second job by those who are otherwise formally employed.

The income gained from informal activities for these households on average is 34,2% of their total household incomes, which represents significant financial contribution. However, expressed in absolute terms the average monthly income from informal activities is moderate since one third of the respondents declared to earn less than 100 euros and another third declared between 100 and 200 euros. As a consequence we can argue that unemployed workers primarily are involved in informal businesses that usually operate on a small-scale basis either in the form of self-employment or as micro or small enterprises.

In order to assess the factors that influence the informal entrepreneurial activities among registered unemployed in Macedonia furthermore we estimate a Logit model, where the dependent variable takes value zero if the person declared that does not earn income from additional activities in the informal sector. In the opposite case where the unemployed worker declared that undertake and therefore earn income from such activities, the dependent variable takes value one. We divide the possible determinants in four groups: Personal traits, household characteristics, services from the ESA and the alternative labour market adjustment mechanisms. The results from the estimated Logit model are presented in Appendix 1.

According to the obtained results, most of the personal traits of the unemployed worker are statistically significant determinants of the employment in the informal sector. In this context, male unemployed are about 56.5% more likely to engage in informal activities than female. Married unemployed are about 31% less likely to perform various form of informal employment activities, whereas those who live in urban areas are 43.6% less likely to engage in informal employment compared to those who live in rural areas. The coefficient of the age variable is positive and statistically significant meaning that among informally employed prevail more experienced workers.

Considering the household characteristics, the number of employed members and having another unemployed member in the household significantly influence the respondents' decision to undertake informal economic activities. Hence, an unemployed worker on average will be 40.5% less likely to engage in informal employment for any additional employed member in the household. On the other hand, having an additional unemployed member in the household on average will decrease the probability for undertaking informal economic activities for about 21.9%. These results are somewhat expected since an increase of employed members in the household is often associated with increase of the income, which in turn renders the employment in the informal sector to be less attractive.

With respect to the labour market policies, we have considered the health insurance, unemployment benefit and participation in active labour market programmes. The signs of the estimated coefficients confirm the theoretical assumptions that passive labour market policies create disincentive effects, whereas the participation in active programmes goes hand in hand with the employment in the informal sector. However, we have not found statistically significant effect of those policies upon the engagement in the informal employment.

Finally, according to our estimated model we find out that among the alternative adjustment mechanisms only social assistance beneficiaries are significantly more likely to undertake informal economic activities. In fact, this category of unemployed are the most deprived on the labour market and, consequently they are about 64.7% more likely to engage in the informal employment as an alternative source of income for their households.

## 5. Conclusions

In this paper we develop the concept of entrepreneurship in the informal sector as a form of labour market adjustment in the Macedonian labour market. Namely, the Macedonian labour market during the past two decades of transition has been characterised by high and persistent unemployment coupled with alternative forms of adjustment such as inactivity, emigration and employment in the informal sector. The conventional forms of labour market adjustment are characteristic for the employed workers, whereas non-standard forms are mainly alternatives for the unemployed workers.

As informal economic activities we consider only those who are legal in nature but not officially registered. With respect to this, we attempt to identify their capacity to absorb part of the unemployed workforce and cushion the economic and social consequences of persistent unemployment. To our knowledge, in Macedonia there is a lack of consistent cross-section data about the role that entrepreneurship in the informal sector play as a form of labour market adjustment mechanism. In order to estimate to what extent the unemployed workers are prone toward the employment in the informal sector we have designed and carried out a survey based on a representative sample of registered unemployed.

According to the results from our empirical analysis, a considerable number of unemployed workers are engaged in various forms of employment in the informal sector. Furthermore, we found that income earned from additional informal activities represents more than one third of the total income for their households. Hence, employment in the informal sector alongside other forms of labour market adjustment significantly contributes to the wellbeing of the unemployed workers. However, most of the informal arrangements of the unemployed workers are low-productivity and small-scale predominantly in the agricultural and farming sector. With respect to the determinants of the employment in the informal sector we revealed that male, mature and those who live in rural areas are more inclined toward the informal sector. Regarding the labour market policies we have not found any significant impact on the respondents decision about participation in the informal sector. On the other hand, those who receive social assistance, who represent the poorest and the most marginalised segment of the population are significantly more involved in the informal arrangements.

Having in mind the characteristics of the employment in the informal sector as an adjustment mechanism for unemployed workers we can draw several conclusions and policy implications. First, the informal economic activities of unemployed workers in Macedonia mostly represent a strategy of last resort rather than opportunities for entrepreneurship. Second, the agriculture and farming represent the most common source of income for unemployed workers, whereas small businesses, own production and artisanship are represented to lesser extent. Third, the policy measures should target the most vulnerable segments of the unemployed population in order to provide appropriate employment opportunities in the formal sector.

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## Appendix 1

Estimated Logit model for the informal activities of registered unemployed

Variable	Coefficient	Standard error	t-value
Intercept	- 3.904221889	1.0497092002	- 3.71933***
Personal traits			
Male	0.447800262	0.1567525856	2.85673***
Age	0.185857540	0.0553166871	3.35988***
Age square	- 0.002107078	0.0006927936	- 3.04142***
Married	- 0.372126675	0.2101287032	- 1.77094*
Urban	- 0.572056576	0.1837637456	- 3.11300***
Long-term unemployed	0.207808458	0.2150794902	0.96619
Household characteristics			
Total number of members	0.074032639	0.0998112538	0.74172
Number of members at working age	0.140424789	0.0987348415	1.42224
Number of employed members	- 0.519439650	0.1096765291	- 4.73610***
Another unemployed member	- 0.246761809	0.1014281714	- 2.43287**
Services from the ESA			
Health insurance beneficiary	- 0.076563156	0.1732241995	- 0.44198
Unemployment benefit	- 0.201085680	0.3176740980	- 0.63299
Participation in active programmes	0.080994776	0.2472235676	0.32761
Alternative adjustment mechanisms			
Have retired member(s)	0.057112170	0.1841800829	0.31008
Social assistance beneficiary	0.498694808	0.2658019372	1.87618*
Have emigrated member(s)	0.254076750	0.2307808600	1.10094
Intention to emigrate	0.067665852	0.1683236838	0.40199
Search for job	0.228974879	0.2100193360	1.09025

Note: \*, \*\* and \*\*\* represent statistical significance at the 10%, 5% and 1% levels respectively.

# Sustainable Entrepreneur and Effective Maintenance: Case for Nigeria

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Technological entrepreneur as a factor of macro economic growth strategy has not been fully foster, though the much clamor for technological change and sustainable entrepreneurship programs has been on increase to enhance the developing nations to compete favorably among its peers or even with the developed nations. Also appropriate focuses has been place on the sustainability of the SMEs in the achievement of effective and adequate competitiveness as a means of providing the Nigeria ailing economy remedies with emphasis on macroeconomic stabilization. Though developing nation's entrepreneur and SMEs programs/ projects faces a lot of challenges ranging from high rate of early enterprise mortality, shortage of skilled technical manpower, financial indiscipline, poor management practice and low entrepreneur skills, as these hindered the development and sustainability of the programs. Although most technological entrepreneur in Nigeria, fails to recognize the concept of effective facility maintenance which has been a source of hindrances to sustainability of the program due to lack of adequate knowledge, as Maintenance has an overwhelming influence on the total cost of plant ownership and enhance the economic viability of the enterprise. This paper provides an insight towards the sustainability of technological entrepreneur activities in Nigeria especially in the areas of manufacturing development, owing to the vast natural raw materials available, with the discussion anchoring around local manufactures which has not been really encourages in meeting the desired aims of trade and investment liberation, a major source of export via the concept of effective facilities maintenance as part of the strategy.

## **Keywords**

Effective maintenance, Maintenance Cost, Nigeria, Sustainable development, SMEs, Technological entrepreneur

## **1. Introduction**

Maintenance is an important function of progressive enterprise, as it ensures reliability and availability of available tools or resources of ensuring productivity and profitability of the enterprise and the sustainability over a long period of time. Effective Maintenance makes the employee and the facilities not to be idle, resulting to prevention of production stoppages, delay in scheduled and expensive emergency repairs as the down time costs usually exceed the preventive maintenance cost of inspection, service and scheduled repair.

And also, Small and medium-sized enterprises (SMEs) contribute to a country's export (especially the manufacturing industry) around the world to coordinate export led growth (Sangosanya, 2011).



Techno-entrepreneur is an important organ in the national development, and assists the nation in building effective competitive advantages and also increases the production capacity and contributions towards the nation GDP. Though, in recent times, techno-entrepreneurship as a factor of economic growth strategy, has not being fully foster as the much clamor for technological changes has been on the rise, especially in the developing nation. Various sustainable entrepreneurship programs have been on the rise to enhance the developing nations to compete favorably among its peers or even to gain much recognition among the developed nations.

Technological entrepreneur has so far been viewed as part of the effort of industrializing any economy across the globe as technological change according to Zoltan and Varga (2004), is central element in macroeconomic growth explanation. Hussain *et al* (2011), identify entrepreneur as the art or science of innovation and risk-taking for profit in business, the quality of being an entrepreneur. Entrepreneurship is an instrument through which through which entrepreneur converts valuable and technological information into products and services (Kirzner, 1997, Hussain *et al*, 2011)

Technology entrepreneurship seeks to shift economic opportunities from established firms and industries to new ventures by the strategic deployment or marketing of new technology inventions or innovations (Stewart, 2011).

Collins (2001), expresses successful entrepreneurs as those who have clear concept of what they are trying to accomplish, and as much focus has been placed on the sustainability of the Small and Medium Scale enterprises in Nigeria, in the achievement of effective and adequate competitiveness as means of reviving the Nigeria ailing economy with emphasis on the economic stabilization, the need to realize the basic factors that will provide and set a better and conducive growth environment for the SMEs is trivial to the nation.

Though developing nation's entrepreneur and SMEs programs/ projects faces a lot of challenges ranging from high rate of early enterprise mortality, shortage of skilled technical manpower, financial indiscipline, poor management practice and low entrepreneur skills, as these hindered the development and sustainability of the programs. Most techno-entrepreneur in Nigeria fails to recognize effective maintenance practice or do have a full understanding of the importance of maintenance, as lack or low level of effective maintenance practices have serve as hindrances to sustainability of business and projects.

## 2. Nigeria

Achieving sustainable growth in industrial production has been a key pillar of Nigeria's economic reforms (Udoh and Udeaaja, 2011). According to Udoh and Udeaaja, 2011, the Nigeria manufacturing has been characterized with numbers of feature among which is the inability to revolutionalised production which is largely dominated by the multinationals. This brought about the Nigerian Enterprise Promotion Decree (NEPD), with the avenue of the average Nigerian to part take in the industrialization of the nation (Udoh and Udeaaja, 2011).

With the nations great number of industries ranging from the oil and gas industries, sawmills, cigarette factories, breweries, sugar refining, rubber, paper, soap and detergent factories, footwear factories, pharmaceutical plants, tire factories, paint factories, and assembly plants for radios, record players, and television sets (Encyclopedia of the nation). In 2009, a total of 834 manufacturing firms closed shop in Nigeria with 176 becoming terminally sick and collapse in the northern area of the nation (Adeloye, 2011).

Rural transformation is a vital tool for national development. It is the bedrock for the actualization of the Millennium Development Goals (MDGs) and vision 2020 of the present country Administration (Agba *et al.*, 2010). As a matter of concern, the rural development can be achieved through developing the area through technology. This as a matter of fact will reduce the mass movement of rural migration to the cities so as to reduce the menace of overcrowding the urban area and household income sharing (Maxwell *et al*, 2001).

Technology transfer is a process in which knowledge, cost, risk, and benefit are shared among various economic entities in modern human society (Song, 1998). Quoting Song and Balamuralikrishna (xxxx), expresses that knowledge as a great source of business power and the management of knowledge is of a serious concerned.

### **3. Maintenance in Nigeria**

Many organizations try to carry out maintenance without implementing or managing some key stages. Good maintenance culture is an important service function for an efficient system. It helps in ensuring and increasing the operational efficiency of facilities with a solitary effect on revenue through the reduction of operational cost and an increase in the effectiveness of production and services.

Despite its deep-seated poverty, Nigeria has a wide range of important assets, which if properly managed/ maintained will provide enormous opportunities for science technology and innovation driven sustainable development of the country. According to Eti et al, 2004, the Nigeria Electric Power Stations has been rated to function below the expected value owing to numerous maintenance challenges as listed by Eti et al (2004); Maintenance not being treated seriously at the board level or even by local management ;Lack of business culture in the maintenance process; Lack of adequate management skills by maintenance technicians and even team leaders; Isolation of the maintenance operation with little or no integration with the activities of other department; Absence of adequate planned preventive maintenance methods; Pre-occupation with introduction of advanced maintenance methods while relevant basic maintenance practices are not being implemented.

Another case example, is the issue of the Nigeria, oil industry, as lack of effective maintenance has allow for shut down of refineries and low functions relative to the expected level of performance. (Abubakar, 2008). With the shut-down of the country refineries, there has been a situation of job loss, huge money being expended on the exportations and the importations of the crude and refined oil respectively, Subsidies being paid to guarantee the product availability to the populace due to the high international oil market price.

Adewumi (2006) noted how the manufacturing sector recorded a relatively high average annual growth rate between the 1960s and the early 1980s as the mean annual growth rate increases from 7.40% to 11.70%. the manufacturing sector later start experiencing a notable decline in the annual growth which lack of proper maintenance procedures/ process was part of the factors contributing to the decline as most industries in Nigeria operates productivity less than 50% of even the nominally-functioning hours per year which is an embarrassment caused by high downtime, supply failures of inputs resources and low spare-capacity to cope with sudden high demands (Eti et al, 2004).

### **4. Conclusions and Policy Recommendations**

An important element of technology globalization is the rise of technology-based entrepreneurs in China, India, Mexico and other emerging economies and Increasingly, these techno-entrepreneurs are strategically important as part of the innovation value chain of multinational enterprises (MNEs) (Lynn and Salzman, 2008). Adopting a good maintenance practice, Nigeria as a country will be able to increase functional reliability of technological facilities and equipment, enable the product and service quality to be achieved through correctly adjusted service and operated equipments, maximizing the useful life of equipments, minimizing the total production or operating cost directly attributed to equipment service and repairs, reducing the frequency of interruptions to production by reducing breakdowns, maximizing the production capacity from a given facility or equipment resources and finally enhancing the safety of manpower.

Proper maintenance culture will in many ways help in the greater development of the Nigeria economy since some Nigerians will be actively engaged in the maintenance aspect thereby contributing to the development of the nation. The more people are employed the less the rate of crime and unemployment in the nation. Developing a good maintenance culture in all the economic sectors will help in the preservation of the existing facilities and for smooth running of the system since the idle time of workers will be greatly reduced to the barest minimum and the expensive emergence on repairs will be cut off resulting to increase in productions resulting to more goods and services for export and increase in revenue generation for the economy.

The much need for the government to set up a maintenance monitoring committee to monitor and encourage the set up of effective maintenance strategies before approving any techno-entrepreneurs in setting up their respective enterprise is required in order to reduce the early mortality level of firms and industries in the nation.

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# Cost Accounting for Globalization and its Impacts on the Hotel Industry

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**The purpose of this paper is to provide insights into the new approach to thinking about cost accounting in the hotel industry today. The task of cost accounting is to provide information about the cost of a company's products/services or processes, which must always adapt to changes in the actual economic system and its environment. In today's terms, managers need information in order to improve the sustainable development of companies, meaning that companies in the hospitality industry should consider the concept of the eco-hotel.**

## **Keywords**

Cost Accounting, Eco-Hotel, Quality

## **1. Introduction**

The aim of this study is to demonstrate the need to introduce a new management approach in terms of cost accounting, imposed by global processes. The main task of accounting is to provide an appropriate information base about costs, which always has to adapt to changes in the economic system and its environment. In modern terms this means that accounting must provide information relevant to the process of ensuring sustainable development and to the enforcement of continuous quality improvement. Therefore, in a time of globalization the main task of accounting in the hospitality industry is to provide instruments to manage environmental protection and at the same time to support the strategic thinking of management in order to improve a company's competitiveness. Nowadays, companies in the hospitality industry should consider using instruments of strategic cost accounting, of which one of the most useful seems to be environmental cost management.

## **2. Development of Cost Accounting**

Accounting experts argue that cost accounting appeared at the time of the Industrial Revolution. The first signs of cost accounting were visible in large companies in the 19th century. Mass production necessitated investments in high industrial capacity and facilities with large values. The result of this new production process was separation of companies' management from their owners. Due to the demands of the market and the need of sales price determination, managers of large factories required detailed information about the costs of producing goods and services [1].

At the beginning of the 20th century the need to manage large capacities and for market development necessitated the separation of cost accounting from financial accounting. On the one hand financial accounting continued to provide information to owners, investors and creditors, but on the other hand, to make operational and strategic decisions in order to achieve the company's objectives, management required more processed data from financial statements prepared by financial accounting. The end of this process has been the bringing into existence of a separate field of accounting called cost accounting or management

accounting. Well-known experts in the field of cost accounting, Johnson C. T. and Kaplan R. S., agree that in the 1980s a period of continuous growth in indirect costs within companies, caused by the introduction of automation and new technologies in the production process, led to the spread of improvements in the use of cost accounting in practice. To solve the allocation problem of indirect costs, managers had no alternative but to turn to the development of theory and practice in cost accounting [2].

At the end of the 20th century, the expression 'management accounting' developed. One of the most recognized professionals, Horngren C. T. stressed, that modern cost accounting is often referred to as management accounting. He explained that managers are considered by accountants to be the primary users of accounting information – they are their internal customers. Globally, managers are becoming increasingly aware of the importance of quality and timely sales of products and services to their external customers. Conversely, accountants are becoming increasingly sensitive to the quality and timeliness of accounting information required by managers [3].

## ***2.1 Strategic Accounting as a starting point to Development of Environment Accounting***

Historically, strategic accounting is created as the need to meet the new demands of the global economy and to ensure management strategic view at the time of uncertain market conditions. Tsuji A. and Garner P. (1995) in their studies expressed strategic accounting as a method to incorporate changes in management system and to achieve efficiency in terms of constant change, which imposes economic and business environment [4]. Now days the strategic accounting is seen as "the process of identifying, coverage, classification and analysis of accounting data, in order to assist the management team in making long-term oriented business decisions to achieve a higher degree of efficiency" [5].

Strategic Accounting is most often found in literatures as Strategic Management Accounting (SMA), which is firstly defined by Simmonds, published in the journal "Management Accounting" in the article "Strategic Management Accounting", at the year 1981. Although the strategic accounting began to develop during the 80-ies, until today it can recognize some basic directions. The Strategic Cost Accounting (SCA) concept, as a major subsystem of strategic accounting has an important contribution in achieving the strategic accounting objectives. It is an entirely new approach about the costs, as Shank J. K. and Govindarajan V. (1993) pointed out to prepare strategic-oriented accounting information, it is necessary to use new accounting instruments which primarily include "value chain analysis, strategic positioning analysis, and analysis of the causes of costs". The concept emphasis a different understanding of the costs, which include not only the level of basic processes of reproduction, but also all phases of Porter's value chain [6].

The first step in a strategic approach to cost assessment is to determine the value chain, based on the specific requirements of each business system in which have to distinguish recognizable activities, functions and business processes at the stage in all phases of product life cycle. The process begins at the design stage, when the concept possesses the greatest part of future costs and their character. The following stages of the production process that involves all activities associated with the insurance market and other conditions as prerequisites for an immediate start of the production process (resource acquisition), and a rational approach to their use in all stages of reproduction. It is necessary to consider the costs of marketing, sales and distribution channels as their related costs. However, this process does not cease, but should include all costs related to customer support, after a particular product or service is already in possession of the customer, but also makes subsequent services that enhance the quality of supply (e.g., installation, training, removal of failures during the warranty period, etc.). In modern value chain includes the recovery, recycling or disposal after the end of product's life cycle, which means that all of the above should be included in the concept of strategic cost management.

Bromwich M. and Bhiman A. (1989) in their research they focus on the interdependence between accounting and marketing approach, and emphasis the methods and techniques which are relevant to the collection and assessment of the cost, the degree of capacity utilization and prices, and to the more realistic assessment of the strategic position in relation to competition and environment [7]. Roslendar R. (1996) in his work follows the marketing orientation of accounting, but also introduces a new dimension, the sociological approach, to evaluate the relationship between business system and environment [8].

As a result of empirical researches, management accounting is focused on the application of techniques evaluating customer needs and desires and to review the possibilities of individual market segments. In this endeavor indicated the need to establish strong interactions with the marketing function and introduced the methods and techniques of coordinating action. This approach leads to significant changes in the content of both functions, since in the marketing activities must put more emphasis on their effectiveness, meanwhile accounting to a higher degree of compliance with external influences in the process of making and assessment strategies. Thus, their further research directed to a role of "brand" in achieving the success of the business system in the target market. Interactive effects of accounting and marketing, as well as the assumptions of the target success supported well-defined brand, promoting a new name, "Strategic Marketing Management Accounting", which includes techniques of strategic impact assessment possible to achieve inter-functional coordination of all relevant factors of importance for the realization of common goal of leather ensemble.

Regardless of the concept that each author represents, above, and numerous other examples indicate that the strategic accounting strives to make a departure from traditional approaches to management focused on the proactive use of accounting information originating from many different sources, and that it must respect the circumstances in which certain operating system functions (strengths and weaknesses, opportunities and risks in the market), in form to create opportunities, in order to provide relevant information for each decision-maker. Strategic Information accounting must be transparent, prepared for internal and external users (stakeholders), in a way to prepare them with the new accounting methods, models and techniques taking into account the relevant technical assessments of risk and uncertainty.

Particular emphasis is placed on the observation of those non-financial items, which have a significant impact on system performance. It can be linked to some seemingly divergent concepts, as always from the operational (short-term business decisions) moves to a strategic management approach (long-term business decisions), and makes the shift from a narrow view of the process of production costs in consideration of the totality of costs in the whole value chain, while respecting economic - cost aspects (strategic cost management, product life cycle costs, opportunities and risks in the market), while social (sustainable development, global initiatives, etc.) and environmental aspects (impact of business decisions on the promotion and protection of the environment, eco-balance, the costs of product life cycle, etc.) at every stage of product/processes/assets life cycle, while respecting the feasibility and justification of resource allocation to target specific market segments, and looking at their profitability in relation to the profitability of its competitors.

According to the contemporary approaches to the strategic accounting there is a shift from the focus on measuring outputs to measuring elements of inputs, in accordance with the requirements of the strategic target management, confronting the need to connect the interests of customers and suppliers, to joint efforts to achieve ever higher standards of quality and high levels of profitability, in accordance with the demands of globalization processes. Therefore, the strategic system of accounting includes techniques that provide information on costs and quality of expenditure for the quality and the cost of inadequacy and on the same concept-based environmental costs in all stages of product life cycle.

## **2.2 Environmental accounting in Hospitality Industry**

Green strategies are identified early in the hotel corporations and tourist destinations. Therefore accounting of environmental costs, as management accounting subsystem must provide management information base, environmental oriented management according to modern requirements. In its structuring is defined by the provisions of the EPA (Environmental Protection Agency). These provisions encourage the establishment of environmental accounting and reporting system construction management at all hierarchical levels of management.

Emphasis is placed on assessing the costs associated with investing in environmental protection and improvement, which deviates from the classical approach in which emphasis is placed on the correctness of classification and coverage for the costs incurred. The stronghold of establishing accounting of environmental costs of the document: United States Environmental Protection Agency (EPA): An Introduction to Environmental Accounting, 1995.

The further step of environmental accounting development is affected by the adoption of the document "Agenda 2001" in Rio de Janeiro in 1992 year (Agenda 21 for Travel and Tourist), as the action of the UN Conference for Environment and Development for the 21st century, where emphasizes the role of environmental management, in which it was a special contribution to the World Tourism Organization (WTO). The document first estimates "the cost of sustainable development on the planet" and defines "sustainability" as a balance between the status of the environment in relation to economic and social demands. These activities have been recognized in practice as a "green campaign".

Hotel imposes a systematic evaluation and publication of positive and negative impacts on the immediate environment, but also the acceptability of destinations in the new conditions, following the principle that the "green hotel" efficient, which followed by a green strategy, accept the principles of sustainable development and responsible behavior practiced by environment. Steps in this direction was the adoption of "Green Globe program," initiated by the HCIMA (Hotel and Catering Institute Management Association) with the primary task of all segments of the management information system in the foreground put activity of importance to raise awareness about the need to protect and improve the environment and to accept the measurement and control instruments. At the starting points for the 1993rd was adopted, "EPA Action Agenda" and initiated the process of establishing advanced environment accounting which puts emphasis on:

- better understanding of the terminology and concepts of environmental accounting,
- the role of management in taking eco-initiatives to internal and external level,
- improving the eco-education, encouraging the introduction of access to environmental management and achieve better ecological results in the wider environment,
- explore new possibilities of application of analytical tools, methods and systems and publish information acquired knowledge.

Because of the importance of a quality environment for sustainable tourism development and the roles that are imposed in this regard, it is necessary to build a specific approach to hospitality as resource base in the design of information on environmental costs that will be relevant to resource-base management in the planning and control of level the world hotel industry. This imposes the need for specific accounting class environment that will focus on issues of policies, or created to ensure quality and timely information on the costs and benefits associated with specific eco-action policies.

These needs were identified at the level of international hotel industry and in accounting theory and practice of introduces a new concept of EHMA - Hotel Environmental Management Accounting. He puts the task to overview all relevant categories of costs associated with improving and protecting the environment, where should recognize the reasons for their application and all relevant activities of management. These theoretical assumptions necessitate further elaboration of specific requirements in the hotel business



system, which should be adapted to an internal chart of accounts, the criteria of eco-balance, the system of reporting by segments with respect USALI standards, so that in the assessment of environmental costs and applicable cost principles defining quality. It should be noted that the calculation of environmental costs do not represent a new cost accounting system, but only in the framework already adopted the system of cost accounting to environmental aspects, which can then perceive leather elements calculations with position input-output relation.

### **2.2.1 Environmental Accounting and USALI**

Accounting for the environment is a fundamental prerequisite and framework in each hotel's business system, which provides management information base decisions on the costs and benefits of investing in eco-action, and to optimize the economic relationship to the requirements of preserving and improving the environment and ensuring the sociological balance. The task of managerial accounting is to identify, collect, classify and record all those costs that are incurred a result of measures of investment in the protection and improvement of the environment and saving resources and exchange. As these decisions are made at different levels of hierarchy, ie. the level of the hotel, across levels of business systems up to national and international corporations beyond, it was necessary to adapt to environmental accounting, and those requirements.

Matheews M. (1997) in his work speaks about the contemporary environmental accounting as a new accounting category appeared 1971 but was quickly adopted in practice. In his work he presented a comprehensive resource base of accounting environmental issues as a starting point for the creation of "environmental policy". However, it should be noted that the application that the application of environmental accounting in the hotel business systems begins at the end of 90-ies [9].

IFAC (International Federation of Accountants) in 1998. published a report on the practical conception of the possibilities of including elements of conservation and environmental protection in the framework of the basic financial statements and auditing reports of this kind, and also their order of use at the international level. IFAC accounting began to treat the "green strategy", which led to the creation of specific accounting reports, with emphasis on traversal environmental costs, or "green costs".

Green Accounting as a segment of modern accounting oriented to individual processes and actions in the hotel business. The main task is to provide methodological preparation directed to information relevant to the environment promotion and protection. This refers to the area of investment in clean technologies, development of green processes and products, forming an eco-friendly range of offers, and more. Green accounting is tasked to identify, take, and be selected to record all relevant data on environmental costs.

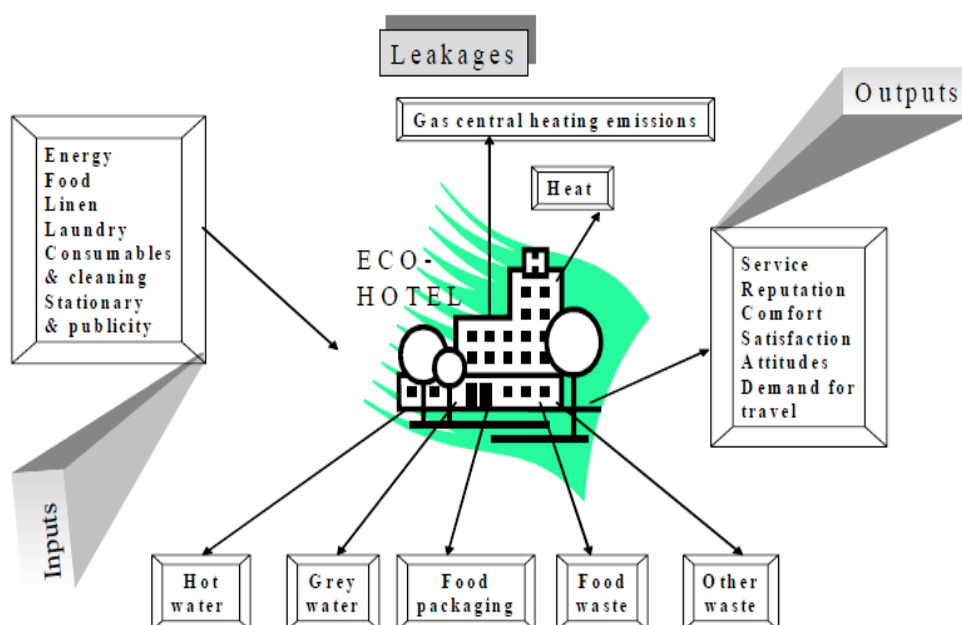
Identifying the environmental costs is not simply because they rarely appear in your usual classical form of natural gardening expenses. They are often hidden or are associated with the probability of a particular business event may be generated or intangible, and before the activity themselves, or are influenced by the emergence of possible future events.

Eco-movement is detectable in the globalization processes on the market, so they want to provide information for environmental management and on a larger scale on which the prevailing uncertainty and risk. Survival in the global market highlights the ability of managers to realistically assess the situation in the environment, resources and capabilities of the competition. The necessary information on the results of investments in eco-system throughout the lifetime of the tourism product in the market with a shorter life cycle, and the supremacy of the needs and desires of customers ever more pronounced.

Conventional costs (cost of capital, assets, materials, inventories etc.)		
Potential hidden costs		
Usual costs (cost of planning, training, examination, insurance, etc.)	Anticipative (R&D, permissions, preparation of locations, etc.)	Consequence (stopping or closeing, destruction of equipment, etc.)
	Voluntary (fealibility studies, recycling, protection, community relation, etc.)	
Unpredictable costs		
Costs of adaptation to future requirements, penaltiesy, the responsibility for future damage, the extent of improvement, legal expenses, etc.		
Costs of image and expenses of the relationship with stakeholders		
Costs of creating the image of the corporation, cost of relationship with customers, investors, insurers, employees, etc.		

**Figure 1** Theoretical assumption the classification of environmental costs

The concept of eco-balance is present in the theory and practice, and basically is a "quantification of all inputs and outputs of the business ... a way to include all adverse impacts on the environment, waste products and pollution" [10]. Assembling the eco-balance of the methodological assumptions provide for a comprehensive capture and assessment of activities of importance to the preservation and protection of the environment of business systems, and these relations are presented taking into account the principles of balance. Starting points for consideration of relevant effects on the eco-balance of the hotel displays in the Figure 2.

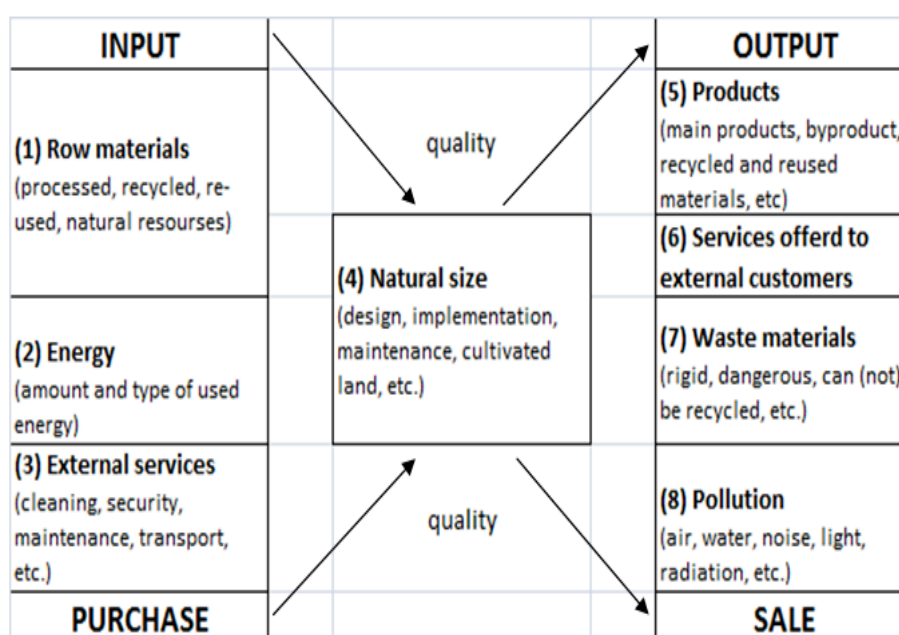


**Figure 2** Hotel performance environmental impact

The aim of drawing up an eco-balance in the hotel business systems to provide relevant information to internal and external customers':

- how much a particular product, service or business process pollutes the environment,
- the lifetime of the product or its position in the process of production, consumption, particularly at the stage of waste disposal,
- the amount of material and energy consumption in all stages of life cycle, taking into account the waste and harmful emissions, and everything is evaluated in terms of environmental impact.

Eco-balance on the basis of quantitative capture of material and energy flows expressed in physical units of measure that is in the form of input-output tables, which must be in balance, so it draws an analogy with the term "balance". Assembling ecological balance must be based on a realistic assessment of all relevant inputs and outputs and indicators on the knowledge of their impact on each segment of the environment. This means that they must consider all phases of the movement of goods and energy (as seen from the point of their impact on the environment) and that during their lifetime with respect to the provisions of ISO 14 000ff, with special emphasis on the specific requirements of 14 031, on the way as shown in the Figure 3.



**Figure 3** Theoretical frame of coverage environmental costs according ISO 14 031

Although this area is constantly evolving and improving, generally in the theory and practice recognize the following types of eco-balance:

- Input/output eco-balance or eco-balance of business system,
- Eco-balance of process,
- Eco-balance of products,
- Eco-balance of basic resources.

Chan W.W. and Lam J. C. (2001) stressed out in their work that hotel managers are not skilled in perceiving and interpreting large amounts of data in-kind, to be published on the consumption of energy and other resources and there's impact on the environment, it is recommended to reduce them to a common denominator of the cost of green and presenting the appropriate level within the accounting statements, and depending on their target users [11].

Uniform System of Accounting in the Lodging Industry (USALI) requires hotels to prepare detailed financial statement according to their business units. 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. To do so, USALI distinguishes 32 separate business units into investment centers or cost centers [11].

With the existing 32 standard reports in the hotel business (USALI), it is possible to conceive of new reports, for example, report on environmental costs, which reflect the economic valuation of certain environmental activities undertaken in the hotel's own contribution to protecting and improving environmental protection at the level of tourist destinations. These reports should include the environmental costs of eco-action taken in a particular accounting period. The benefits of eco-action taken would be visible at the level of those for-profit center, which could capture the benefits of entrepreneurial actions (1-14 reports and 32. report: Casino). For example, if the investment in the protection and enhancement of the environment increases the image of tourist destinations, then the benefits will be visible to a greater degree of capacity utilization and higher selling prices, you will be able to achieve sales of service accommodation, food, drinks, wellness offers, and more.

In this sense, the system will take into account the report of defined standards USALI and presented in the form of the model for the hotel, in a way that will shape the new report "Environment", which will follow after the report was last segment within Hotel (Casino) and will include all environmental costs actions taken by the hotel or the hotel business systems, policies and participation in joint actions at the level of tourist destinations.

**Table 1** Environment segment report according USALI

<b>USALI report: Environment segment (\$)</b>		
<b>Staff costs (Green actions)</b>		
Salary (Eco-manager)	50	
Wages and other expenses (Eco-actions)	10	
Total		60
<b>Eco-costs (Green costs)</b>		
Cost of wastewater (collector)	100	
Costs of separation and segregation	20	
Eco packaging	40	
Subsideis	10	170
Total Environment segment costs		230

The above statement should be viewed together with other statements prepared by the standards of USALI. Thus, within this report include the cost of the person responsible for environmental and other benefits for eco-action. The report "Environment" becomes a new item in the summary report on the partial results of the hotel - according to international accounting regulation system for lodging industry USALI.

**Table 2** The Hotels' Income Statement with Environment segment according to USALI

Operational Units/Operating segments	Net revenue	Costs of sales (direct)	Staff costs	Other expenses	Gain/loss
Rooms	X	X	X	X	X
Food	X	X	X	X	X
Beverage	X	X	X	X	X
Telecommunications	X	X	X	X	X
Garage and Parking	X	X	X	X	X
Golf Course	X	X	X	X	X
Golf Pro Shop	X	X	X	X	X
Guest Laundry	X	X	X	X	X
Health Center	X	X	X	X	X
Swimming Pool	X	X	X	X	X
Tennis	X	X	X	X	X
Tennis Pro Shop	X	X	X	X	X
Other Operated Departments	X	X	X	X	X
Rentals and other Income	X	X	X	X	X
<b>Total</b>	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
Other overhead					
Administrativ and General			X	X	X
Human Resurces			X	X	X
Information System			X	X	X
Security			X	X	X
Marketing			X	X	X
Franchise Fees			X	X	X
Transportation			X	X	X
Unlity Cost			X	X	X
<b>ENVIRONMET</b>			60	170	230
Sum of overhead			XXXXX	XXXXX	XXXXX
<b>Total</b>	XXXXXX	XXXXXX	XXXXXX	XXXXXX	XXXXXX
Result					XXX
Management fees					XXX
Rent, Property Taxes and Insurance					XXX
<b>EBITDA</b>					
Interests					XXX
<b>EBTDA</b>					
Amortisation and Deprecation					XXX
<b>EBT</b>					
Income Taxes					XXX
<b>Net Income</b>					XXXXXX

An internal report prepared by the standards USALI provide information for making short-term business decisions about the ongoing impact of investments in environmental protection and improvement. Business decisions for long term bases making, it is the value of investments and the expected benefits to follow over a long period and throughout the product lifecycle and the participation of all stakeholders in the value chain, which is a task of strategic accounting.

### 3. Conclusions

The aim of this paper was to bring attention to the environment accounting in the hospitality Industry in the process of Globalization. Today, due to globalization and intensified market competition, companies face with the new approach enforced by customers, which is protecting the environment. Companies in the hospitality industry use large amounts of water, energy, chemicals, etc. They also generate lots of waste in form of wastewater and solid waste. To become a competitive and an environmentally friendly enterprise is the adoption of a new thinking about the cost.

Globalization enforced companies to continuing increase quality and productivity, while reducing costs and product life cycle of their products/services, to do so, managers need a relevant information, which will be comparable with the environment at the same methodological basis. It is always necessary to assess their own position in relation to the most important competitors (benchmarking). As strategic accounting considers all elements in the value chain and the impact of the global environment, it is necessary to apply the methodology of risk assessment and target market positioning.

The above includes consideration of relevant economic impact on every phase of the life cycle of products and processes (LCC - Life Cycle Costing), while not neglect consideration of the relevant impacts of a policy improvement and environmental costs of the product life cycle (LCA - Life Cycle Assessment), which is also called the eco-balance. In addition to defining the vision and strategy in the selection of strategic objectives must take into account the character of the chosen scenario, since the actual conditions of the emphasis placed on respect for the principles of sustainability and balancing economic, environmental and social components of the concept of long-term development of business systems in the environment.

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# Product Enabled Services in Technology Start-ups

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Product-enabled service development has been identified as one of the potential sources for sustainable growth and competitiveness of firms in advanced economies. Many firms are in the process of shifting their focus from offering standalone products or services towards integrated offerings of products and services to meet specific customer demands, thus generating additional value. This thesis examines technology-based start-ups' attitude towards the development of hybrid offerings as part of their business differentiation and positioning strategies. The main research question is answered within the context of Danish technology-based start-up firms by adopting a case study based qualitative research approach. Five explorative case studies, of in total four different start-ups and one larger firm used as reference case, have been composed to examine the challenges associated with the development of product-enabled services as part of an integrated value proposition. The research findings indicate an insufficient approach towards hybrid offerings where start-ups initially focus on products or services, but not as an integrated hybrid solution. This decoupled approach seems to be linked to the fact that start-ups have limited human and financial resources that is often combined with lacking business and commercialization knowledge. The screening criteria from the new venture funding organisation seems to be very much product focused, as the tangibility of the products, as compared to services, makes it easier to make selection decisions. By basing their selection criteria on a customer-dominant logic the funding organisation can better support start-ups to embark onto the right competitive path from the very beginning. This would help the start-ups in the design and development of integrated hybrid offerings and avoiding the pitfalls of a fragmented "product first and then service" strategy.

## Keywords

Product-enabled services, hybrid solutions, business differentiation

## 1. Introduction

Advanced economies throughout the world, and the Nordic countries and Denmark in particular due to the higher standard of living, are constantly forced to explore new growth opportunities. The on-going globalization processes have greatly challenged the innovation and competitive strategies of European firms. Today it is much harder for firms to compete and to escape the forces of commoditization since manufacturing and business process knowledge and insights are being widely spread around the world to low-cost regions

(Chesbrough, 2011). In addition, the ever-increasing degree of knowledge and information sharing are shortening the product life spans, making it even more difficult for firms to compete in successfully satisfying customers' increasing demands for highly customized products and services.

These disruptive economic forces create a "commodity trap" - many product-focused firms are sooner or later trapped in a prices game that leads at a minimum to very hard times (Chesbrough, 2011). Firms must take action to avoid this destructive situation and product-enabled service development has been identified as one of the key sources for sustainable growth of firms in advanced economies. There is an increasing acknowledgment of the economic potential from product-service hybrid offerings (Velamuri et al., 2011). The promise and value of product-enabled services can be found in the fact that successful firms always have been able to leverage complementary products and services to enhance their customers' value (Schiling, 2010; Teece, 1986, 2006). Firms must turn to the development and innovation of services in relation to new and existing product offerings as it provides an escape from the route to commodity trap and a solution for growth and competitive advantage (Chesbrough, 2011). Knowledge-intensive services in particular are becoming the engine of growth for firms in advanced economies where prosperity lies in service and business innovation initiatives based on customer integration and co-creation.

Given the potential benefits, many firms are trying to mix products with services in an effort to boost revenue and balance cash flows. However, many of these firms do not exactly know how to structure, market, and sell their combined offerings (Shankar et al., 2009). Several publications have pointed out numerous challenges faced by firms dealing with the transition from product manufacturer to service provider, but product-enabled services development in start-up firms have been given nearly no attention.

### **1.1 Objective and scope**

The objective of this thesis is to examine the attitude of technology-based start-ups towards the development of hybrid offerings as part of their business differentiation and positioning strategies. The main research question focuses on the challenges associated with the development of product-enabled services as part of an integrated value proposition. The research question is answered within the context of Danish technology-based start-up firms that are already dealing with or interested in the development of new services and service innovation. The study is exploratory in nature and aims at providing a basis for future more systematic research.

### **2.1 Relevance**

The relevance of the research is based on the on-going emergence of product enabled service innovation and hybrid solutions as a way of escaping the disruptive forces of commoditization. This makes the research relevant to at least three groups of people:

- Entrepreneurs and executive management teams will be able to use some of the research insights to make informed decisions in the process of establishing new services as a key component of their competitive business strategy.
- New venture funding organizations can use the insights to align their selection criteria with emerging business trends, to strengthen their screening process and to enhance the commercialization potential and global competitiveness of their portfolio firms.
- Researchers and students can use the case studies and practical insights that are based on empirical data and existing theories as a basis for future research in product-enabled services.



## **2. Summary of insights from literature review**

The insights from the literature review can be summarized in the following lessons learned.

### ***2.1 Hybrid value creation is becoming a survival factor for manufacturing firms***

Hybrid value creation enables firms to escape the “commodity trap” and is increasingly becoming a survival factor for manufacturing firms, especially for those who operate in businesses with high commoditization level (Chesbrough, 2011).

### ***2.2 Little research on product-enabled service development in start-up firms***

Several publications points out challenges faced by firms dealing with the transition from manufacturer to service provider, but product-enabled services development in start-up firms have been given very little attention. Since it is highly relevant for existing firms it should also be of strategic relevance for start-ups. Looking at services as add-ons might be inadequate path for firms, as they have to see their offerings as hybrid solutions from the beginning.

### ***2.3 Commercialization strategies for start-up firms lack focus on hybrid offerings***

Literature regarding start-up firms' commercialization strategies is focusing on products and thus missing the commercialization aspects related to hybrid offerings. In addition, many small firms are lacking capabilities for business development and have limited resources making both the development and commercialization of hybrid solutions a difficult task.

### ***2.4 Complementarity vs independence – two characteristics of hybrid offerings***

The two underlying characteristics, complementarity and independence, determine how customers value and use an offering (Shankar et al., 2009). The two characteristics lead to four types of hybrid offerings, where the two related to high complementarity are most interesting from a product-enabled services point of view.

### ***2.5 The value-adding attributes depend on the type of hybrid offering***

There is no standard formula for hybrid offerings, as different value-adding attributes (individualization, marketing-integration, operational-integration and firm-customer interaction) are all important for the success a specific kind of hybrid offering.

### ***2.6 There are multiple definitions related to hybrid product and service offerings***

Many different disciplines and perspectives try to define the concept of combined product and service offerings, including the overall term “hybrid value creation” and definitions like “product service systems”, “Combined product and services”, “integrated solutions” and “servitization.” The term product-enabled service is defined as hybrid value creation though the combination of a product and complementary value-adding services enabled by the product.

## ***2.7 Product and service innovation have multiple points of differentiation***

There are fundamental differences in the nature of services and products which cause firms to struggle with a combined product-service development (Ettlie & Rosenthal, 2011). These differences include lack of formalized service innovation process, lack of dedicated investments in R&D for service innovation, type of customer involvement in the development process and source of ideation.

## ***2.8 The emerging customer-dominant logic is the most suitable for studying firms offering product-enabled services***

The service-dominant logic (SDL), in which intangibility, exchange processes and relationships are central, is a more suitable way than the traditional good-dominant logic in helping firms to see and think about their business as service and their products as service enablers (Vargo and Lusch, 2004). SDL can help firms to better understand how the function of service and product are related and in that way serve as a better logic for combining products and services than the GDL. However, Heinonen et al. (2010) argue that even though the SDL has widened the scope of understanding the function of marketing it is still very production- and interaction-focused, thus calling it provider-dominant logic. Co-creation in the SDL is dominated by and from the perspective of the service provider. They contrast the provider-dominant logic with an emerging customer-dominant logic (CDL) that positions the customer in the centre, rather than the service, the service provider/producer or the interaction. CDL is not a subset of SDL but rather a different perspective that focus on what customers are doing with services to accomplish their own goals, instead of what companies are doing to create services that customers will prefer (Heinonen et al., 2010). If firms only focus on interaction, they will fail to take into account what the role of the firm is in the customer's life. The ultimate outcome of marketing should not be the service but the customer experience and the resulting value-in-use for customers in their particular context (Heinonen et al., 2010). This is also why the customers should not be involved as a co-creation partner but instead the firm should be involved in the customer's activities, so it is the customer's context that is in focus and the customers who control the value creation.

Value is created within experiences and focusing only on value creation within the interactions between service provider and customer is too narrow, as not all experiences are co-created with the service provider (Heinonen et al., 2010). This might contain a business opportunity for the service providers, as customers create value beyond their role as participators. Service providers should expand their perspectives in order to get to know their customers on a deeper level, i.e. going beyond the co-creating activities to identify activities that customers are involved in with other individuals, companies or service systems.

## ***2.9 Moving from a product to a service provider includes multiple challenges***

Transition from product manufacture to service provider implies multiple challenges related to change in business model, change of firm's mind-set, the way customers are involved, development of new managerial capabilities and cultural changes in the business (Oliva & Kallenberg, 2003; Shankar et al., 2009). For example, Heinonen et al. (2010) identifies five major challenges for firms moving from a provider-dominant logic to a CDL, based on the three issues. These challenges include firm involvement, firm control in co-creation, visibility of value creation, scope of customer experience and character of customer experience.

## **2.10 Services provide a better source of innovation for small firms**

The innovation capacity in small firms is in general at a higher level on the service side than on the manufacturing side. Beside this, smaller service firms tend to be more innovative than smaller manufacturing firms.

## **3. Research methodology**

This present study adopts a qualitative research methodology to examine start-up firms' attitude towards hybrid value creation by focusing on their specific challenges. The selection of a case study-based qualitative research approach was motivated by the fact that there are relatively little known about the challenges start-up firms face in relation to the development of hybrid offerings (Velamuri et al., 2011). Eisenhardt (1989) defines the case study approach as "a research strategy which focuses on understanding the dynamics present within single settings" (Eisenhardt 1989, p. 534). The case study based qualitative research approach adopted here is based on multiple explorative case studies of Danish technology-driven firms that have received funding from an investment organization supporting technology-based start-ups. However, the methodology has been enhanced by using a single-case study of a larger well-established firm that did already move from a purely product market orientation to one focusing on hybrid solutions. This single-case study is used as a reference in the development of the list of issue addressed during the interviews. The funding organisation that are funding the four start-ups case firms has also been addressed with an interview to examine their perspective and attitude towards product-enabled services in the firms they screen or fund. The research method comprised of the following steps: literature review; problem formulation; case selection; design and formulation of interview questions; data collection and preparation of case profiles; data analysis; shaping insights; enfolding existing literature; articulation of recommendations.

The contacts to the case firms were established through a preliminary interview with the CEO of the Danish investment firm SDTI. SDTI have a portfolio of about 70 start-up firms and invests each year in approximately 15 new innovative Danish start-up businesses with international perspective and potential. These firms are all based on innovative product and/or service ideas in various kinds of technology driven industries and are geographically located in all places of Denmark. This approach to the selection was driven by three reasons. *First*, the firms were already preselected for a certain level of innovation capacity, i.e. these are firms that are expected to be open towards newly emerging trends in the global business environment. *Second*, the fact that they were funded by an organization supporting innovative start-ups allows examining how such organizations perceive hybrid value offerings as part of the overall business strategy of new start-ups. *Third*, the firms were located in various parts of Denmark and operated in multiple industries securing less biased data. Six firms from SDTI's portfolio were selected based on two criteria: i) the age of firm being under two years, and ii) the business is dealing with or willing to deal with innovative product-enabled services. The six firms were contacted and the following four responded positively and agreed to cooperate in the data collection process (Table 1).

## **4. Analysis of Results**

This section summarizes the main results from both the within-case and cross-case analysis of the case profiles constructed on the basis of the collected data. The observations associated to each of the four start-up firms and the larger reference firm, have one by one been examined in order to cluster related observations. The clustering have resulted in 27 dimensions that are ranked by the relevance for the four start-up firms, with the dimensions associated with most observations first. The dimensions are divided into two groups

depending on relevance. The first group contains those dimensions that have been found to be most relevant, as they have been found in more than two cases (Table 2). The second group of dimensions have been found to have less overall relevance, since they only are represented by two or less observations. An investment manager at SDTI was also interviewed as some of the dimensions were related to the role of SDTI as funding organisation. The additional interview provided a broader perspective on firms' attitude towards product-enabled services not only from the start-up point of view but also from the point of view of the funding organisations supporting the start-ups. The following list summarizes the relevant observations extracted from the interview with the investment manager:

**Table 1** Overview of case firms

Firm name	Location	Firm age	Industry
Me mover ApS	Copenhagen	1 year	Transport
IndeklimaTest ApS	Odense	1 year	Biotech
Brainreader ApS	Aarhus	1 year	Software (Medical)
Symphonic Playground ApS	Copenhagen	1 year	Software (Music)

**Table 2** Most relevant observations from cross-case analysis (X means "no data")

Dimension	Case A	Case B	Case C	Case D	Case E (Ref.)
Nature of offer	Mostly product-focused	Mostly service-focused	Mostly product-focused	Mostly product-focused	Both product and service focused
Formalization of innovation process	No formalized product and service innovation process	No formalized service innovation process	No formalized process, new service development is left for the future	Specific agile approach towards product development but none towards services	X
Value proposition (VP)	No clearly defined VP	No clearly defined VP	Clearly defined VP	No clearly defined VP	Clearly defined; Knowledge embedded in the products is used as USP
Impact of people-intensive services	People-intensive services require management of properly skilled employees	Digitization of processes	People-intensive services requires management of properly skilled employees	X	Difficulty to locate and hire better-qualified people to replace staff with obsolete skills
Resource capacity	Lack of resources to consider service development in parallel with products	Resources are allocated to development of the initial idea only	Lack of resources to consider service development in parallel with products	Lack of resources to consider service development in parallel with products	X
Service	Services are	Services are	Services are	Services are	X

testing	tested real-time	tested real-time	tested real-time	tested real-time	
Management ICT systems *	Employment of currently available commercial software systems	X	X	X	Investments in systems and structures like CRM, to handle the service component

**Table 2** (continued)

Dimension	Case A	Case B	Case C	Case D	Case E (Ref.)
Exploration of tacit knowledge	Through social media and through firms' user community	No particular way	Through firms' user community	Through firms' user community	X
Competences of entrepreneurial team	X	Lack of business and commercialization related experience and skills	Entrepreneurial team with multiple competences	Lack of business and commercialization related experience and skills	X
User community as innovation source	Using user community as a source of innovation	X	Using user community as a source of innovation	Using user community as a source of innovation	X
Service customization	Customization is seen as part of future services	No customization of service as it will add no value	X	X	Services help customization; important competitive advantage
Complexity of the problem faced by customers	Low level	High level	X	Low level	X
Solution complexity	Low level	High level	X	Low level (a lot was needed to reach that level)	X
Branding	No branding of the link between the product and services	X	X	Branding of the total solution	Brand products and services through other well-known architect brands
Product testing	Systematic tested internally and through beta tests	X	Systematic tested internally and through beta tests	Systematic tested through beta tests and focus groups	X
Offering the combination of product and service as a platform for 3rd party value	No intention	No intention	X	No intention	X

propositions					
Impact from external factors	X	X	a) Service development opportunities are affected by legal issues b) Venture firms are product focused	X	Shifting amount and allocation of public funding

- The screening process of new technology-driven start-up firms focuses on the business model presented by the entrepreneurial team, i.e. the business case with a focus on potential revenue streams.
- Product-driven businesses are primarily screened and evaluated on the basis of their products. Prototypes and proof of concept are important factors in the initial phase of the development.
- SDTI is primarily investing in development projects that are targeting commercialization within a relatively short period.
- The entrepreneur has to invest at least 8% and SDTI covers the rest of the needed capital up to DKK 3.5 mil. in the pilot phase. A private investor has to be included if further investment is needed.
- Patents applications, patents or at least opportunities for patents are considered to be highly relevant when screening product firms. Some start-up firms, depending on their specific offerings and industry, are not attractive for investment if the firm does not possess a patent.
- The business idea and the possibility to commercialize the idea relatively quickly are considered to be highly relevant when screening service businesses, where IPR is more difficult to protect.
- SDTI see a tendency in the competences of the entrepreneurs, especially in very knowledge-intensive businesses: they are missing commercialization skills and thus are very focused on research and development.
- The quality of the entrepreneurial team is, like the business concept, a very important factor for SDTI when screening the firm. SDTI has to be convinced that the team can reach the agreed milestones.
- SDTI's procedure is to screen new potential start-ups, invest in the start-ups and exit their engagement with the start-ups within 3-5 years, in order to invest in new start-up firms. There are not enough resources helping entrepreneurs in shifting their business models to a better services focus.

## 5. Summary of insights

This section summarises the main research insights.

### 5.1 Informal innovation process

Start-ups should not give up attempting to structure their development processes by taking into account the differences between product and service development and aiming at higher business efficiency. Funding organizations could help in the development of programs and services to support start-ups and help improving their innovation processes.

## ***5.2 Product-enabled services not part of an integrated value proposition***

The entrepreneurs and funding organisations need to pay more attention to hybrid offerings from the very beginning as an integrated part of the business model. Technology start-ups have to design the hybrid offering as such and not as a product with services added at a later point. Hybrid offerings are a question of differentiation and, in the end, survival, which implies that choosing a product-only strategy from the beginning will result in missed opportunities and loss of possible competitive advantages (Chesbrough, 2011).

## ***5.3 Lack of resource capacity***

Start-up innovators should continue to pursue a very focused strategy as their limited financial and human resources force them to focus on delivering effective consumer value. However, services could provide new opportunities for the start-ups because the service innovation capacity in small firms is more or less at the same level as in larger firms (Forsman and Rantanen, 2011). Services provide start-ups with better competitiveness and innovativeness as compared to larger firms (Forsman and Rantanen, 2011). Start-ups appear to face a paradox regarding resource allocation and commercialization strategy. The limited resources force the start-ups to focus on either products or services, which implies a fragmented commercialization strategy.

## ***5.4 Real-time service testing***

Given the differences between product and service development, the testing phases should be designed as part of the overall development strategy (Ettlie and Rosenthal, 2011). Start-ups should continue to apply this real-time testing approach towards services. The new venture funding organizations should support the start-ups in this approach and through their influence and activities in the start-ups, secure real-time testing of the service.

## ***5.5 Competences of the entrepreneurial team***

This insight is highly relevant for governmental stakeholders as political resources need to be allocated for development of programs that lead to better awareness of PES as differentiator within the context of commercialization. Especially targeting entrepreneurs for whom lack of resources and skills have a huge impact on the firms' performance and wrong decisions can have devastating consequences. The commercialization strategy should, as pointed out in the literature, reflect the firm's commercialization environment (Gans and Stern, 2003; Gebauer et al., 2010). Start-ups risk choosing a losing path from the very beginning if not aware of the influencing factors within the commercialization environment (Gans and Stern, 2003).

## ***5.6 User communities as a source of user-driven innovation***

Start-ups should continue to establish user communities around their businesses because it allows the possibility for future user-driven innovation initiatives and provides a gateway for the firms to establish firm-customer relationships through two-sided communication and information sharing (Brax, 2005; Vladimirova et al., 2011). Start-ups must see customers as primarily an operand resource, instead of an operant resource as in the GDL, because they are active participants in relational exchanges and coproduction (Vargo and Lusch, 2004). Even though firm-customer relationships are important, start-ups should not allocate too much of their scarce resources as the remaining three value adding attributes are more crucial, depending on the type of hybrid offering (Velamuri et al., 2010).

### **5.7 ICT management systems and human resources**

Start-up firms must actively begin to locate potential human resources at an early stage if they want to ensure them in the future, since it could be too late to start searching when the services have been developed and launched. One way for start-ups to start this process could be through participation in different kinds of networks, which not only could promote the entrepreneurs activities but also help the firm establishing relationships with potential human resources. The reference case shows that active engagement in service enabling networks can also be used as a source of new knowledge and information, which might could be transferred into novel service offerings.

### **5.8 Customization of hybrid offerings**

As pointed out in one of the previous insights, entrepreneurial teams face various challenges related to PES due to their limited amount of human and economic resources. Customization is as pointed out by Velamuri et al. (2010) an important source of hybrid value creation and the start-ups have to recognize the diversity in the customer needs as pointed. The reference case emphasises that services help customization and is seen as an important competitive advantage for larger firms, as it is a survival factor. Start-ups should address customization, as a part of their hybrid offering, but depending on the kind of hybrid offering the start-ups should first of all focus on the critical value-adding attribute, due to their limited amount of resources. The start-ups did already digitalize various components of their business, and should continue to do this as it makes the offering easier to scale.

### **5.9 Screening and funding of start-up firms**

It appears that the selection process of funding organizations is very much product driven. In many cases the funding organizations see the value from refocusing the firms to more service-driven business models. However, they do not have the time and enough resources to help such refocusing. The product-focused funding approach of the funding organization motivates start-up firms to initially focus on a more tangible product development process in order to reach the important milestones and get further investments. Basing the selection criteria on a customer dominant logic could provide a better basis for businesses with hybrid solutions. It is not easy for firms to change their business mind-set and remaining parts of the old manufacturing mind-set can prevent the right adoption of the new service mind-set (Brax, 2005). The start-ups have an advantage because they have the possibility to embark onto the right competitive path right from the beginning. If existing funding mechanisms support the start-up firms in moving to the design and development of integrated hybrid offerings from the beginning, they can avoid the pitfalls of a fragmented “product first and then service” strategy. The start-ups and funding organisation must understand that services are the fundamental basis of exchange (Vargo and Lusch, 2004). The insight indicates a need for services or programs that can help start-ups refocusing their business model towards more service-driven business and affect the GDL that are predomination in the start-ups, by helping start-ups adopting a more CDL (Heinonen et al., 2010; Vargo and Lusch, 2004).

### **5.10 Hybrid offering as a platform for 3<sup>rd</sup> party value propositions**

It appears that start-up firms have little knowledge about existing theories of innovation focusing on specific commercialization strategies (Gans and Stern, 2003; Teece, 1986, 2006). Funding organizations could cooperate with university education programs and innovation offices in order to develop professional training and knowledge sharing programs



targeting executive managers of start-up firms. Such cooperation could become a new and innovative resource that could help start-up firms in reinventing their value propositions.

### **5.11 Impact of external factors**

Start-up managers have to identify and be aware of the external factors that can have influence on the service development and the service itself. Legal issues did in one of the cases cause the firm to follow a transaction-focused business model, as the product could not be sold as a service, even though this approach in many ways would be preferable for all the stakeholders.

## **6. Conclusions**

This paper focused on examining the attitude of technology-based start-ups towards the development of hybrid offerings as part of their business differentiation and positioning strategies. Relevant literature related to product-enabled services and service business has been reviewed in order to identify possible issues and challenges faced by firms in relation to product-enabled services development. The final results are based on the joint analysis of five case studies of technology driven firms in Denmark.

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# Evaluation of the National Innovation System of the Republic of Macedonia – Business Sector Perspective

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Authors examined innovation capacity of the business sector in the Republic of Macedonia. Analysis was conducted on the data gathered from the Community Innovation Survey (CIS 4 version - 2000 companies in 2010 with aim to introduce Innovation Union Scoreboard for a first time in the country) and OECD survey (500 companies in 2011 with aim to prepare background study for development of National Innovation Strategy 2012-2020). Key findings reveal very modest level of innovation activities among companies (only ~30% of the companies introduced some type of innovation in product or service, process, organisation and management in the last 3 years), and extremely low company investment in research and development activities. Other barriers for innovation were noted for instance: very small number of researchers in the business sector; low research and development (R&D) demand; weak links with academia; low to medium level of know how in the area of new product development, innovation management, intellectual property rights, etc.; low level of support from the governmental institution for R&D activities in the private sector (small scale and amount grants scheme for R&D joint projects business-academia; just introduced innovation voucher, limited cluster and business start-up centers state support, etc.); insufficient network activities of business sectors (weak clusters, modestly active chambers, etc); very low level of business sector participation in the EU programs (CIP, IPA, FP7, etc.). Paper ends with series of recommendations for government side, as well as for business sector side, such as: to increase business sector access to knowledge, investments in education and new equipment, especially ICT, improvement of accounting system to properly catch R&D costs, strengthening linkages between academia (research institutions) and business sector, tax incentives for introducing R&D activities, etc.

## Keywords

National Innovation System, Business Sector, Republic of Macedonia, Barriers for Innovation

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# 1. Introduction

Almost 100 years ago Schumpeter (1911) clearly stated that „entrepreneur act as an innovator“ is the key for economic development in a society [1].

Now, the situation is the same... U.S. Federal Reserve Chairman Ben Bernanke said “Innovation is critical to the long-run economic growth and more efficient production methods ..., Innovation has not only led to new products, but also brought about dramatic changes in how businesses are organized and managed...” [2], while “Knowledge is the main driver of today’s global economy,” said OECD Secretary-General Angel Gurría at the launch of the OECD Innovation Strategy in Paris. “Countries need to harness innovation and entrepreneurship to boost growth and employment. This is the key to a sustainable rise in living standards.” [3] Number of authors, institutions and countries developed similar discussions and actions.

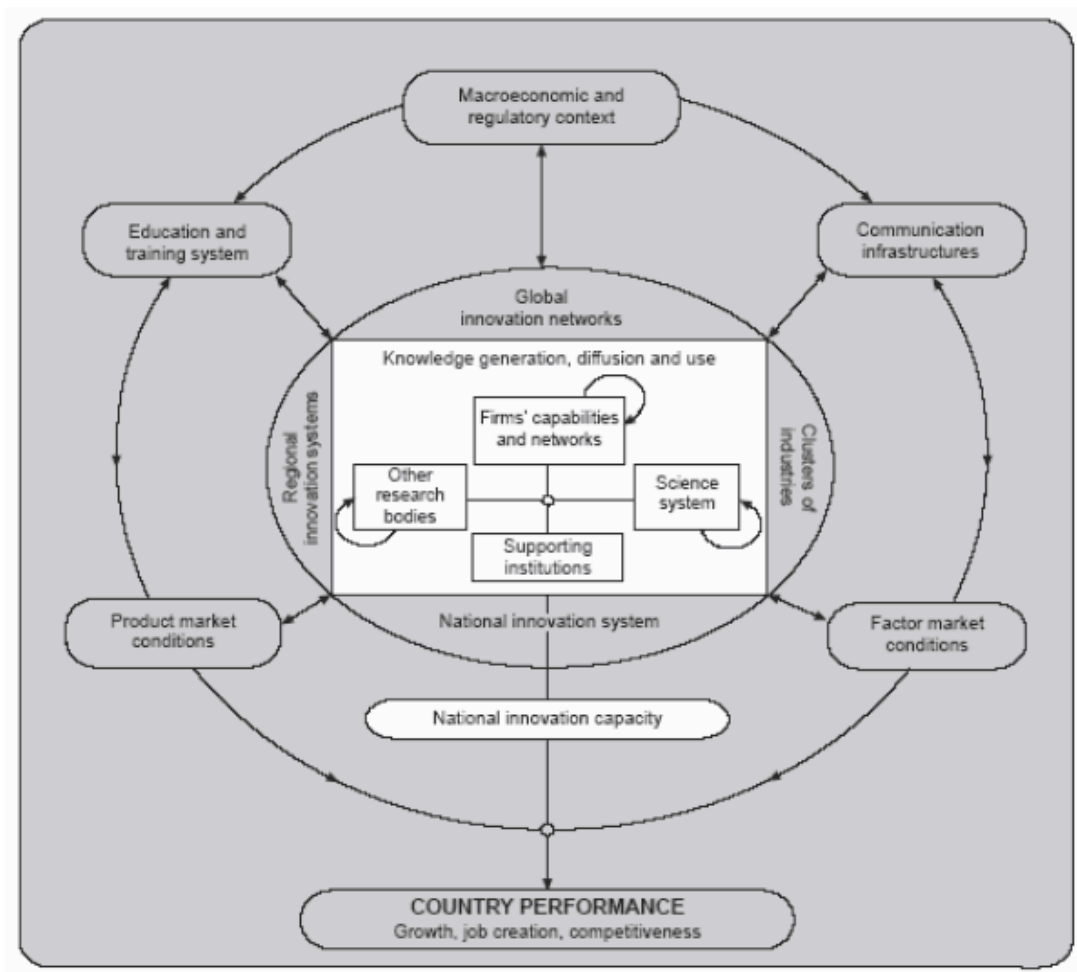
In that direction almost 3 – 4 decades ago academic community started an open discussion about the existence and importance of national innovation systems. The concept of national innovation systems (NIS) rests on the premise that understanding the linkages among the actors involved in innovation are key to improving technology performance [4]. Number of NIS related definitions can be found in the academic and business literature, started with early works of Freeman and Lundvall:

- “The network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies.” (Freeman) [5],
- “The elements and relationships which interact in the production, diffusion and use of new and economically useful knowledge... and are either located within or rooted inside the borders of a nation state.” (Lundvall) [6],
- “Set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process. As such it is a system of interconnected institutions to create, store and transfer the knowledge, skills and artefacts which define new technologies.” (Metcalf) [7],
- “NIS can be perceived as a historically grown subsystem of the national economy in which various organizations and institutions interact and influence each other in the carrying out of innovative activity. (Balzat and Hanusch) [8].

Similar to the different approaches for NIS definition, there are also diverse descriptions related to the elements of NIS. Very comprehensive approach was developed by OECD experts, where all main ingredients of NIS were depicted and interlinked (figure 1). Using the NIS concept highlights interactions and interfaces between various actors and the workings of the system as a whole, rather than the performance of its individual components.

However, highly effective NIS should ensure right environment for companies to develop their innovative potential in order to grow and expand their activities on national, as well as on international markets.

It that direction, this paper is addressing the level of innovative capacity of the business sector in the Republic of Macedonia.



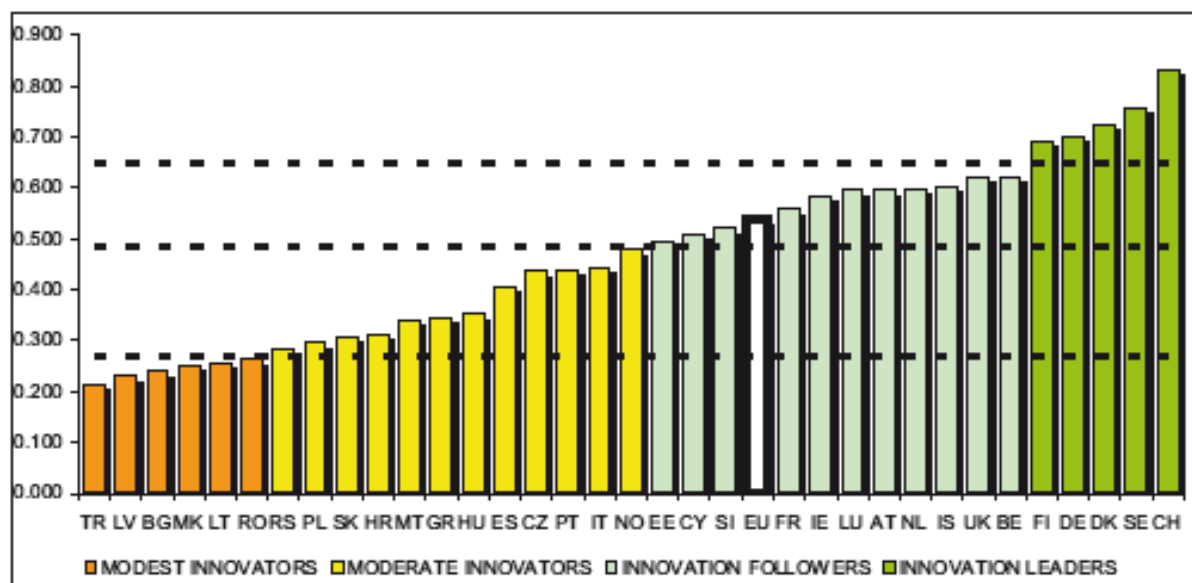
**Figure 1** Actors and linkages in the innovation system [10]

## 2. Current Status of Innovation System of the Republic of Macedonia – Business Sector Perspective

On the latest Innovation Union Scoreboard (EU 2011) Macedonia is placed in the group of modest innovators, on the bottom of the list, just before Turkey, Latvia and Bulgaria [11, pg. 17]. However, country growth performance of 2.3% is above EU27 average. Main findings of the IUS (general indicators) for Macedonia were:

- “Relative strengths are in Human Resources; Innovators; and Economic effects, while relative weaknesses are in Open, excellent and attractive research system; Finance and support; Linkages and entrepreneurship; and Intellectual assets.
- High growth is observed for Population with completed tertiary education; International scientific co-publications; Community trademarks; and Medium-high and high-tech product export, while strong decline is observed for Non-EU doctorate students; and R&D expenditure in the public sector. Growth performance in Human resources; Firm investments and Economic effects is well above average.”

One of the worst results Macedonia experienced on the indicator SMEs innovating in-house as % of all SMEs. This indicator measures the degree to which SMEs that have introduced any new or significantly improved products or production process have innovated in-house. EU average is ~ 30% of SMEs innovate in-house. Unfortunately Macedonia is on the bottom of the list with average of only 12% of SMEs innovate in-house [11, pg. 84].



**Figure 2** Innovation Union Scoreboard composite index for 2011

Another very weak performance of Macedonian economy is R&D expenditure in the business sector as % of GDP (Gross Domestic Product). This indicator captures the formal creation of new knowledge within the firms. While the average R&D intensity for EU27 is 1.23%, Macedonia performance is slightly above zero, only 0,03% [11, pg. 82]. In the same direction are the latest available data (table 1) for the country R&D expenditures [12].

**Table 1** Types of R&D expenditures

Type of expenditure	2000	2001	2002	2003	2004	2005	2006	2007	2008
GERD (Gross domestic expenditure on R&D)/GDP	0.44	0.32	0.26	0.23	0.25	0.25	0.21	0.18	0.23
BERD (Business intramural expenditure on R&D)/GDP	0.03	0.02	0.01	0.003	0.02	0.03	0.03	0.04	0.06
GOVERD (Government intramural expenditure on R&D)/GDP	0.15	0.16	0.15	0.14	0.12	0.12	0.10	0.09	0.09
HERD (Expenditure on R&D in higher education)/GDP	0.26	0.14	0.10	0.08	0.12	0.10	0.08	0.05	0.07
Note: Ratios for 2000-2007 is Macedonia Statistical Office calculations, whereas ratios for 2008 are World Bank staff calculations based on R&D and GDP figures from the Macedonia Statistical Yearbook 2010.									

In order to understand reasons for so bad scores of Macedonian companies, comparative analyses of latest two most significant on-site surveys conducted in the country was performed. Authors had chance to work directly on both studies (1) Implementation of the European Innovation Scoreboard for the Republic of Macedonia in 2010 [13] and (2) background study for development of National Innovation Strategy for the Republic of Macedonia 2012-2020, realised in 2011 [14].

## 2.1 Innovation Activity in the Business Sector

Two main surveys have been conducted on innovation in the private sector. The European Innovation Scoreboard assesses the innovation activities of the private sector building on the Community Innovation Survey (CIS) conducted by NCDIEL and Contesti from May 2010 to September 2010 on a sample of 2000 companies. The CIS allows for a comparison of

innovative activities in EU countries and other candidate economies. In addition, in the months of May and June 2011, on the request of OECD GfK, has conducted a survey of 500 companies focusing on various aspects of companies innovative capabilities. OECD experts developed Questionnaire on innovation activities of private companies, as an internal document for the purposes of Regional Competitiveness Initiative, a three year project funded by the European Union with focus on Development of Macedonian Innovation Policy 2012-2020. Received data was analysed by NCDIEL team.

Both surveys showed that companies in Macedonia have low to medium potential for innovation activities. Table 2 illustrate that Macedonian companies in the period of last three years have introduced number of innovation on the level lower to EU (CIS) average. The GfK survey however shows that the majority of surveyed companies, i.e. 56%, consider themselves as somewhat innovative while 23% state that they do not innovate at all (i.e. these companies do not introduce any single type of innovation). 35% of the respondents stated that their company “did not innovate” in the period of 2008-2010.

**Table 2** Type of innovation introduced by companies

Country	EU27	Macedonia		
Type of innovation that companies introduced in previous 3 years	CIS	CIS (1980 companies)	CIS (1980 companies)	GfK (492 companies)
Product or service innovations	34%	39,2%	17%	23%
Process innovations			19%	15%
Marketing innovations	39%	30,8%	32%	22%
Organisational innovations			29%	16%

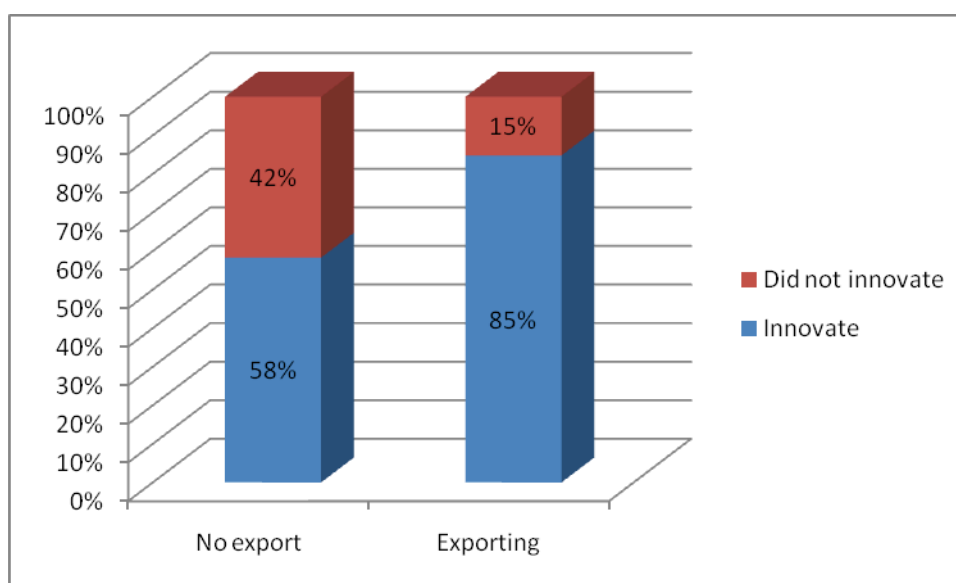
Cross tabulation conducted for GfK surveyed firms between the type of sector of the company and type of the innovation showed that the sector where the most innovations are noted is in the area of manufacturing and processing industries (249 companies) where 65% of all innovation are related to product, service or process innovation (table 3). Among service companies (133) dominant are product/service (34%) and marketing innovations (39%). Analysis of surveyed companies showed that basically micro companies (1-9 employees) have relatively limited attitude towards innovation activities. Almost half of them did not introduce any type of innovation.

From 224 micro firms included in the GfK survey, only 22 mentioned having staff working on R&D activities, even 39% of them acclaimed that had certain R&D related costs. This could potentially be explained by the firms’ limited exposure to export markets given that only 6% of surveyed micro companies have export related activities. It is interesting to note that, in the past three years, more than half of the companies identified some type of innovation which could have improved the company’s market position, but was not introduced. This shows that, although companies are aware of the need to innovate, there may be a need for better support that would come within the company itself, as well as from external sources: state or other innovation support institutions. Analysis of all GfK surveyed companies showed that the export oriented companies have significantly higher level of innovative activities (85%) versus companies that do not export (only 58% of companies introduced some type of innovation) – figure 3.

**Table 3** Distribution of types of introduced innovations by the industry (GfK survey)

Type of innovation	product service or innovations		process innovations		marketing innovations		organizational innovations		No. of firms <sup>1)</sup>
Industry sector	product service innovations		process innovations		marketing innovations		organizational innovations		
Manufacturing and processing industries	32%	79	33%	81	18%	46	17%	43	294
Construction	26%	7	26%	7	26%	7	22%	6	28
Services	34%	45	11%	14	39%	52	17%	22	133
Trade	25%	35	6%	8	41%	58	29%	41	142
Other sectors	28,5%	4	28,5%	4	7%	1	35,7%	5	10

1) Some of the companies mentioned that were active in two or more sectors. .



**Figure 3** Export orientations and the level of innovation activities

## 2.2 Resources Dedicated to Innovation

Absorptive capacity, which is defined by Cohen and Levinthal as the “ability to recognize the value of new information, assimilate it, and apply it to commercial ends” is an important aspect of the ability to innovate [15]. Studies show that having staff dedicated to research, investment and the development of human capital are key aspects of innovation capacity. However, these aspects are very much undeveloped in the Republic of Macedonia. Only 19% of surveyed companies reported that they have staff devoted to R&D activities within the company. Furthermore, investment in R&D is likely to directly impact absorptive capacity since the more a firm invests in research and development activities, the more it will be able to fully appreciate the value of new external information.

Investment in R&D is very low. Less than 40% of the companies surveyed estimated having some type of expenditure related to innovation activities. These were mainly expenditures for the acquisition of machinery, equipment and software. Furthermore, companies rarely used external R&D services. Only 7% of companies surveyed by GfK reported usage of external R&D services.

Another important dimension of the absorptive capacity of companies is their willingness to acquire new knowledge. Almost half of the companies surveyed by GfK have never offered



any form of training to their employees. 50% of companies which offered training generally rely on in-house training focusing on technical training (37%) and on management related training (17%). Companies in transition economies which try to develop human capital can be confronted with the issue of brain drain. In the Republic of Macedonia, 20% of companies consider that the emigration of skilled employees causes a major (9%) or significant (11%) disruption to the activities of the company. More than 25% of companies reported that at least one technical/scientific person emigrated from the company in the last 3 years.

The GfK survey (table 4) has suggested that the training offered to the employees is strongly influencing the innovation outputs of the company and even it is influencing its market success. Namely, the companies that has offered training for its employees have shown 10 times more capacities for receiving a patent (5% against 0,5%), and almost double innovation capacities (80% vs. 44%) compared to the companies that did not offered any kind of training. Those companies have also shown better performance in the export of its products and/or services (30% vs. 19%).

**Table 4** Impact of trainings on the company's innovation related activities

	Patents	Innovation activities	Have tech./scien. staff emigrated	Export products/ services
<b>Companies that offered training</b>	5%	80%	34%	30%
<b>Companies that do not offered any training</b>	0,5%	44%	14%	19%

### **2.3 Impact of Innovation on Companies**

As a consequence of the low level of innovation activities of companies few patents were granted in the country. Among the 492 companies surveyed, only 12 companies has stated that they have patents registered with the State Office for Industrial Property, two companies registered patents with the United States Patent and Trademark Office and only one company registered a patent at the European Patent Office. In addition, nine patents were registered with other national patent offices.

Although it is difficult to fully assess the impact of innovative activities on the profitability of companies, the GfK survey asked private companies what impact innovation had on the companies' finances. There are evidence that companies that introduced single or a combination of any of the four types of innovation (product/service, process, marketing or organisational innovations) in the period 2008-2010 have experienced a positive impact on the companies' turnover and profit. Table 5 shows that, for a majority of companies, innovation increased turnover and profitability by more than 10%.

31% of CIS surveyed companies mentioned that market changes are the main motivation for innovation. Similarly, the GfK study reveals that companies introduce innovation in order to answer customers' needs and preferences (42%), and competitors pressure (31%). These two findings suggest that companies react to their environment, but fail to proactively take initiatives.

**Table 5** Impact of innovation on company turnover and profit (data are for 243 companies that introduced at least one type of innovation out of the 492 GfK surveyed)

Introduced innovation in previous 3 years had impact on	Company turnover	Company profit
over 30%	7%	5%
20-30%	9%	10%
10-20%	19%	10%

5-10%	24%	26%
less than 5%	17%	22%
Not introduced any innovation	0%	0%
Do not know / Not available	24%	27%

## 2.4 Sources of Innovation

In general, firms with a good access to information are in a better position to identify and develop innovation opportunities. In that respect, developing linkages with other stakeholders is an important step in developing innovation. The CIS study showed that in order to introduce innovations, 43.5% of companies relied on internal knowledge as the most significant source, while other sources - government or public research institutes (7%), conferences, trade fairs, exhibitions (19%), scientific journals, trade/technical publications (17%) are mentioned as being less significant [13 pg. 43]. The most commonly used source of external knowledge and support used by companies surveyed by GfK are private consultants (16%) providing intellectual services. Not only is the use of external providers of knowledge by firms limited but, in general, companies rely on external knowledge to introduce only minor changes to their operations. Companies consider possibilities to receive external innovation related assistance mainly for minor modification of technologies already used in-house (almost 50%), followed by major modification of technologies already used in-house (29%). The fact that only 12% of companies would like to adopt new “turn-key” technologies or to make radical changes in technology (5%) shows that most companies in Macedonia have a relatively conservative attitude towards change.

When companies used external sources of knowledge, companies rely on the internet (25%), customers’ advices (17%) and suppliers (16%) to provide information on innovation opportunities. The CIS survey covered in depth the usage of different types of internet, and it shows that there is positive correlation of innovations in firms with employees’ access to the Internet and also with the frequency of internet usage of those employees. 96% of companies that increased speed of the internet service reported some type of innovation [16]. Also this study showed that the diffusion of innovation is greater in firms that have better internet access. Although e-mail services, which are used by 85% of internet users, are the most widely used application, the survey clearly shows the importance of internet to seek new business opportunities (66% of respondent), perform daily work (66%) and to find news and information regarding their business (30%). Companies using the internet have access to more information and obviously use them to implement some type of innovation in their daily business. As part of the CIS, an in depth analysis of the sources of information used by so called “extremely innovative companies” to identify technological and non-technological opportunities was conducted. The results showed that these companies tend to use a different set of sources of information. Instead of using internet as the main source of information, they mainly rely on other companies, and companies in the same sector (16%), clients or customers (32,5%) and suppliers of equipment, materials, components, or software (34,6%) [13 pg. 43]. Moreover, the role of linkages seems much more important as companies gather information from customers (80%), industry associations (70%) and suppliers (60%) to identify new opportunities and challenges. Establishing formal links with universities has been shown as especially effective mechanism (table 6). Even 94% of the companies that used this mechanism stated that they developed at least one type of innovation in the least three years, and 12% of them have been granted a patent in the same period. Just for comparison, only 63% of the companies that did not use this mechanism have developed some innovation and only 2% have been granted a patent.

**Table 6** Effect of collaboration with universities on patents, export and innovation activities

Links with Universities	Effects on:		
	Patents	Export	Innovation activities
Established formal links with specific universities	12%	64%	94%
Did not have links with universities	2%	23%	63%

## **2.5 Main Constrains for Private Firms to Develop Innovation**

Main constraints that were identified, in addition to above mentioned, are:

- Lack of financing instruments for innovation support: Few financial instruments for innovation exist and the existing loans from the commercial banks are hardly accessibly and very expensive. Banks are very restrictive regarding innovation projects and are offering just classical loans. Business angel support is in its embryonic phase, while participation in EU and other donor related projects is very rare among SMEs.
- Lack of institutional support: There is a lack of support instruments for innovation development. The most serious problem is shared and overlapping responsibilities for innovation support amongst institutions. The Ministry of Education and Science and the Ministry of Economy, both have programs to support innovation projects, while the Agency for Entrepreneurship Promotion deals with innovation vouchers..
- Low level of collaboration between SMEs and academia: Direct collaboration between industry and academia, especially the use of research centers and laboratories is very weak. Universities tend to focus on teaching, with few exceptions.
- Lack of awareness and innovation culture: Innovative SMEs mentioned that company culture could be an obstacle to innovation. More generally, there is a limited recognition of innovative activities.
- Lack of management skills: There are only few innovators which take in consideration the commercialization of the product or developing line production. A significant problem is the lack of management skills and business knowledge of innovators.

## **3. Conclusions**

Based on the above mentioned barriers for innovation of the business sector several recommendation are noted:

### **A. Education and access to knowledge**

- Employment Flexibility – Introduction of Innovation Assistants: Allowing the Universities (especially Engineering Faculties) to employee Research assistants – that will have main obligations in the process of R&D and technology transfer and not teaching.
- Accounting system: Training of accounting staff in order to recognise and register real R&D costs in the companies.
- Innovation experts/consultants: Train more Innovation experts (topics like: new product development, new markets exploitation, new processes development, etc.) and use them to strength innovation voucher schemes.
- Increase Macedonian participation in EU innovation related projects: Strengthen the capacities of Macedonian Chambers of commerce, Clusters, Business networks, Universities with tailored training for participation in FP7, CIP, COST, and other programs; and provide links with international community.

- Support National Competitions for Most Innovative Business Plan: organised for University students and research staff.

#### **B. Governmental interventions:**

- **Tax Policy:** Introducing specific, stimulative tax policies aimed to support research, development and innovation activities at the companies; e.g.
- Correlate tax deduction with purchasing of R&D equipment,
- Correlate tax deduction with conducted innovation related training in the company,
- Correlate tax deduction with part-time employment of R&D staff from the universities, etc.
- **Financial Policy:**
- Promotion of proper financial tools and services to sustain research, development and innovation activities within enterprise, with focus on venture capital;
- Development of innovation/patent fund that will support commercialization of inventions.

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# Workplace Security and Willingness to Start Own Business

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In this paper it is examined whether the workplace security has an important influence on decision to become an entrepreneur or taking the risk to start own business. The definition for the entrepreneur is a starting point for this research approach. The entrepreneur is a person who owns or manages business enterprises that makes money through risk and initiative. Here variables like: age, gender, education, position within the firm, workplace security, nationality, public/private sector, have been matched with the willingness to start own business. The general question is: If there's a possibility to get a strong financial support for opening your own business, how willing would you be to start it? The data has been analyzed on bi-variance level. The entrepreneurship literature examined social factors that influence decisions to become an entrepreneur like: access to information and resources (Gompers, Lerner and Scharfstein, 2005; Lerner and Malmendier, 2008), the role of social networks and knowledge to run a business (Gianneti and Simonov, 2009), the role of workplace peers (Nanda, Sorensen, 2008). In this paper the focus is on important form of social influence, especially in the less developed countries with the high percent of unemployment that has not received much attention in the entrepreneurship literature- the role of workplace security in influencing the decision to become an entrepreneur. According to Schumpeter, an entrepreneur innovates, introduces new technologies, increases efficiency, productivity, or generate new products or ideas, the question that has been raised here is: Is the workplace security, factor that slow down entrepreneurial spirit and indirectly deprive society from innovation?

## Keywords

Entrepreneur, innovation, risk taking, social factors, workplace security.

## 1. Introduction and Theoretical Background

Governments see entrepreneurs as the drivers of new job creation, accordingly the policy makers have focused on promotion of entrepreneurship in recent years (Kanniainen and Keuschnigg 2004). This initiative comes from the belief that entrepreneurial activities are associated with the creation of wealth, technological innovation, and increased social welfare. When tracing the development of entrepreneurial concept in the literature it becomes clear that researchers look at this phenomenon from different perspectives, one coping with definition from prism of economy, sociology, management, physiology, other with circumstances, opportunities and barriers that influence development of entrepreneurs.

In this paper it is examined whether the workplace security has an influence on decision to become an entrepreneur or taking the risk to start own business. We focus on an important form of social influence that has not received much attention in the entrepreneurial literature- the role of workplace security and influence on decision to start own business. This approach is important and interesting especially for the less development countries from the ex socialist/communist bloc which are usually with high rate of unemployment. The private ownership was one crucial difference between capitalist and ex socialist /communist countries. In the ex socialist /communist countries where private ownership were not allowed, strongly influenced on development on entrepreneurs, or with other words mostly blocked entrepreneurs. In the old regime, only few small private enterprises were officially tolerated to some degree (Hungary, Poland, Ex Yugoslavia and West Germany). Further expansion of these enterprises was impossible without attracting attention of the authorities, who often imposed additional discretionary taxes on private entrepreneurs who grew too big. The purpose of these taxes was to ruin them and to drive them out of business (Kozminski, 1993: 123). This is a hard culture legacy that influence risk taking for starting own business in this countries. It reflects in the mind of people that risk taking for starting own business is futile and mostly ends with the disaster. After the changes of political system that reflects into the change of economic system , from contract to market economy , for the most of the citizens that were part of the working force, it was more safely to search for work in state or public administration, instead to open own business. According to the ex socialist /communist country statistics, this sector even today is over employed. Taking into consideration that one of the fundamental driving activities of entrepreneur is to achieve the dream of private kingdom (Schumpeter 1934) than we can make conclusion that for this part of the world even the dormitory room is not build that will provide the conditions to place the beds where people can dream of private kingdom. Although theorists disagree over exact definition, entrepreneurs are widely considered to be attracted to risky ventures that promise above average profit and growth (d'Amboise and Muldowney 1988). Risk taking seems to be common denominator to most definition of entrepreneurship.

The entrepreneurship literature examined social factors that influence decisions to become an entrepreneur like: access to information and resources (Gompers, Lerner and Scharfstein, 2005; Lerner and Malmendier, 2008), the role of social networks and knowledge to run a business (Gianneti and Simonov, 2009), the role of workplace peers (Nanda, Sorensen, 2008).

Gompers, Kovner, Lerner, Scharfstein (2009) in the resent research show that entrepreneurs with a track record of success are much likely to succeed than first time entrepreneurs and those who have previously failed . Successful entrepreneurs have an attribute of persistence in selecting the right industry and time to start new venture. In this way, success breeds success and strengths performance persistence.

Gianneti and Simonov (2009), show that individuals residing in highly entrepreneurial neighborhoods are more likely to become entrepreneurs and invest more into their own businesses, even though their entrepreneurial profits are lower and their alternative job opportunities more attractive. Their results suggest that peer effects create nonpecuniary benefits from entrepreneurial activity and play an important role in the decision to become an entrepreneur.

Nanda, Sorensen (2008) concludes that coworkers can increase likelihood that an individual will perceive entrepreneurial opportunities as well as increase his or her motivation to pursue those opportunities. They find that an individual is more likely to become an entrepreneur if his or her co-workers have been entrepreneurs before.

In this study we make an attempt to measure entrepreneurial orientation in the correlation with job security. The question that has been raised here is: Is the work security, factor that slow down entrepreneurial spirit and indirectly deprive society from innovation? Consistent with this assertion, cross-national studies (Djankov et al. 2002) suggest that nations with greater barriers to entry of new firms also have poorer-functioning and more corrupt

economies. Having in mind that private sector has less workplace security than public sector in the Republic of Macedonia we made cross tabulation with the willingness to start own business between this two sectors. Between three and five of the dimensions of autonomy, innovativeness, competitive aggressiveness, risk-taking, and proactiveness have subsequently been used by researchers to measure the term 'entrepreneurial orientation', (including Covin and Slevin, 1989; Naman and Slevin, 1993; Richard et al, 2004). Autonomy relates to the actions of individuals or teams in establishing new business concepts or visions (Lyon et al, 2000); innovativeness reflects a willingness to promote new ideas, novelty and creative solutions (Richard et al, 2004); competitive aggressiveness is concerned with the intensity of the combative posture adopted by firms reacting to competitive trends and market demands (Lyon et al, 2000); risk-taking concerns a propensity to take business-related chances with regard to strategic actions when faced with uncertainty (Richard et al, 2004), and proactiveness refers to a initiative in seizing opportunities in the marketplace (Lumpkin and Dess, 2001). The two dimensions of entrepreneurial orientation - autonomy and risk-taking - are used in this study. The dimension of autonomy has been measured with general question: "If there's a possibility to get a strong financial support for opening your own business, how willing would you be to start it?", and the dimension of risk taking has been measured through the presence of the job insecurity factors, as they are: threat of unpredicted work related changes; threat of unbearable job tasks enlargement; threat of being fired; threat of being unemployed.

## **2. Methodology**

### **2.1. Research sample**

The research sample is purposive and designed by the following criteria: (a) first line, middle and top managers; (b) in medium and large size organizations; (c) from transport, culture and health service; (d) working in public and private sector in Republic of Macedonia. It's consisted of 126 respondents/managers, from both sectors proportionally. The sample is considered to be relevant as managers are the most adequate people who possess the knowledge, skills and competences to start up and lead a business by their own.

### **2.2. Research technique and data analysis**

Primary data was collected by questionnaire developed for the needs of the research. Data was analyzed by SPSS, generally on bi-variant level, by cross tabulations, testing the Chi-square values and correlations.

## **3. Results**

The data analysis verify the main research hypothesis,

Hypothesis 1: Workplace security influence the willingness to start up own business.

Results confirm the existence of positive correlation ( $p < 0,01$ ) between job insecurity and willingness to start up own business (table 1), meaning that as the job insecurity grows, also the willingness to start up own business increases.

The results shown in the table below also confirm the existence of difference toward starting up own business willingness, between managers who work in public and private sector in Macedonia, which confirms the second hypothesis,

Hypothesis 2: There is difference toward starting up own business willingness based by the sector of employment (public vs. private).

**Table 1** Correlation between job insecurity and starting up own business willingness**Correlations**

		Job insecurity makes planning for the future impossible	Are you willing to start up your own business?
Job insecurity makes planning for the future impossible	Pearson Correlation	1	,237**
	Sig. (2-tailed)	,	,007
	N	126	126
Are you willing to start up your own business?	Pearson Correlation	,237**	1
	Sig. (2-tailed)	,007	,
	N	126	126

\*\* . Correlation is significant at the 0.01 level (2-tailed).

**Table 2** Difference toward starting up own business willingness: cross tabulation by public/private sector

**Employed in \* Are you willing to start up your own business?**  
**Crosstabulation**

Count		Are you willing to start up your own business?		Total
		Yes	No	
Employed in	Public sector	12	51	63
	Private sector	30	33	63
Total		42	84	126

The results from table 2 show that managers from private sector are more likely to start up their own business, or at least they are thinking about it, than their counterparts from public sector ( $p < 0,01$ ).

As the general hypothesis states that this kind of entrepreneurship initiative is mostly due of the job insecurity, and unpredictability of the future working plans, there were cross tabulations made about the factors of insecurity in both, public and private sector.

Results confirm the existence of the following factors of insecurity in managers from private sector:

- Threat of being fired ( $p < 0,01$ )
- Threat of being unemployed ( $p < 0,01$ )
- Threat of becoming incapable for work ( $p < 0,05$ )
- Threat of unpredicted changes ( $p < 0,01$ )
- Threat of unbearable job tasks enlargement ( $p < 0,01$ )

That confirms the next research hypothesis,

Hypothesis 3: The workplace insecurity in private sector is higher than the workplace insecurity in public sector.



Also the data analysis (table 3) discovered that there are gender differences toward the starting up own business willingness ( $p < 0,05$ ), which confirms the last hypothesis:

Hypothesis 4: There is difference toward starting up own business willingness based by the gender (male vs. female).

**Table 3** Difference toward starting up own business initiative: cross tabulation by gender

**Gender \* Are you willing to start up your own business?**  
**Crosstabulation**

Count		Are you willing to start up your own business?		Total
		Yes	No	
Gender	male	26	35	61
	female	16	49	65
Total		42	84	126

Results show that male managers are more likely to start up their own business, than female managers.

No other significant associations or correlation between willingness to start up own business and other variables as they are: age; educational degree; nationality; position in the firm; were registered by the data analysis.

## 4. Conclusions

The research paper successfully explains and confirms the relationship between workplace security and willingness to start up an own business. The results of the study confirm that there is positive correlation between the workplace insecurity and business start up initiative. As defined through the dimensions of the entrepreneurial orientation conceptualization (autonomy and risk taking), that brings us to the conclusion that if one feels that he or she enjoys job security, will rarely think about the possibilities to start up an own business, keeping the well known status quo, but if the same person face with some factors of uncertainty, he/she will begin to take into consideration specific business - related individual strategic opportunities and actions. In this context, the workplace insecurity becomes a motivation for entrepreneurial activities, which makes the workplace security a barrier. The paper also confirms that people working in private sector are more likely to start up their own business because they face with higher job insecurity than people working in public sector. Gender also has an influence on the decision to start up a business, as the results show that man are more likely to become entrepreneurs than woman. This can maybe be explained by the traditional belief that woman's main role is taking care about the home/family, and having a secure job or not having a job at all, which doesn't mean that they would be less successful entrepreneurs if they just decide to take their chance.

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# Social Entrepreneurship is a Step Forward to High Human Development

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Social entrepreneurship last decade starts to be focal point of many EU, documents, commitments, reforms and legislation as well as USA and other developed countries, which marks the development of economy, not only by creating investment for profit, but the creation “social economy“, which includes cooperatives, nonprofit organizations, foundations and social enterprises that provide goods and services that create thousands of new jobs. Social entrepreneurship is entrepreneurship of individuals who devote their lives and work of social improvement and wellbeing. Social entrepreneurship means applying practical, innovative and sustainable approaches on behalf of the general benefit of the society, with particular emphasis on the marginalized, poor social groups of population in many fields of the society, especially in the health, education, human rights, labor rights, economic development, agriculture etc. These entrepreneurs with their business endeavor to alleviate poverty, with an entrepreneurial spirit and passion, with courage for new business and innovation, beyond traditional practices, and build strong and sustainable organization (whether profit or not). It may be noted that social entrepreneurs are entrepreneurs, business people with strong social responsibility and morality, and therefore economic science give them place as a special kind of entrepreneurs who are rewarded, recognized and appreciated. They have the big role in raising the level of human development in the world. In the Republic of Macedonia social entrepreneurship as a process is in the beginning of the legal frame, as a topic of economic policy and measures.

## Keywords

Innovation, Human development, Jobs, Macedonia, Social entrepreneurship

## 1. Introduction

Entrepreneurship, as a process of philosophy of business and creativeness, is important task of political and economic strategies, plans and documents all around the world, as a dynamic economic factor. 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.

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. Defining Social Entrepreneurship**

Social entrepreneurship is a particular form of entrepreneurship that is part of a wider idea of social economy. Social economy is a broad concept set around four types of organizations that we recognize nowadays: cooperatives, mutual societies, associations and foundations and social enterprises. [2]

Any definition of social entrepreneurship should reflect the need for a substitute for the market discipline that works for business entrepreneurs. We cannot assume that market discipline will automatically weed out social ventures that are not effectively and efficiently utilizing resources. The following definition combines an emphasis on discipline and accountability with the notions of value creation taken from Say, innovation and change agents from Schumpeter, pursuit of opportunity from Drucker, and resourcefulness from Stevenson. In brief, this definition can be stated as follows:

Social entrepreneurs play the role of change agents in the social sector, by:

- Adopting a mission to create and sustain social value (not just private value),
- Recognizing and relentlessly pursuing new opportunities to serve that mission,
- Engaging in a process of continuous innovation, adaptation, and learning,
- Acting boldly without being limited by resources currently in hand, and
- Exhibiting heightened accountability to the constituencies served and for the outcomes created.[3]

Social entrepreneurs don't have a monopoly on believable change. Social movements, enlightened business and progressive governments can also drive believable change. But the social entrepreneur takes a unique approach. Social entrepreneurs look for opportunities to create social value, uncover the best approaches for realizing those opportunities, and build "social capital." [4]

For social entrepreneurs, the social mission is explicit and central. This obviously affects how social entrepreneurs perceive and assess opportunities. Mission-related impact becomes the central criterion, not wealth creation. Wealth is just a means to an end for social entrepreneurs. With business entrepreneurs, wealth creation is a way of measuring value creation. This is because business entrepreneurs are subject to market discipline, which determines in large part whether they are creating value. If they do not shift resources to more economically productive uses, they tend to be driven out of business.

Social entrepreneurship is entrepreneurship of individuals who devote their lives and work of social improvement and wellbeing. Social entrepreneurship means applying practical, innovative and sustainable approaches on behalf of the general benefit of the society, with particular emphasis on the marginalized, poor social groups of population in many fields of

the society, especially in the health, education, human rights, labor rights, economic development, agriculture etc.

These entrepreneurs with their business endeavor to alleviate poverty, with an entrepreneurial spirit and passion, with courage for new business and innovation, beyond traditional practices, and build strong and sustainable organization (whether profit or not). It may be noted that social entrepreneurs are entrepreneurs, business people with strong social responsibility and morality, and therefore economic science give them place as a special kind of entrepreneurs who are rewarded, recognized and appreciated. They have the big role in raising the level of human development in the world.

Instead the focus is placed solely on financial income, these organizations show strong social functions, tend to focus on society questions are based on principles of solidarity and active citizenship. The social economy includes various cooperatives, associations, non-profit enterprises, societies for mutual aid, foundations, trusts, etc.

Social entrepreneurship is an expression of active role of nongovernmental sector (NGO) and all organizations, institutions and individuals, who make changes of society environment and climate for living and working honestly and human, in the welthfere, supported by governmental policy, very often.

Social entrepreneurship is entrepreneurship of individuals who devote their lives and work of social improvement and wellbeing. Social entrepreneurship means applying practical, innovative and sustainable approaches on behalf of the general benefit of the society, with particular emphasis on the marginalized, poor social groups. The term social entrepreneurship reflects access to economic and social problems, based on unique values and social processes all entrepreneurs, regardless of the area in which they function (health, education, human rights, labor rights, economic development, agriculture, manufacturing, art and design, etc.). These entrepreneurs with their business endeavor to alleviate poverty, entrepreneurial spirit and passion, with courage for new undertakings and business innovation beyond traditional practices, and build strong and sustainable organization (whether profit or not). Social entrepreneurs are entrepreneurs, business people with strong social responsibility and morality, and therefore science gives them special place in human development and social entrepreneurs, as a special kind of entrepreneurs, are rewarded, valued and affirmed and promoted as a "best practice" in the human activities devoted not only to the profit but to the human aspects of business activities, including social responsibility.

Nowadays, more than philanthropy ( is accepted as charity guests of well standing people), social entrepreneurship model means high level of filing for useful person and business activity, filing of working and earning with dignity and proud. The social enterprises are "weapon" in the global battle against poverty (which kills 22,000 people every day).

The terms as social enterprise/social entrepreneurship came into widespread use in the 1980s and 1990s, promoted by Bill Drayton the founder of "Public" in the USA.

A Nobel Peace Prize-winning economist in 1986 together with Grameen Bank, is famous for his two theories-microcredit and social business-and famous for his successful practical work through Grameen Bank that has already helped millions of poor women break the cycle of poverty in Bangladesh.

- Muhammad Yunus is that rare phenomenon, it is extraordinary example to help the helpless but honest people in the world all around who need a little help for survival through the work and respect from the community. The practice in the USA, Canada and other most developed countries in the world has significant contribution on this topic. [5] EU, to which strives for Macedonia to become its full member, characterized by acceptance of a series of documents, definitions, reforms and legislation, indicating the development of economy, not only by creating profit by investment but creating so called 'social' or 'social economy', which includes cooperatives, nonprofit organizations, foundations and social enterprises that provide goods and services and creating

thousands of new jobs.

Therefore, the Department of Industry and enterprises of the EU Commission, starting in 1989, begins with a serious task and activities, as a function of development and sustainability of socio-economic enterprises (social economy enterprises). As common characteristics of these enterprises highlighted the following:

- Contribute to the enrichment and development of market competition and strengthen solidarity and unity,
- Their primary goal is to get back capital, although naturally they are established for that purpose,
- They operate on the principle of solidarity and togetherness
- They are innovative and flexible
- Those based on active membership and responsibilities, and often on a voluntary basis.

EC of the EU, given the huge economic and social importance of these enterprises, and create appropriate policies to support and guarantee non-discriminatory attitude towards them, respecting their specific principles, methods of operation, needs, style of work in protection of health, rural development, consumer protection, protection of human environment. It should be noted the fact that the EU, these companies are about 2 million and represent about 10% of total businesses with about 11 million employees that it is about 6% of the active working population in the EU, of whom 70% are employed in nonprofit organizations, 26% in cooperatives, and other mixed or joint. Often it is micro and small enterprises, and joint policy support and assistance apply to them. The adopted Law on small businesses in June 2008, has the form and development, given the fact that in 2000 all major EU bodies, give proper weight to this part of the economy, held conferences, and already in 2008 year, the group of economic policy has been renamed the European society Economics (Social Economy Europe). The world is more prevalent international conferences [6] debated the term social economy, which is more prevalent and is elaborated [7] in terms of government policies for its promotion and support of the obstacles and opportunities for establishing social economic organizations. The authors, who advocate for greater recognition of social / social entrepreneurship, to promote more entrepreneurial-managerial approach (not just philanthropic), which provides qualitative and quantitative efficiency in producing goods and services with social impact, through the inclusion of marginal social groups (effective social inclusion). The role of continuing education is increased in order to attain the skills and knowledge to the individuals in the interest of social welfare and benefits. [8]

Official education system with its modern programs on one hand, and lifelong learning and education through adequate programs, on the other hand, can help raise the level of knowledge of the population. On the other hand, there is the financial component in this process that is very important. So, for example, Inter American Development Bank, assisted by a special program for socially entrepreneurship (The Social Entrepreneurship Program (SEP)) credits to be easily accessible for business people or entrepreneurs groups that have no access to them under commercial conditions in the capital market. The Bank provides loans and grants to private, nonprofit, and local or regional governmental organizations that provide financial, business, social and local development services for marginal groups of the population. The Bank finances these operations and activities through intermediary institutions that distribute funds to end users. According to latest data, 26 countries (from South and Central America), is available 10 mil.dollars annually for such projects that are handed out as loans to 1 million dollars and donations are given to 250,000 dollars. [9]

The Bank (with a capital of 48 countries) was founded in 1959 with the mission to support efforts of countries in Latin America and Caribbean countries (26), reducing poverty and inequality, while simultaneously and increase economic development component in these countries.

The Bank is a good example of bank as a “best practice” that supports sustainable economic development, and creating societies where the social component is not negligible, but

significant in the overall development in the interest of creating a social welfare or society with high levels of human development. In the process, social entrepreneurship has great role. But for its efficient development and its durability, it is necessary to develop awareness, especially through the education system, and development and sustainable institutions for its support.

On the Balkans region, the idea of developing and supporting social entrepreneurship, in terms of the still unfinished reforms, remains as a kind of 'utopia', although the social element was present in the socialist system of the past. The idea of incompatibility of the capitalism system and system of social enterprises, including social responsibility, is still present that need permanent education and promotion, supported by a strong and consistent government policy to overcome these wrong opinions and attitudes.

### **3. Social Entrepreneurship in Macedonia**

The Republic of Macedonia has adopted all relevant documents (strategy, long term program, annual programs etc.) in last 15 years, which shows devotion of the governmental bodies for entrepreneurship development as a main key issue in dynamic economic growth and sustainable development. In spite the fact that the relevant documents and legislatives are accepted, institutional infrastructure for SMEs support is on the insufficient level as well as financial support, especially lack of micro legislation in the field of establishment crediting and credit guarantee schemes.

Social entrepreneurship is still at the beginning of the process of affirmation and promotion is spite the fact that the Law for foundation and association<sup>57</sup> is in force, on NGO remarks that work against the government (generally) without any meaning or role in entrepreneurship. Even now, the donations from the foreign donors are reduced, and NGO have no important role in the society as it should be related to the entrepreneurship aspect.

#### ***3.1. Some initial aspects of Macedonian social entrepreneurship and Human Development Index***

In Macedonia was conducted a study on the topic: social entrepreneurship-potential for further development in 2011. The starting hypothesis was that there isn't a favourable framework for implementation of the concept of social enterprise. The Centre for Institutional Development from Macedonia in partnership with the Euclid Network from UK examined the "best practices" of social entrepreneurship in US and Europe and also investigated the potential for further promotion of the social enterprise as innovative business model with social aim in the Macedonian economy. They analysed the current macro-economic conditions in Macedonia and presented an overview of the existing environment for promotion of the social enterprise concept. Also, they assessed the level of understanding among the NGOs and businesses in Macedonia about the concept of social entrepreneurship as well as their attitudes, perception and opinions about relevant laws and problems they are facing during the implementation of the legislation related to the social enterprise or commercial activities of civil society organizations. At the moment in Macedonia there is no specific legal framework regulating the work of a social enterprise, except the existing Law for association and foundation. [10] In meanwhile, the finance problems still are present and have biggest barriers on the way of entrepreneurship development.

Social enterprises nowadays are getting more attention of the governmental officials since they help to reduce the inequalities and increase social cohesion in a community. Some of the benefits for the country and society can be summarized as:

- Target social needs and use the "market" opportunities to create new social value

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<sup>57</sup> Law for association and foundation, adopted in 1996, and changed at 2010/52 number of official Gazette

- Use and generate social innovation to create social capital
- Provision and delivery of low cost social products/services
- Targeting social problems and social groups, especially those that are not prioritized by government or are “not attractive” for the traditional business sector
- Use the multi-stakeholder dialog and involve stakeholders in their work
- Support the reintegration of people with difficulties into labour market as well generate jobs for marginalized and excluded people [11]

The 2008 Report “Entrepreneurship in Macedonia” prepared by the Global Entrepreneurship Monitor about the perceptions and attitudes on entrepreneurship run on 2000 respondents between the age 18-64, showed that in Macedonia there is a positive perception about entrepreneurship and moreover Macedonia showed highest entrepreneurial activity from the countries in Europe where this study was undertaken. Entrepreneurship is considered as a good career choice by 80 % of the respondents; 40 % said that were ready to start business activity in the next 3 years and only 35 % had a fear of failure that can prevent them from starting a business. The main motivation for entrepreneurship in Macedonia is the unemployment especially between the young people which means that willingness to grow the business (and get more profit) is less present. [12]

Currently in Macedonia there are 2 business incubators for young and innovative people that are very attractive with offer premises and borrowing money (initial seed money) including consultant services to the start-ups.

At the beginning of 2010, one of the most successful ICT companies in Macedonia, SEAVUS has opened the first ICT incubator as a unique case where a business is initiating a business incubator in its frame.

So far, social enterprises in Macedonia have been unknown to the financial institutions. This form of enterprises will be treated as the same as other business, which means that can, get a bank loan. If the social enterprise is established as non-governmental organization that doesn't have a property it would hardly be considered by the banks as eligible client for a loan. Alternatively, social enterprises, with a legal form of an association can be financed by using some other ways like their own saving, investments from informal investors, establishing a joint venture with already existing business, get a donation or grant.

In order to obtain primary data for the current conditions for development of social enterprises in Macedonia there were round table with experts, representatives of the government, Municipalities and civil society sector and field research through focus groups and interviews with the representatives from the civil society sector, business sector and government. Also, some positive examples of CSO with economic activities were shown as good practices for the community and motivation for new social enterprises.

Conclusions of the study on social entrepreneurship in Macedonia say that we should raise the stakeholder's awareness on importance of social enterprises, improve the legal framework, develop more favourable fiscal framework, and create supportive structures. Since only one study was made so far on the subject in Macedonia, it is expected there more research should be done in this field to complement the current ideas and advices given from the first study.

The last data shows that Macedonia with more than 30 % of unemployment and poverty rate, in last years, has a dissent place in the world Human Development Index (HDI) which means “middle developed country”. [13] Actually, in 2008 the HDI shows that Macedonia is on 72 places in the world, but in 2011 the place is worse and Macedonia is on the 78 place of rang list of HDI. It seems to be result of reducing of GNI(Gross National Income), according to the unemployment.



HDI<sup>58</sup> as a complex index is relevant indicator that the authorities should have more understanding including application of relevant models and instruments for support SMEs and entrepreneurship as a key component for economic development, new jobs and alleviation of poverty.

## Conclusions

Social entrepreneurship is entrepreneurship of individuals who devote their lives and work of social improvement and wellbeing. Social entrepreneurship means applying practical, innovative and sustainable approaches on behalf of the general benefit of the society, with particular emphasis on the marginalized, poor social groups of population in many fields of the society, especially in the health, education, human rights, labor rights, economic development, agriculture etc.

It may be noted that social entrepreneurs are entrepreneurs, business people with strong social responsibility and morality, and therefore economic science give them place as a special kind of entrepreneurs who are rewarded, recognized and appreciated. They have the big role in raising the level of human development in the world.

So far, social enterprises in Macedonia have been unknown to the financial institutions. Also, at the moment in Macedonia there is no specific legal framework regulating the work of a social enterprise. Conclusions of the study on social entrepreneurship in Macedonia said that we should raise the stakeholder's awareness on importance of social enterprises, improve the legal framework, develop more favourable fiscal framework, and create supportive structures. In near future more research should be conducted on the topic of social entrepreneurship in order to raise the awareness of the importance of social enterprises and the benefits that they offer for Macedonia.

From the other hand, the authorities have to find solution for application of micro crediting model and social entrepreneurs support model as an important part of support activities for creation of new jobs and raising the welfare (high human development) of the Macedonian society.

The priorities in the future for Macedonian economy are:

- Micro financing (and credit guarantee scheme);
- Legal, institutional and financial support for social entrepreneurship,
- Consistent support (financial education, consultancy, institutional) for SMEs and entrepreneurship.

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<sup>58</sup> HDI is result of 3 main components:

- A long and healthy life: Life expectancy at birth
- Education index: Mean years of schooling and Expected years of schooling
- A decent standard of living: GNI per capita in US\$

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# Innovation Policy in Croatia, Slovenia and Finland: Towards Multiple ‘Best Practices’?

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Although innovation policy is generally recognised to be vitally important, few countries in Europe have developed and implemented adequate evaluation practices related to innovation policies and programmes; since the use of evaluation varies very much from country to country, one may talk about different “evaluation cultures”. Moreover, evaluation is burdened by a trade-off between complexity of evaluation (which is also related to the respect towards economic, institutional, cultural and other differences) and comparability of evaluation results across countries. The more complex an evaluation becomes, the less likely it is that its results will be easily comparable or transferable to other countries. Given the difficulties in defining ‘good’ or ‘best’ practices, the exchange of experiences and evaluation results is hindered. Consequently, it is reasonable and relevant to define and analyse in detail innovation policy in a smaller group of relatively similar countries at different levels of innovation performance, overall economic development and EU integration. This paper aims to tackle innovation policy in Croatia, Slovenia and Finland. All of them are small peripheral European countries; two of them (Croatia and Slovenia) have largely shared institutional background, whereas the third one (Finland) is perceived as a global innovation leader with a particularly strong culture of evaluation related to innovation policy (cf. Ministry of Education of Finland, 2009). When it comes to classification of these countries within the Innovation Union Scoreboard framework (IUS, 2011), Finland is classified as innovation leader, Slovenia as innovation follower and Croatia as moderate innovator – i.e. they occupy three adjoining ranks. Hereby the policy objective of Finland is to preserve its leading role, whereas policymakers in Slovenia and Croatia aim at improving innovation performance. The paper thus proposes to obtain a deeper insight into effectiveness of innovation policy and its best practices through an analysis of these three cases. Finland is analysed as a developed EU economy which is often used as a best practice example of effective knowledge-based development (innovation leader). Slovenia is viewed as a new EU member state with that aims towards developing a knowledge-based economy (innovation follower). Croatia is analysed as an accession country which has been developing innovation policy while lagging behind in terms of competitiveness and EU accession (moderate innovator). The research indicated that there are common elements of the innovation policy mix which are necessary prerequisites for its effectiveness. Furthermore, specific characteristics of an effective innovation policy depend upon its institutional environment, financial system and industrial structure. Finally, the complexity of innovation policy increases with the differentiation of the national innovation system.

## **Keywords**

Innovation policy, Evaluation, Croatia, Slovenia, Finland

## 1. Introduction

Effective policy development and implementation require incorporation of monitoring and evaluation into policy processes; that also enables learning and appropriate policy adjustments. Evaluation can be defined as systematic assessment of a programme to determine how far it is meeting its objectives, whether it is meeting these objectives efficiently and effectively and how the management structures (and other factors) have shaped these results (EU Innovation, 2005). Innovation processes are complex, systemic and pervasive, whereas the history of innovation policy is relatively short (in general and in particular in the countries of Central and Eastern Europe). Therefore, it is not surprising that the evaluation of innovation policies, programmes and measures has not been developed and implemented in a comprehensive and coherent way. The obstacles to evaluation include the lack of evaluation culture and resources – both of which are necessary to promote more systematic evaluation of innovation programmes – and to make sure that the lessons of evaluations are learned and built into policymaking. Although EU programmes play a role in innovation policy, the majority of programmes and measures are developed and implemented at national and regional levels. Evaluation exercises are usually performed at the national level and/or using the data collected at the national level. The time horizon of the analysis may range from ex-ante evaluation to monitoring and ex-post evaluation.

Some of evaluation instruments are comparable across Europe. These include Innovation Union Scoreboard (IUS) (previously named European Innovation Scoreboard) and the Innobarometer. The EIS attempts to benchmark, on a yearly basis, the innovation performance of Member States, drawing on statistics from a variety of sources, primarily the Community Innovation Survey. The Innobarometer complements the results of the IUS by analysing specific aspects of innovation through a survey of 3,500 randomly selected companies in the EU. The initiatives such as INNO-Policy TrendChart and ERAWATCH have also played an important role by providing comparable reports on innovation policy developments in different countries.

In some EU countries (including Slovenia and Finland) analyses and evaluations of national innovation systems have been performed (e.g. Ministry of Education of Finland, 2009, Bučar, Jaklič and Udovič, 2010). However, such analyses usually display a trade-off between comparability and respect to particularities of specific innovation systems and policies. Such case studies may encompass three different levels: evaluation of innovation programmes; evaluation of innovation agencies; evaluation of the institutional mix of programmes, agencies and competitive environment measures (EU Innovation, 2005).

Finally, there is econometric literature dealing with determinants of innovation activities (e.g. Boia et al., 2003, Aralica et al., 2008) or effects on subsidies on innovation activities (e.g. Hujer and Radić, 2005, Takalo et al., 2008). This stream of research relies on data provided through the Community Innovation Survey or national innovation agencies.

## 2. Improving evaluation methodology and moving towards best practice(s)

Although innovation policy is generally recognised to be vitally important, few countries in Europe have developed and implemented adequate evaluation practices related to innovation policies and programmes; since the use of evaluation varies very much from country to country, one may talk about different “evaluation cultures” (EU Innovation, 2005). Moreover, evaluation is burdened by a trade-off between complexity of evaluation (which is also related to the respect towards economic, institutional, cultural and other differences) and comparability of evaluation results across countries. The more complex an evaluation becomes, the less likely it is that its results will be easily comparable or transferable to other

countries. Given the difficulties in defining 'good' or 'best' practices, the exchange of experiences and evaluation results is hindered.

Consequently, it is reasonable and relevant to define and analyse in detail innovation policy in a smaller group of relatively similar countries at different levels of innovation performance, overall economic development and EU integration. This paper is an initial step in this direction. It aims to tackle innovation policy in Croatia, Slovenia and Finland. All of them are small peripheral European countries; two of them (Croatia and Slovenia) have largely shared institutional background, whereas the third one (Finland) is perceived as a global innovation leader with a particularly strong culture of evaluation related to innovation policy (cf. Ministry of Education of Finland, 2009). When it comes to classification of these countries within the Innovation Union Scoreboard framework (IUS, 2011), Finland is classified as innovation leader, Slovenia as innovation follower and Croatia as moderate innovator – i.e. they occupy three adjoining ranks. Hereby the policy objective of Finland is to preserve its leading role, whereas policymakers in Slovenia and Croatia aim at improving innovation performance. It is useful to obtain a deeper insight into effectiveness of innovation policy and its best practices through an analysis of these three cases:

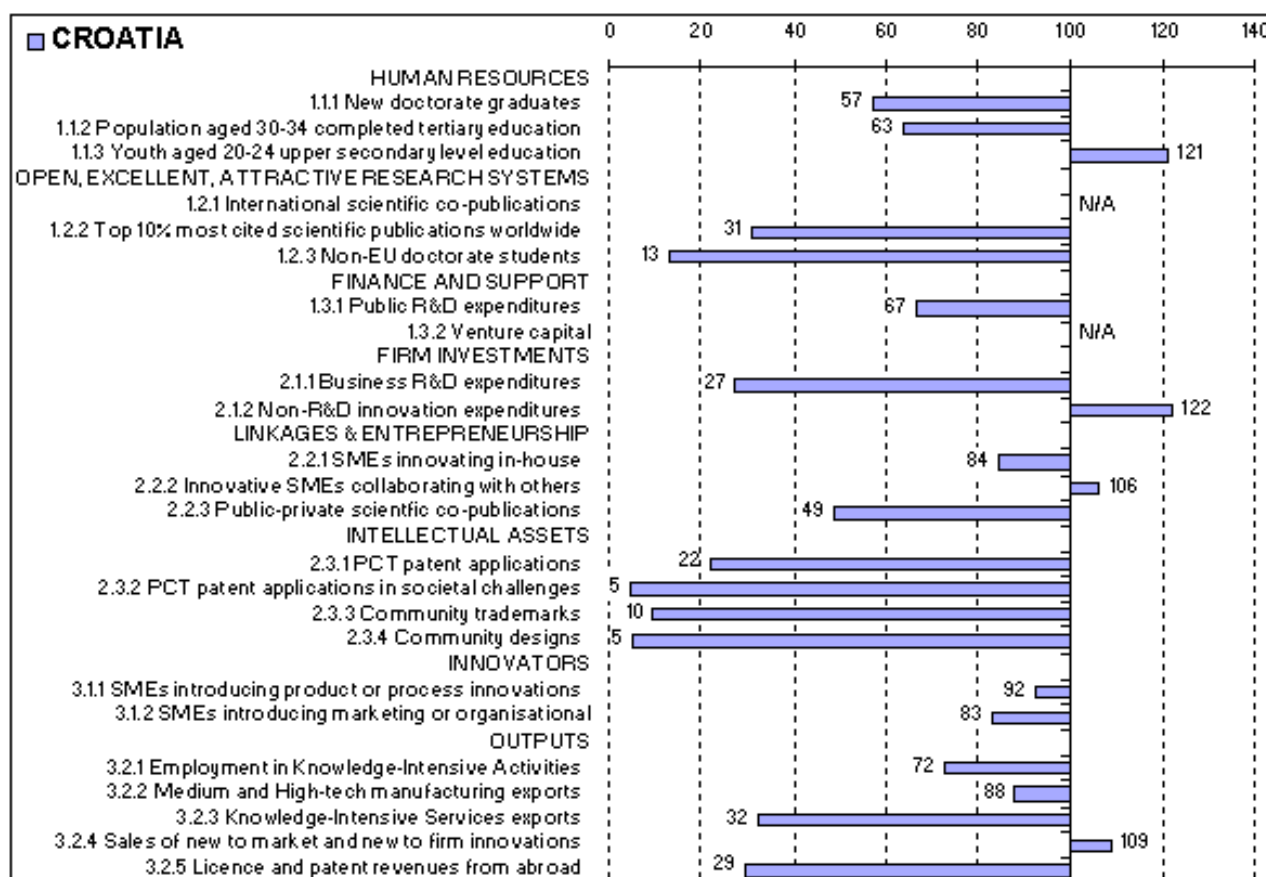
- Finland: a developed EU economy which is often used as a best practice example of effective knowledge-based development (innovation leader)
- Slovenia: a new EU member state with that aims towards developing a knowledge-based economy (innovation follower)
- Croatia: a candidate country which has been developing innovation policy while lagging behind in terms of competitiveness and EU accession (moderate innovator).

### **3. Croatia**

Croatia has been gradually developing its innovation policy since 2001 – with most key policy measures being developed by 2006. However, its lagging position in terms of EU accession (it will join the European Union in mid-2013) have meant a lower degree of internationalisation and reliance on limited domestic financial, human and other resources, which also limited the effects of innovation policy.

The financial and economic crisis reduced the total R&D expenditure in 2009 to 0.83% of GDP from 0.9% of GDP in 2008. The public resources for R&D in 2009 have also slightly decreased compared to 2008 and amounted to 0.43% of GDP which is far from the Barcelona target of 1% of GDP of public resources for R&D. Business R&D expenditures are decreasing even more drastically. In 2009, the business sector investments in R&D have decreased in comparison to the previous year (from 44.2% of GERD in 2008 to 40.4% of GERD in 2009), whereas its total investments in R&D amounted to 0.34% of GDP (0.40 % in 2008).

In the context of the 2010 Innovation Union Scoreboard, Croatia is one of the moderate innovators with a below average performance. Relative strengths are in Human resources, Innovators and Outputs. Relative weaknesses are in Open, excellent and attractive research systems and Intellectual assets (IUS, 2011).



**Figure 1** Indicator values relative to the EU27 in Croatia (EU27=100)

Source: PRO INNO Europe (2011). *Innovation Union Scoreboard 2010: The Innovation Union's performance scoreboard for Research and Innovation* [online]. Brussels: EC - Directorate General Enterprise and Industry. Available at: <http://www.proinno-europe.eu/inno-metrics/page/ius-2010> [20.01.2012]

Despite the expiration of the Science and Technology Policy 2006 – 2010, no new strategic documents have been developed to replace it. The major characteristics and measures related to innovation policy continue, but, in the context of economic crisis, the policy debate related to innovation has been scarce. The changes to innovation policy which have been implemented (i.e. introduction of the Proof of Concept incentives) have not affected its overall orientation in a major way – they mostly complemented the existing measures and structures. Economic crisis led to significant budget reductions. There were no new policy priorities introduced. No comprehensive evaluations have been performed. There have been no significant changes in the responsibilities of governmental bodies that define and implement innovation policy. Innovation governance in Croatia is insufficiently developed. Policy coordination needs to be improved as well.

In the current policy mix both direct (grants) and indirect (e.g. tax incentives) innovation policy measures are in place. The main types of measures include financial support (e.g. grants for pre-commercial research and innovation commercialisation) and actions to improve the functioning of institutions which affect innovation processes and performance (e.g. intellectual property rights, financial markets, including venture capital, setting up firms, regulatory reforms etc.), with some resources devoted to funding of innovation infrastructure and intermediary institutions. Demand-side innovation policies have not been implemented. The structure of policy measures is relatively simple and the procedures well-developed, but

the measures are usually underfunded and their effects are still not systematically evaluated. The main innovation policy challenges include access to capital, increasing business R&D expenditures as a means to enhance accessibility of knowledge, and facilitation of protection of intellectual property.

The main innovation policy opportunities include utilisation of pre-accession assistance and Community Programmes in order to build up competencies and prepare for the utilisation of structural funds, which will provide a major impetus to all beneficiaries of innovation policy measures. The reform of academic institutions and enhanced networking can create more opportunities for science-industry collaboration, technology transfer and innovation development.

## **4. Slovenia**

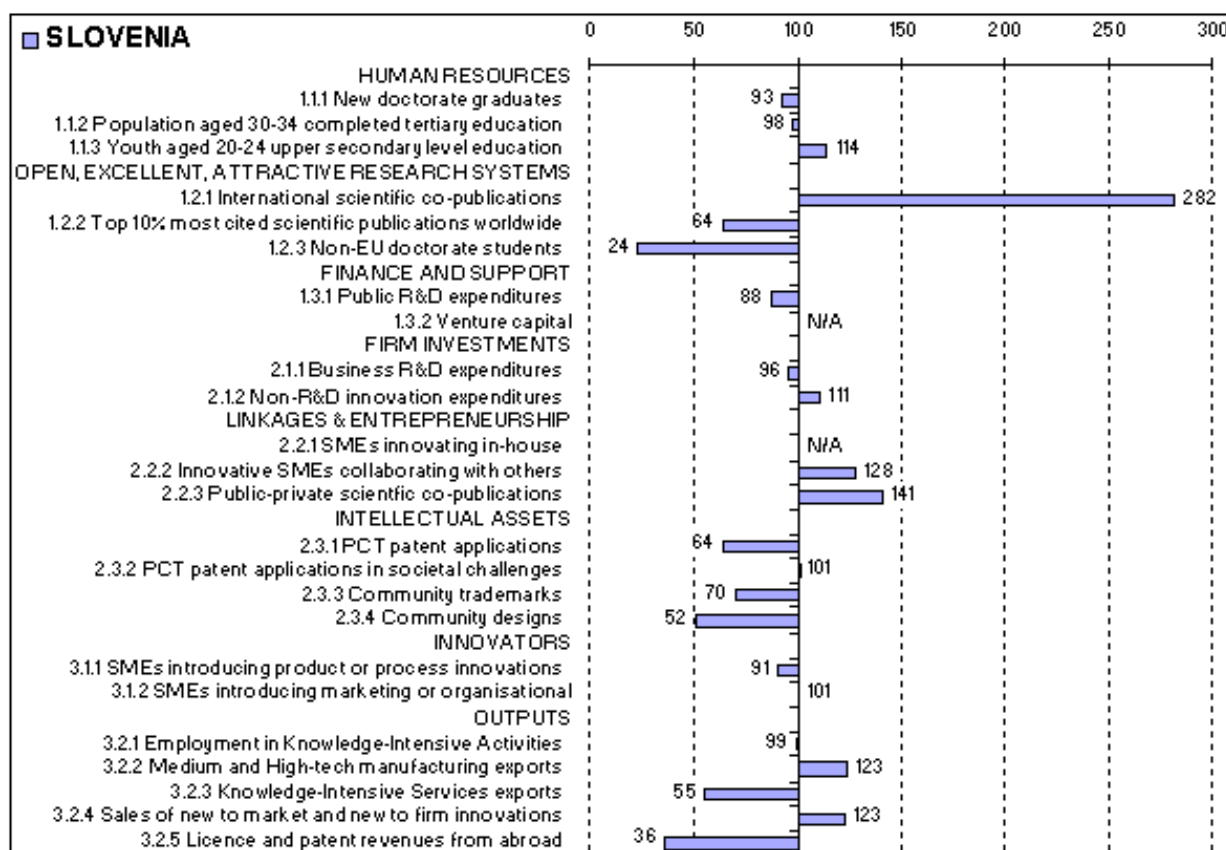
Slovenian innovation system has evolved through a complex relationship of relatively strong public R&D sector, increasing presence of business R&D and innovation and development of institutional set-up and governance mechanisms (cf. Bučar, Jaklič and Udovič, 2010).

Policy learning has occurred over the transition period (including joining of the EU in 2004), and R&D and innovation are well integrated into key policy documents (e.g. Slovenian Development Strategy and National Research and Development Programme). Institutional setup is complex and well-developed, but its effectiveness and the level of coordination among different institutions could be improved. EU accession brought about not only a more complex governance frameworks, but also increases in public R&D and innovation resources; availability of EU funds played a crucial role. Increased competitive pressures coupled with industrial restructuring facilitated business investments into R&D and innovation.

Slovenia is slowly, but steadily improving its innovation performance but in recent years catching up with more advanced countries becomes a more challenging task – both due to economic crisis and internal shortcomings of the national innovation system. However, good performance in R&D input indicators, where Slovenia scores relatively well, is not always matched by adequate outputs, such as the proportion of innovative firms and high technology exports and the number of patents. This indicates that the innovation activities and policy measures could be more effective and efficient.

In 2009, GERD continued its positive trend and accounted for 1.86% of GDP, with increases recorded in higher education and business enterprise sectors. Business sector participated in GERD with 58% of overall sources of funding R&D, whereas the government sector participated with 36% (ERAWATCH, 2011b).

Slovenian innovation performance is just below the EU27 average with rate of improvement above that of the EU27, as evaluated by the IUS (2011). Relative strengths, compared to the country's average performance, are in Human resources, Finance and support and Innovators, while relative weaknesses can be identified in Firm investments and Intellectual assets (IUS, 2011).



**Figure 2** Indicator values relative to the EU27 in Slovenia (EU27=100)

Source: PRO INNO Europe (2011). *Innovation Union Scoreboard 2010: The Innovation Union's performance scoreboard for Research and Innovation* [online]. Brussels: EC - Directorate General Enterprise and Industry. Available at: <http://www.proinno-europe.eu/inno-metrics/page/ius-2010> [20.01.2012]

## 5. Finland

Innovation performance and innovation policies of Finland are regularly assessed as exemplary in the European context. Finland belongs to the group of innovation leaders, together with Sweden, Denmark, Germany and Switzerland. Its complex institutional features, high availability of private and public resources for R&D and innovation, strong networking of all actors (including companies and academic institutions), a high degree of internationalisation and developed evaluation culture all contribute to high performance of the national innovation system and of the corresponding innovation policies (cf. ERAWATCH, 2011c).

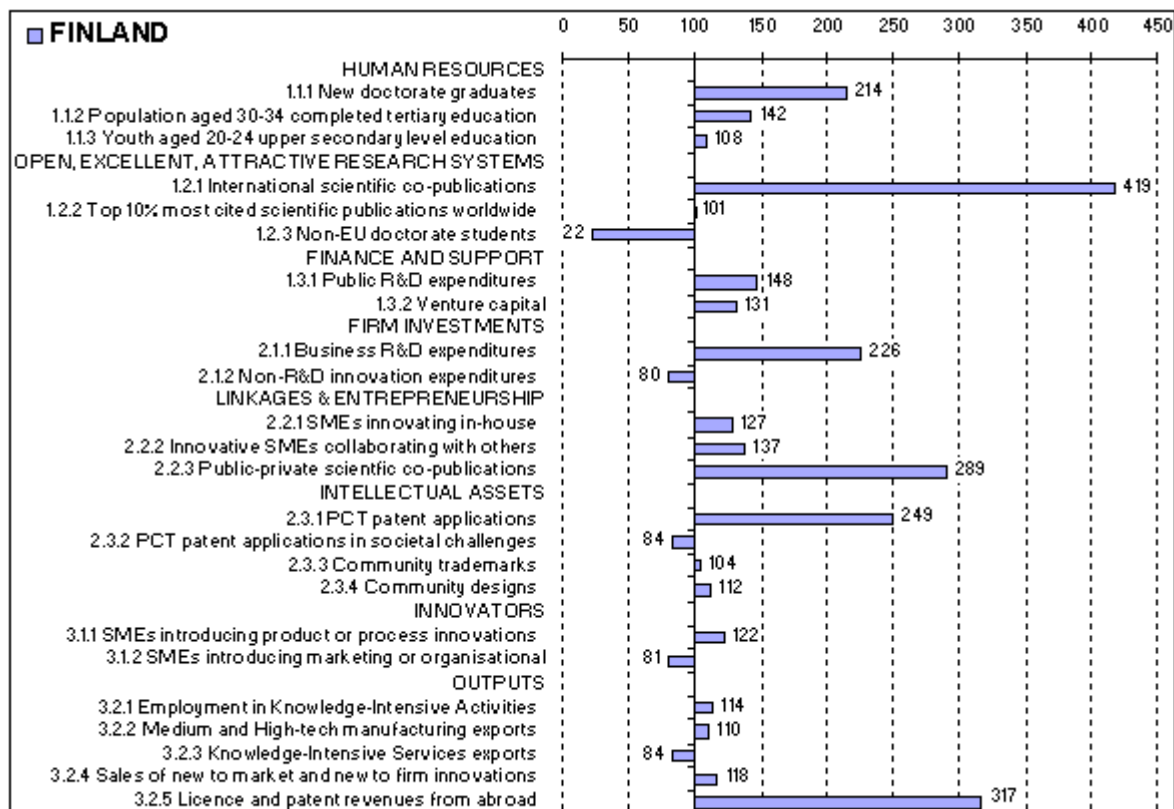
Innovation policy in Finland is firmly based on the national innovation strategy and widely shared commitment to providing adequate inputs based on excellence criteria; the policy also displays a high degree of adaptability and responsiveness to changing circumstances. For instance, policy response to the economic crisis entailed a strong increase in public R&D investments, which overshadowed a small decline in business expenditures on R&D and enabled GERD to reach almost 4% of GDP in 2009.

Having developed strong, highly internationalised and networked systems of innovation, with an emphasis on high technology sector, Finland aims to address new challenges, address some of its gaps and shortcomings and undertake reforms which will maintain its leading



position. The reforms tackle the national innovation strategy, higher education system and institutions, sectoral research, national infrastructure etc. (ERAWATCH, 2011c)

Finland is one of the innovation leaders with an above average performance. Since the 3% GERD/GDP target has been achieved a long time ago, the new target of 4% has been set in 2008. Relative strengths can be identified in the areas of Human resources, Finance and support and Linkages & entrepreneurship, while relative weaknesses are in Intellectual assets, Innovators and Outputs (IUS, 2011).



**Figure 3** Indicator values relative to the EU27 in Finland (EU27=100)

Source: PRO INNO Europe (2011). *Innovation Union Scoreboard 2010: The Innovation Union's performance scoreboard for Research and Innovation* [online]. Brussels: EC - Directorate General Enterprise and Industry. Available at: <http://www.proinno-europe.eu/inno-metrics/page/ius-2010> [20.01.2012]

## 6. Concluding Remarks

When Croatia, Slovenia and Finland are compared, one can observe an increasing complexity of innovation policies which corresponds to the complexity of corresponding innovation systems, competitiveness of national economies, availability of resources and the degree of internationalisation of innovation activities. Implementation of certain core features of innovation policy (related to the scope and funding of policy measures and capacity of institutions that implement them) enables the realisation of beneficial effects on the national innovation system – related to competitiveness, technological advancement and economic growth. Innovation policy can provide a contribution to development of the knowledge-based economy / society, but the effectiveness and efficiency of innovation policy depend upon its design and implementation – both of which need to take into account economic, institutional and technological peculiarities of particular countries, regions and sectors. Reaping of benefits of innovation policy requires its complementarity with the characteristics and

development patterns of national, regional and sectoral systems of innovation. Acknowledgement of these differences does not prevent policy learning from more effective examples abroad, but it necessitates a more careful use of the notion of 'best practice' and allows a possible plurality of 'best practices' dependent upon particular conditions in systems of innovation. Finally, the complexity of policy measures and implementation mechanisms is expected to evolve with the systems of innovation that are being addressed. However, even in the most complex national systems of innovation, the benefits of increased complexity of innovation policy cannot be extended indefinitely. This is due to fundamental uncertainty of innovation processes and the limits in absorption capacity of the actors within the national system of innovation.

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# The Consequences of Changes in Groundwater Levels in Costal Areas of the Sava River

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Changes in groundwater levels in recent years drastically affect the state of forests in the plain part of Serbia, which is especially evident around the river basin. That resulted in deterioration of forests, which are reflected in the reduction of existing tree species growth and change toward the creation of new forest communities, in places so far. The survey determined the causes of these phenomena and habitat conditions. We tested changes in groundwater levels of which essentially depends on the further development of forest communities, and determined measures to be taken in forest management and rehabilitation to improve their current situation. It is important to continue to decline in groundwater levels, which is particularly evident last 10 years. The decline in groundwater levels has long-term negative consequences on the real forest vegetation. In the forests of oak, ash, poplar and willow growth rate significantly decreases first, and later comes to the appearance of dry trees and other tree species. Determining the state cut vegetation, flora, fauna influenced by changes in groundwater levels occurred in coastal sites Save. The area of research includes Coastal River Basin, stretching from Ostruznica bridge over Ostruznica, Umka, Great Mostanica, Baric, Zabrezje, Obrenovac, Kupinovo, Obedska pond Orlac, Sabac, Sremska Mitrovica, Mačvanska Mitrovica, Zasavica delta of the river Bosut to delta of river Drina to river Sava. The investigation were made in period 2010-2011. It appears that the future management of the Sava river will require a much closer cooperation of all the basin states specially the cooperation of users organizations, and dependable real time information from all sectors and all parts of the basin should be made available.

## Keywords

Forest, Ecosystem, Sava River

## 1. Introduction

In the past, in Serbia there were large plains flooded by the Danube, Sava, Morava and other rivers. In the last decades, the regulation of the greatest part of river channels was carried out, and the flood plains were cut off by levees. The areas which are still flooded are the so-called forelands, i.e. unprotected areas. On flooded areas, especially at places where flood water remained for a long time, with a high level of water table, hygrophilous forest tree species appeared spontaneously: willow, poplar, narrow-leaved ash, etc. Autochthonous willows and poplars attained modest results in timber production. In the last decades, natural forests were replaced by poplar and willow clones. Generally, the clones produced an incomparably greater wood volume, both by quantity and by quality [1].

Changes in groundwater levels in recent years drastically affect the state of forests in the plain part of Serbia, which is especially evident around the river basin. That resulted in deterioration of forests, which are reflected in the reduction of existing tree species growth and change toward the creation of new forest communities, in places so far [2].

Without adequate protection of habitat does not have adequate protection of species and biodiversity at the genetic level. The concept of biodiversity habitat protection becomes a central unit. Habitat is defined as "a group of plants and animals (and other members of biocenosis), which together with the abiotic factors (soil, climate, water quality and quantity, etc..) represents a single functional unit [3].

Harmonization of national norms and standards in the field of environmental protection (nature and biodiversity protection ) with European and international standards came from obligations under ratified international conventions and the need for substantial involvement in international processes.

The main documents that define the initial elements of the habitat protection are:

- The Convention on Biological Diversity - CBD - UNCED, Rio de Janeiro, 1992
- Berne Convention - Council of Europe, Bern, 1972, and Habitat Directive - EU Habitats Directive 92/43/EEC.

Serbia habitat classification system is based on the EUNIS classification system. Habitats that are in the EUNIS system's kept the same names and codes, and the habitats that do not occur in this system EUNIS received new names and new codes, with the most reserved EUNIS's logic appointment. The new codes are integrated into EUNIS's classification system. Each habitat is received and the corresponding new code relevant to the national classification system [4].

Classification of habitats is an integral part of the system EUNIS (European Nature Information System), developed between the 1996th and 2001. by the European Centre for Nature Conservation and Biodiversity (ETC / NPB) for needs of the European Environment Agency (EEA). This classification was created in order to provide a universal and unified habitat classification for Europe.

For the purposes of EUNIS habitat classification term is defined as: "a place inhabited by plant and animal species, which is characterized primarily by physical characteristics (topography, plant and animal physiognomy, characteristics of land, air, water quality, etc..), then species of plants and animals that live there " .

EUNIS classification is actually a comprehensive database that provides a comprehensive typology of habitats of Europe: from natural to artificial, terrestrial and aquatic. Habitats are classified hierarchically, at certain levels and shall be marked with alphanumeric codes. Thus, for example, all marine habitats are in A, while B-J codes belong to different types of terrestrial habitats. Continue to follow the numerical divisions within each of these basic types.

To identify the types of habitats used sets of parameters and criteria. The parameters used to distinguish individual habitats, while the descriptive parameters (geomorphology, salinity, anthropogenic impacts, etc..) used to closer determine the properties under the each habitat.

Habitats are defined in relation to a particular scale. Most, but not all EUNIS habitats are actually biotopes, or areas with environmental conditions enough unique to support a characteristic combination of organisms that inhabit them. All EUNIS habitats (except the smallest) include at least 100 m<sup>2</sup>, while the upper limit is not determined. At the smallest scale can be described by the so-called "microhabitats" (which generally takes less than 1 m<sup>2</sup>, and is significant for some small invertebrates and lower plants). Examples of this are the dead trees from old growth forests, which are ideal habitat for many devastating species. On a larger scale habitats can be grouped into so-called "habitat complexes", which often occur in characteristic combination or as a individual mosaic of habitat types, which may be interdependent.

With the development of the classification, made the basis of parameters that includes the reference systems for climate, soil, water quality, vegetation, and physiographical elements characteristic or dominant plant and animal species. EUNIS classification is compatible with most other categories, including national.

The aim of formation of this system is just creating a reference database on species, habitats and areas that form the basis of the Birds Directive and Habitats Directive the Natura 2000 network and its sister EMERALD Network of the Bern Convention, and is used in the development of indicators (EEA Core Set and others) and create reports on the state of the environment. This paper presents Save Coastal habitats in the city of Belgrade.

## **2. Method and aim**

The question of forest survival in forelands has a great economic and especially ecological significance, as these are the areas in the vicinity of Belgrade (Fig. 1). The research was carried out on a large number of bio ecological profiles, from the river channel to the levee, with three to five sample plots. The sample plots (with about 50 trees) were researched as follows: hydrologic, soil, and vegetation characteristics, as well as the state, increment, and development of forest trees. The research was carried out by standard methods and it had the multidisciplinary character.

The aim of this research is to determine the effect of the groundwater levels in costal areas of the Sava river and its tributaries on the forests, and to propose the criteria which must be fulfilled, so as to conserve the forests, i.e. to harmonize the production of wood and the ecology of the region with the requirements of electric power industry.

## **3. Results**

### **3.1 Forest protection is nature protection**

Forest is the community of living and nonliving nature – biogeocoenosis. It is an environment that sustains numerous plant and animal species and it satisfies numerous human needs (sources of wood, food, environment for rehabilitation and recreation, the main factor of landscape beauty, an ambience for leisure, etc.).

The road to nature always passed through a forest. Forest as a natural phenomenon has been exploited, shaped (as far as the degradation and destruction) and studied. Today, the international bodies focus their attention on the study of the effects of exogenic factors on forest ecosystems (climatic change [5], fire and other hazards), but also on the economic role of forests and on the invention of such forest management systems that can mitigate the disastrous trends of environmental hazards.

According to the documents of the Rio Summit *"The human kind is in the centre of interest of sustainable development. It is entitled to healthy and productive life in harmony with nature"*. Sustainable Development has become the key term of the global economic policy and policy of environmental protection. There are almost no countries in the world not dealing with these issues seriously. As the consequence, public attention is focused to nature conservation and production potentials of the renewable natural resources. Therefore it is understandable that the interest in the protection of forest ecosystems, as the integral part of nature, has wide proportions.

### **3.2. Forests and forest ecosystems save costal area of the sity Belgrade**

Obrenovac reserve (Figure 1) is located next to the Sava River, downstream from Obrenovac. Since the city is only about two kilometers and is connected by asphalt road. It is

a complex of state-owned forest, area of 65 ha. Forest complex is situated directly along the right bank of the Sava and is a favorite destination of people Obrenovac.

For recreation on the water there is little natural harbor for boats and the issuance of the coastal strip arranged for fishing, and this area is hunting reserve and Hunting Club "Obrenovac".

Under the shade of trees set a number of desks, tables, eaves, swings, seesaws and other entertainment for children. The beach on the river Sava is equipped coastal pontoons - plateaus for sunbathing and showers, a nice tidy water, and during the summer day at the picnic and gather over 10,000 Obrenovac. In addition to clearing the forest, along the Sava River, was built "Green Hotel", a complex of five dwelling houses. The largest is the so-dwelling houses. "Visitors' Center" dedicated to ecological research, while four smaller houses on stilts are used for relaxation and enjoyment. Through the forest complex was built in "paths of health." And if it is not "trim" content, many visitors use it for recreational movement. With I-forest picnic revir, there are three restaurants where guests can enjoy the fish and other food specialties. This is an excellent example of how a forest-aquatic complex is possible to do so attractive to tourists, without major financial investment.

Analysis of forest stands in the complex "Obrenovac Reserve" by way of origin, types of breeding is shown in the Table 1.

Contemporary care of existing stands, will contribute to more complete excursion-recreation function of these forests as the basis of psychophysical recreation and health visitors.

### ***3.3. The functions of coastal forests in the locality Belgrade of river Sava***

All functions of forests, whether they are mediated by the production resources or from a favorable environmental impact, are classified into three global categories:

- Protective,
- Productive and
- Social.

#### ***Protective functions include:***

- Bullet item one, some text.
- Erosion – protection of soil from erosion,
- Hydrological - protection and improvement of water regime,
- Climate-protection - climate control, protection from adverse effects of wind,
- Regulation of rainfall, temperature, solar radiation and so on.
- Protection from unwanted and harmful effects imisionih,
- Protection and improvement of agricultural production,
- The protection of roads,
- Protection against noise, harmful substances and so on.

#### ***Production functions of forests include:***

- Production of wood assortments,
- Production of seeds and seedlings,
- Production of wild game,
- The production of other species of fauna (snails, turtles, fish, etc. .),
- The production of medicinal and plant protection,

- Coal (charcoal),
- The use of peat, stone, sand, gravel, etc.,
- The production of oxygen ( particularly specific and significant),
- Other forms of manufacturing.

### ***Social functions of forests can be grouped as:***

- Health,
- Cosmetic - decorative,
- Tourism - recreation,
- Educational, educational, scientific and others.

According to increasingly complex functions of forests for which it must be plan different objectives of forest management in some parts of the forest complex, there is a need to perform complex spatial division according to the interim use of its individual parts (Table2).

Note: In the production function, provided for the wildlife and hunting in remote hunting areas, and within the socio-cultural function of "nature protection and spatial development" envisages the introduction, cultivation and protection of precious non-aggressive animals.

## **4. Conclusion**

Monitoring of forest tree increment, as the bioindicator of their reaction to the effects of natural and anthropogenic factors, should be raised to the level which ensures the necessary base of actual information in the proportion in which there is the public interest in the conservation of forests and their economic, ecological and other functions.

The extensive approach to increment monitoring in our conditions, due to the lack of the adequate equipment, but also due to poor organisation and insufficient awareness of its significance, does not enable the acquisition of reliable information, necessary for the characterisation of the present condition and the forecast of the future state of forests, endangered in time and space, by the variable effect of different harmful factors.

Based on the above, clear dependence of the effect of flood duration and high level of water table was assessed, i.e. it was evaluated in which hydrologic conditions, at which altitudes of the bioecological profiles, the species are endangered, as well as which species can survive at some sites, and also the positive effect of the raised water table. The research enables us to define the limits of possible survival of forest tree species on the forelands of the Sava river.

## **5. Acknowledgements**

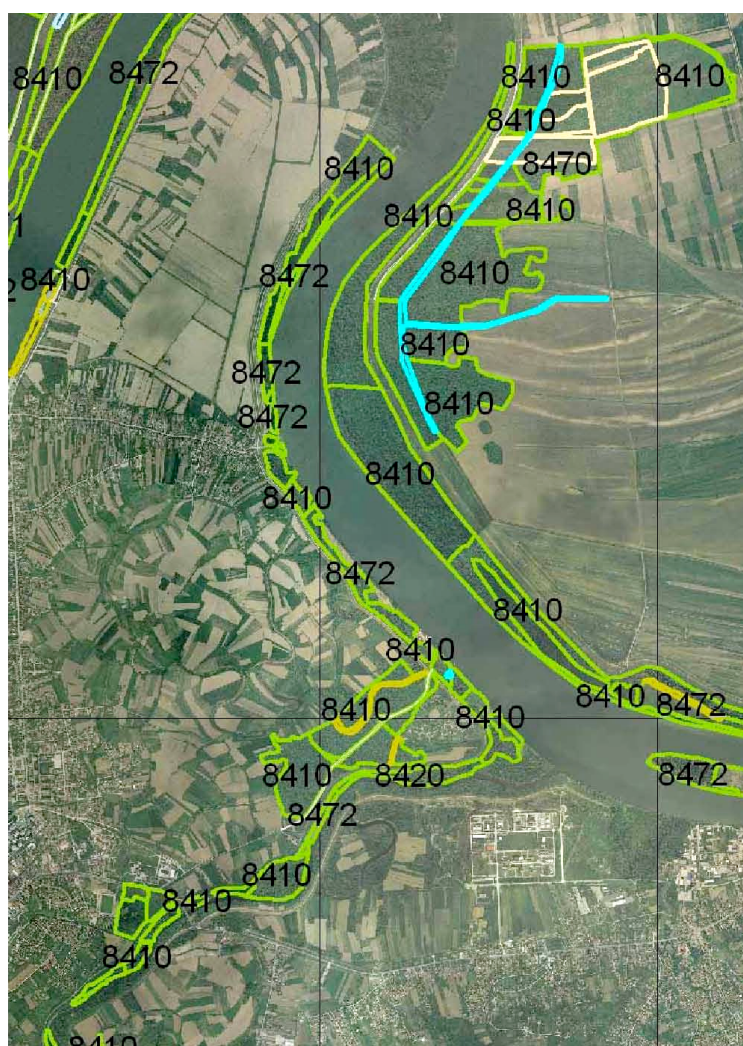
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**Figure 1** Featured biotopes in the area Obrenovac ban



**Table 1** Summary of habitat structure in the complex "Obrenovac Reserve"

Habitat	Department	Segment	Surface	The relative share of species in the mixture	
				species	share
G1.2233 – Mixed forests of ash (Fraxinus angustifolia), oak (Quercus robur) and hornbeam (Carpinus betulus) along major rivers					
Coppice stands over 40 years of age	59	a, c, d	22.40	ash oak	0.8 0.2
	60	a, b	15.88	ash oak	0.8 0.2
	75	e	2.87	ash oak	0.8 0.2
TOTAL			41.15		
G1.115 – Riparian forests of willow and poplar					
Coppice stands over 40 years of age	75	c, m, n	12.25	willow poplar poplar elm	0.4 0.3 0.1 0.2
TOTAL			12.25		
G1.C1 – Poplar plantations (Populus)					
The stands aged up to 20 years	75	a, b, d, k, l	5.5	l-214	1.0
TOTAL			5.5		
G1.C2 – Plantations of exotic deciduous oak (Quercus)					
The stands aged up to 20 years	59	b	0.28	oak	1.0
	75	j	5.89	oak	1.0
TOTAL			6.17		
TOTAL FOREST COMPLEX			65.07		

**Table 2** Assessment of the relative values of the main functions of the suburban woods of state forest administrative area of Belgrade

MAIN FUNCTION OF FOREST (%)									
LOCALITY	PRODUCTION				%	PROTECTIVE-REGULATORY			%
	Production of wood	Production of safe food and medicinal plants	Breeding and hunting	Manufacture of other products (forest seed exploitation. Peat, etc.).		Protection of land	Protection of water	Micro-climate of the city and air quality	
Obrenovac ban	10	-	-	2	12	10	10	15	35

Bojcin	20	10	-	5	35	10	5	10	25
Back forest	10	10	40	-	60	10	5	5	20

**Table 3** Continuation of the table

MAIN FUNCTION OF FOREST (%)					
LOCALITY	SOCIO-CULTURAL			%	100%
	Recreational	Nature and development of space	Educational		
Obrenovac ban	35	15	3	53	100
Bojcin	20	15	5	40	100
Bleck forest	10	5	5	20	100

# Internet and its Diffusion, the Vlora Region Case Study

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Internet is today one of the most common phenomena of technology development. Though a relatively new network with its beginning related to the use for military purposes, today it is the most widely used network in the world for business, research, study, entertainment and social purposes. The aim of this paper is to analyze the use of Internet by families in a developing region as is Vlora and its surrounding cities. The methodology used includes the study through a questionnaire realized in a sample of students in university environments who are asked as representatives of their families, in relation with the use of Internet, the frequency, the reasons for using it or not and other issues about quality of services. Primary data are gathered with a quality. Advanced econometric techniques are used to present an assessment of demand for Internet functions, including socio-demographic characteristics of individuals and their families. First of all it is presented a graphic analysis of data, looking for relationships between different characteristics. Then, we have specified the two estimates with econometric models, the first for access at home and the other for the intensity of Internet use outside home environment including the purpose of use, reasons for obtaining Internet service as well as its impact on improving social capital. The demand for Internet services is related to income and other technological attributes as well as to other socio-demographic attributes. Our results are consistent with previous studies for other countries, although there are some differences. Many socio-economic studies, theoretical as well as empirical, are currently underway regarding the phenomenon of Internet Service Providers, especially high-speed Internet. Demand for them gradually grew until, in a very short time, it became an indispensable product.

## **Keywords**

Internet, access, use, socio-demographic characteristics, social capital

## **1. Introduction**

Internet is today one of the most common phenomena of technology development. Though a relatively new network with its beginning related to the use for military purposes, today it is the most widely used network in the world for business, research, study, entertainment and social purposes. Historically, the use of systems to a common network to allow connection of two computers began to develop in the early 60's. In 1969 the decision was made to implement an experiment for the network that will enable the exchange of information between different computers. If we analyze the Internet phenomenon from a historical perspective in terms of adoption of a new product/service, the Internet is nothing different from other products/services. Just as happens with some new products, demand for content increases gradually until, in a very short time, it becomes a commodity.

The advent of Internet has pervaded our daily lives. The number of websites has increased from 130 in 1993 to well over 17 million in 2000 (Connolly, 2000). The Internet has experienced explosive growth and the Internet traffic has grown exponentially in the last decades. Technology has developed to resolve the traffic problem, in ways that many homes and access points rely on different services, with different speed, offered by Internet service providers.

There are some early descriptive studies carried out on the basis of independent surveys concerning the adoption of Information Technologies and communications in different countries. In Spain the National Institute of Statistics (INE) began to compile this kind of information as of 2001. Different reports have been written to consider demographic influences on the adoption of Internet in general, and especially broadband Internet.

A pioneer econometric focuses on the adoption of the broadband Internet service (Madden, Savage and Simpson 1996), with data collected in Australian homes. These authors were the first to discover that demographic characteristics are one of the main influences on the individual decision to use the broadband Internet service. Goolsbee (2000), Duffy and Deno (2001), Kridel and Taylor (2002), also examine the demand for Broadband Internet access with data from different samples in US cities and households. U.S. Department of Commerce (2002) has its contribution in this regard too. Finally, we should mention the report issued by the OECD (2001) which analyzes the adoption of Wideband Internet connections in 30 countries.

Past research has investigated a wide variety of factors influencing computer adoption and usage such as demographic characteristics (Brancheau and Wetherbe, 1990; Thong, 1999), perceived ease of use, perceived usefulness (Davis *et al.*, 1989; Gefen and Straub, 2000), and perceived enjoyment or fun (Igbaria *et al.*, 1994). In contrast, research in the context of factors influencing Internet usage is relatively limited. Researchers examining the Internet phenomenon have examined a wide range of issues such as demographics and growth (Hoffman *et al.*, 1996; Pitkow and Kehoe, 1996), strategic and commercial uses (Cockburn and Wilson, 1996; Farhoomand, 2000), use in various functional areas (Quelch and Klein, 1996; Upton and McAfee, 1996), adoption and diffusion (Soh *et al.*, 1997; Teo *et al.*, 1997-98), and gender differences (Teo and Lim, 1997; 2000). It is claimed that the phenomenon of Internet has changed the habits of households in developed countries, but it is affecting also the life in developing ones.

The aim of this study is to understand the

- State of the art of Internet usage and adoption level in Vlora region and surroundings
- Demographic and motivation factors that are associated with Internet usage among students and their families.

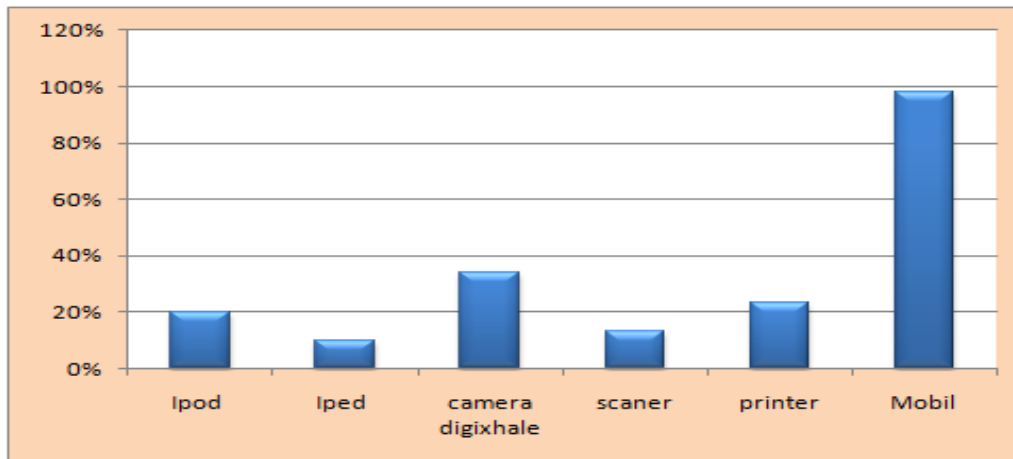
The case of University of Vlora has served us as a base for studying students and their families behavior regarding Information and Communication Technology (ICT) and especially Internet usage in our region. Data are gathered in the period from March to April 2011 in the survey on the extent of ICT usage, including Internet usage.

## 2. Methodology of the study

After careful consideration of literature review, primary data are gathered through a survey done in the University of Vlora. Students were the respondents as representatives of a middle level family type, including so families of all the region (Vlore, Fier, Berat, etcT). The sample of students is based on quotas according to year of the study and type of degree. Face to face interviewes were administered during March-April 2011.

H1. We must ask what are the relationships and different factors that lead a family in a developing country to get online. Is this condition a real case for this study in this paper research?

**Table 1** Indicate the survey in this system of computing research



The survey took into account a variety of areas related to ICT:

1. Fixed Telephony
2. Mobile phones
3. Computer/devices use
4. Internet use
5. Other digital technologies

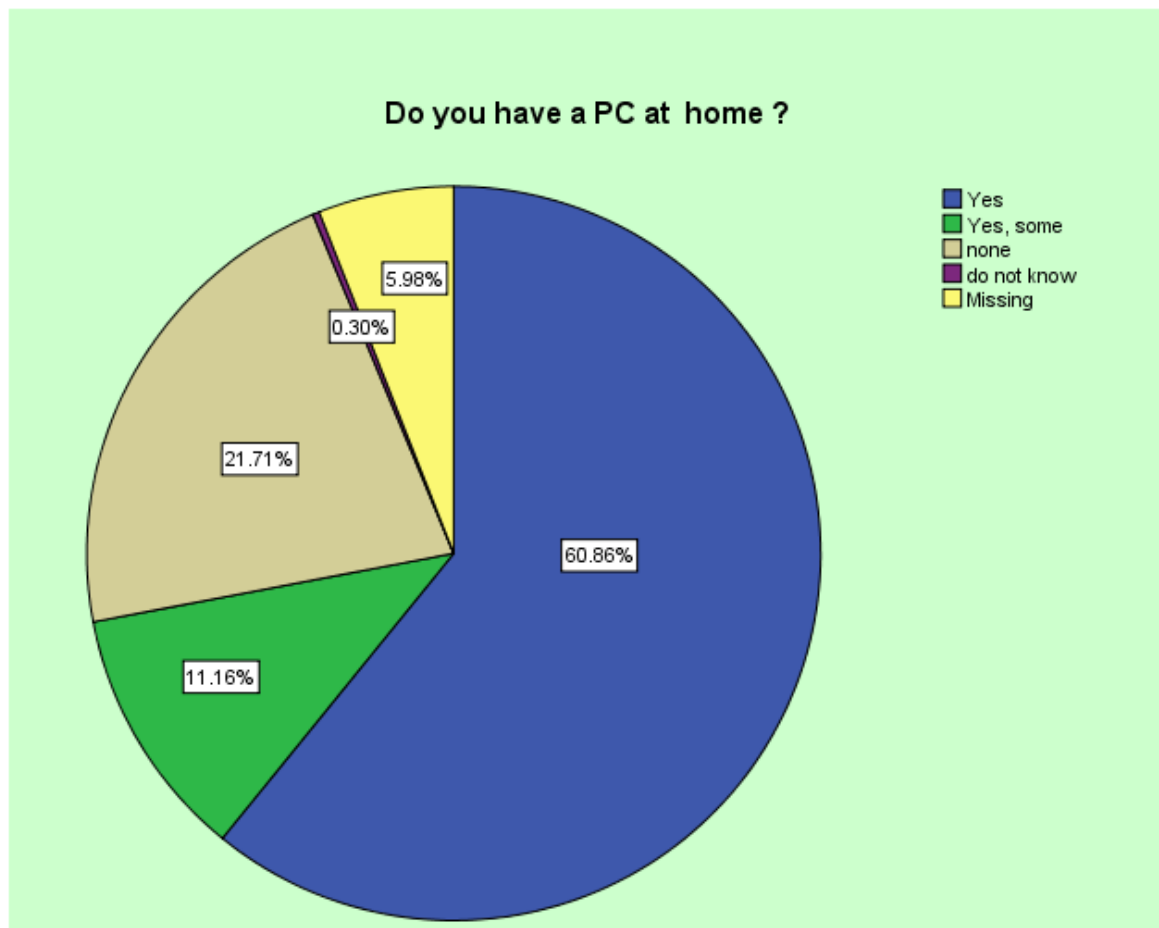
The questionnaire designed include all these topics and comprises about 50 variables.

H 2 Data for the first section consist in obtaining information about the extent and spread of fixed line as a very important tool of ICT. We also analyzed the degree of their proliferation according to the service. Cell phones and the purpose of using them is the subject of the second section. Questions are asked about the type of operator, costs, frequency of use, the number of SMS, the frequency of changing the mobile device, etc.

Supply of computer use is a very important part of our study; without the presence of computer Internet makes no sense. The information collected on the number of users within the family, type of computer, access the Internet, his age will help in identifying relationships. Questions also deal with information about the quality of Internet services and the impact of ICT usage on social capital. Great attention has also been paid to the access to computer and Internet use at work and study environments. The purpose of using the Internet is part of the study. To better assess the situation and to understand developments the study considered also environmental and demographic problems collecting data on the respondent and his family like gender, faculty, year of study, family Income education of family head, residence, etc These data are tabulated and further analyzed ot only in descriptive terms, but also in the light of relationships between them. We are trying to build an econometric model and analyze the degree of influence of each variable with itself or a group of variables for problems of access and purpose of Internet usage.

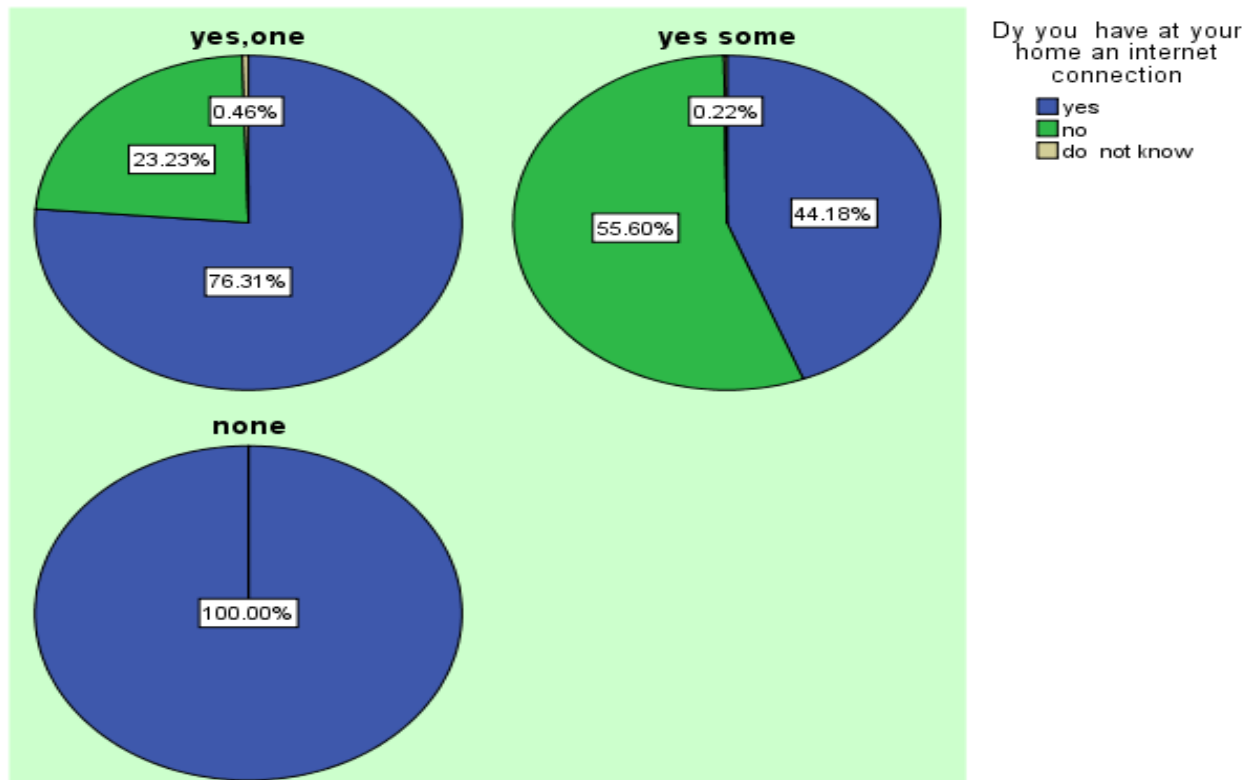
### 3. Survey Findings

Equipment with computers. Before analyzing Internet and its usage, we should first of all note the families equipped with computers. The results show that 72% of students' families have a computer at home. It should be stressed that only 66% of them use it every day. This factor is very important for indicating the presence of the Internet at home. It should be emphasized the fact that 48% of the families with a computer have a laptop computer.



**Figure 1** PC presence at home and internet access  
b. Equipment with a fixed line phone.

Investing in Internet access is closely related with the presence or not of a fixed line. About 52% of respondents do not have a fixed line phone. Despite the lack of fixed telephone, approximately 8% of respondents have Internet access obtained it from other non-fixed lines. Relationship between fixed telephony and Internet access is given in the following diagram.



**Figure 2** Internet access and fixed phone line

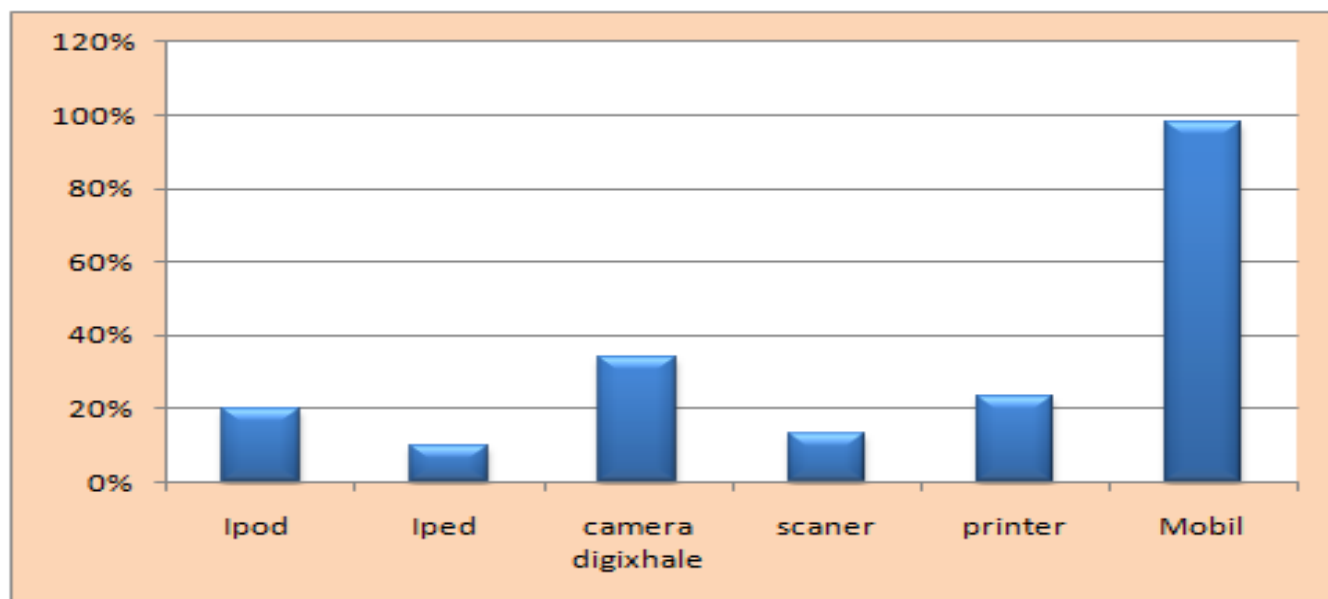
Although we showed a not very high level of infrastructure needed to have a fixed line, people equipment with mobile device is very high, 98% of the interviewed have one.

c. The equipment with the iPod and iPad

Equipped with such a device is the iPod is only 20% of them while the device with a camera-type iPad is still 10% lower, which indicates a low degree of proliferation of these technologies in student facilities and beyond.

d. The equipment with a digital cameras, printers, scanners

The respondents equipped with a digital camera are about 60%. Those equipped with printers and scanners depend on the equipment with PCs, but are a few. In fact 80% of respondents do not have a scanner and 70% do not have a printer in their homes.



**Figure 3** Equipment with a digital cameras, printers, scanners  
**f. Internet connection**

A good part of the above results also determine whether or not families have internet access at home. The following chart shows that about 54% have an internet connection at home, a low figure when compared with other European countries. As for example we see that Spain in 2003 had 75% of households with internet.

On the other hand, the results show that web presence has greatly expanded in recent years: about 46% of respondents are connected to the Internet from only two years

Using the Internet at home is not a daily habit. Only 53% of respondents who have internet at home use it every day. From all the respondents who have an Internet connection at home, a good portion of them also complain about the quality of the service, and the speed of connection. The level of use of ICTs is closely linked with the level of investment of public institutions, especially those of education in this field. In our case only 40% of students have the opportunity to use a computer in their study place and only 22% of them are able to use it every day.

### **3.1 Internet Access and fixed telephony**

We note that 37% of respondents have Internet access in their place of study. They can use the Internet from other facilities like internet cafes, while 58% of student applicants are never connected to the internet in the environments. It is important to emphasize the purposes of Internet use in our evaluation. They lead us to conclusions about the reasons for the demand for this service.

- To apply for a job online.  
The development of ICT and Internet is a better opportunity in the labor market, even though using Internet for job search is far from what it should be. Only 23% of interviewed have sought employment through the Internet. Also, its use for administrative action may be considered very low, only 13% of respondents use the Internet experience to perform administrative actions. About 65% of respondents use the Internet to prepare, and get information.
- Television, Web, downloading via Internet  
About 50% of respondents use the Internet to view television. 40% of them have a personal web. From this study it is noted that a high percentage (78%) of them use it to download music and 64% of them use it to download movies. So using Internet as an



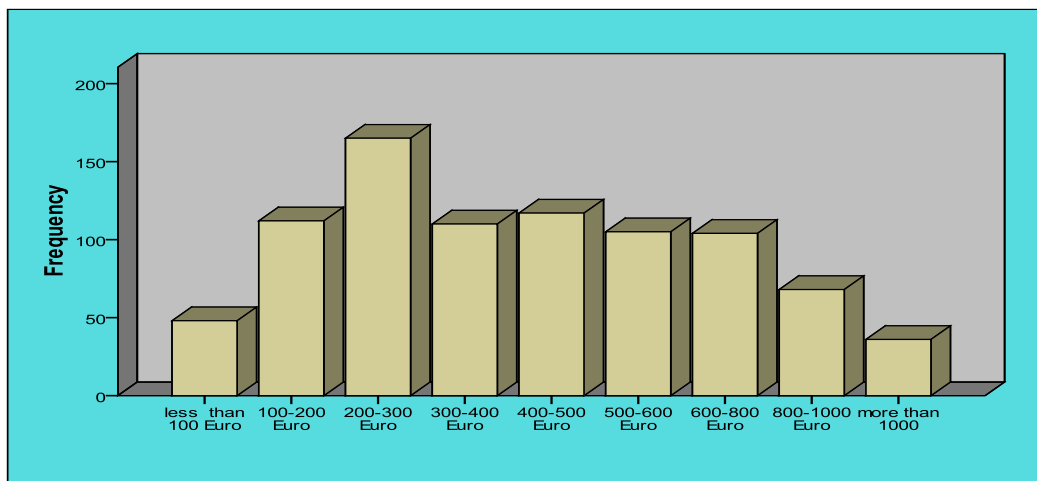
entertainment tool occupies a lot of time of the interviewed in relation to other uses. Results are shown in Figure 5. The level of spread of ICTs affects the social capital and its growth. Internet is used also to make transactions on-line which provide the opportunity to save time and money. The current situation according to our data is different. Though 42% say they can save by comparing offers and services on the Internet, only 12% of them have made a purchase online in the last 12 months, an indication of the low figure when compared with figures in other countries.

- The time of surfing the Web, social networks.

The Internet access phenomenon is associated with the consumption of physical time on it. 61% declare that their time on the Internet has grown tremendously and only 12% claim that it is the same as before. Investing in social groups while being online is a phenomenon which shows that 85% of them are part of Face book and only 14% are part of other social networks. This shows an increase of social capital in different social network and an increase in the real time to stay online. Internet access has also increased people's access to call via Internet, almost 50% of them use Internet telephony via Skype. Information to purchase books or equipment is far different, only 13% of them have used it for this purpose while 86% never. This happens also because of a lack of confidence (46%) to the price of products offered. It is very important to show also the reasons that impact negatively the use of Internet. Among them are the problem with the security of their data (29%), quality of the service (21%) and high prices (21%). Despite various limitations, 63% of respondents acknowledge that the Internet is an opportunity for artistic creativity and 87% of them call the Internet an opportunity for employment, only 3% of them consider it a threat.

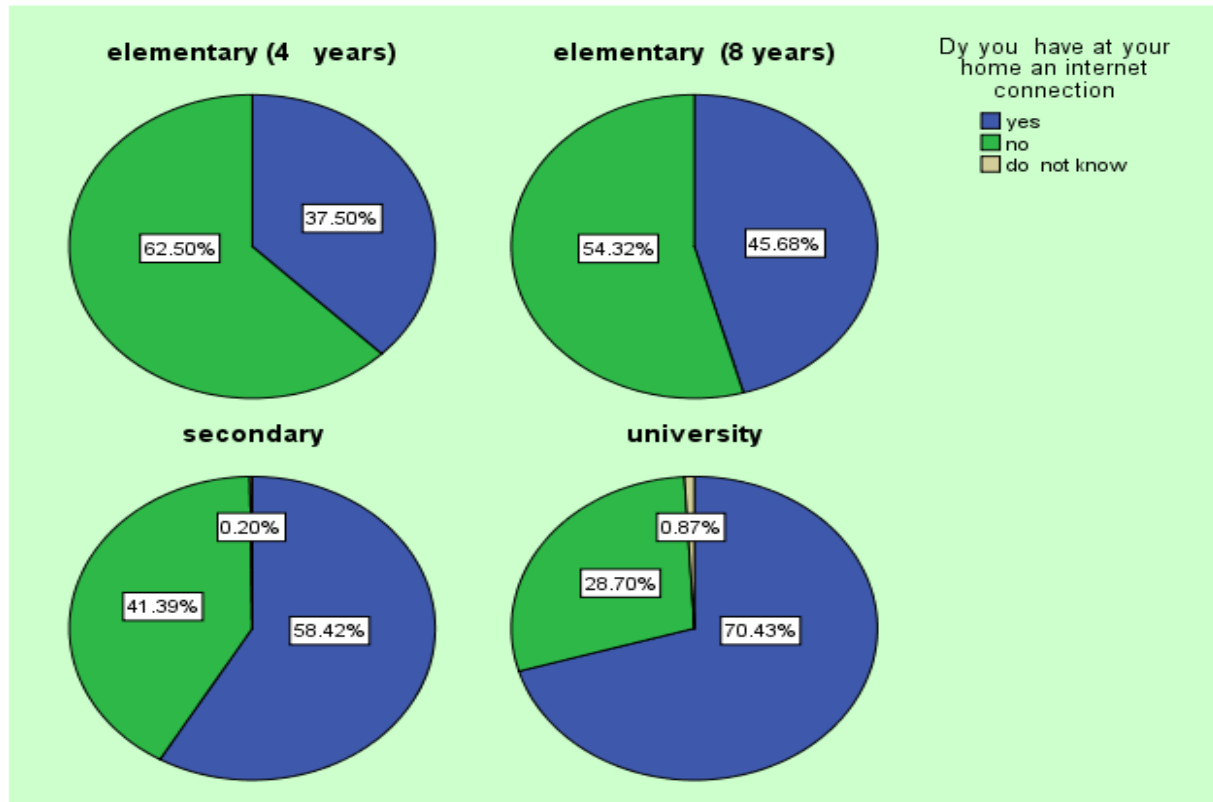
The Internet ranked second with 28% of the respondents, in pursuit of reality, compared with 52% occupied by television. The data noted that the Internet ranked second with 25% versus 40% for television in the information taken to understand reality. In this study the majority of households have 4 or 5 persons, respectively 18% and 16%.

- If you do not have the Internet which is the fact that better explains this fact?  
It is very important to analyze also the reasons why families do not have Internet access. Analysis shows that 45% of those who have no Internet access the reason that ranks first is the high price of this service.
- Monthly family income is a good indicator of the causes that affect the Internet presence. The chart below shows the distribution of revenues among the respondents. So, 19% of households have 200-300€ of monthly income, 13% have 300-400€, 400-500€ have 13% and only 8% have 600-800€ average monthly income.



**Figure 4** A relation of family Internet access with the education of household head

Overall consideration of several variables to explain one or several other variables remains an estimate for the future. But as an illustration, we will show the degree of Internet presence in the family according to the education of household head:



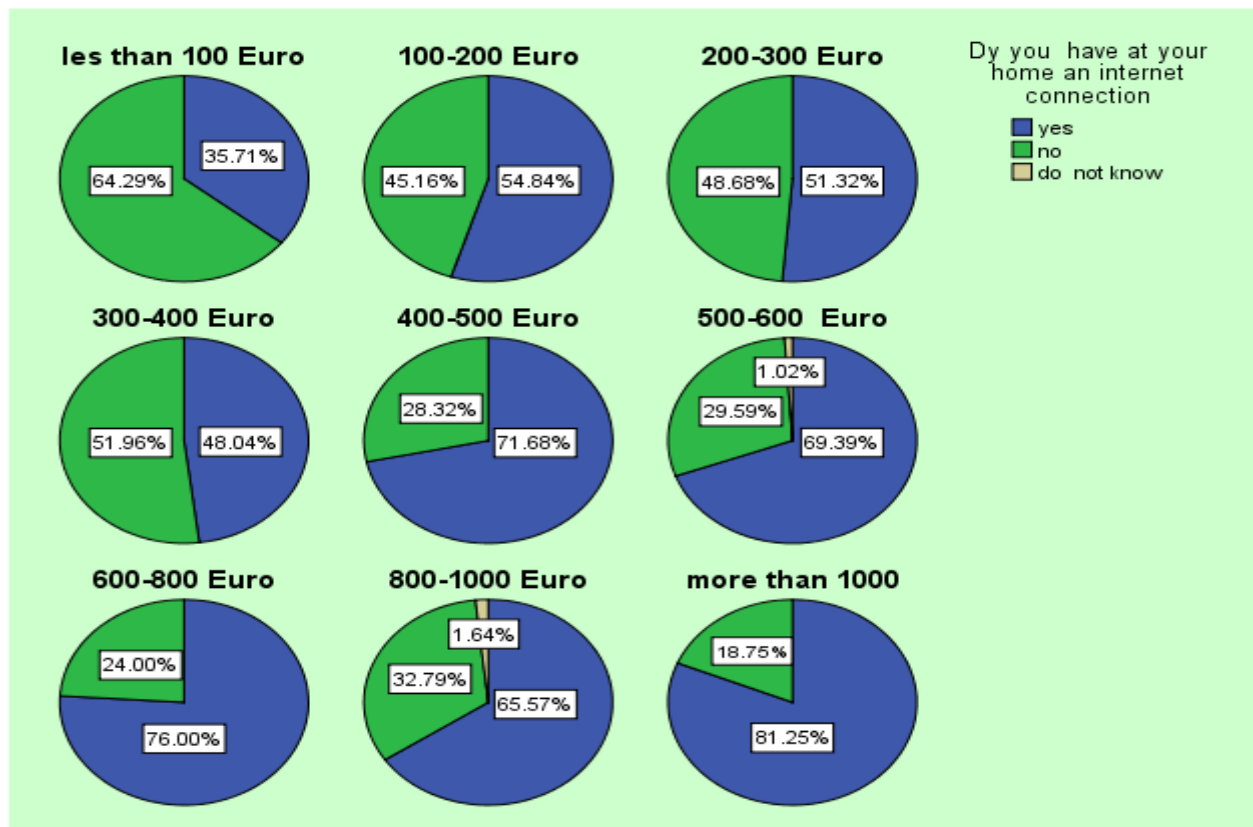
**Figure 5** The internet access and the technology distributed

Does the family income a variable that affects the family Internet access? Access to this service is closely linked to family income, as seen in the graph below:

- Internet connection and the costs of internet access From the presentation and revenues appear a direct relationship where the higher the education level and family income, the higher the percentages of families that Internet access. In these view we are showing the distribution of the family incomes in the education levels of internet access.

### 3.2 Mathematical Modelling

The aim of this study was also the construction of a model which shows the demand for Internet (use, access and services). In fact, the use of a provided service by an individual is possible if he / she have access to the service. At the same time an individual will choose to join a network only if he / she plan to make some use of it. Access is also limited by use. This observation is central to the model of Averous Artle (1973) and still represents a cornerstone for modelling demand for the Internet (Taylor, 1994). An econometric model remains a goal for the future. But note that while theoretical arguments suggest that the Internet application is used to save money and time. According to Taylor (1994), there are two types of respondents to the questionnaire:



**Figure 6** The internet access and the outcome

$G_0$ : the set of respondents without access to the network and  
 $G_1$ : the set of respondents with access to the network.

The individual utility function is expressed in the form

$$U^i = U^i(x^i, q^i \delta^i)$$

Where  $x^i$  is the vector of goods consumed by individual  $i$ , dichotomous variables that determine the access status of the agent  $i$ .

$$q^i = q, \forall i \in G_1 \text{ and } q^i = 0, \forall i \in G_0$$

$$\delta^i = 1, \text{ if the individual has access and } \delta^i = 0, \text{ otherwise.}$$

The problem of maximizing the utility would then be expressed with individual utility functions for each type of agent as follows:

$$\begin{aligned} U^1 &= U^1(x^1, q) & \text{if } \delta &= 1 \\ U^0 &= U^0(x^1) & \text{if } \delta &= 0 \end{aligned}$$

## 4. Econometric Model

The literature suggests that Internet users differ from other users of telecommunication about the kind of attributes that are important. This is supported by studies in 2002, when they describe the differences between the phone application and Internet application. Jackson et al. (2002) tends to use a model of utility maximization, assuming that customers want to have income, leisure activity and also online. Theory shows that the maximization of customer service that has Internet access at home is limited by consumption of other goods and the

allocation of time and income. A linear approximation of the conditional utility function would be:

$$U_i^* = x_i^T \beta + \varepsilon_i,$$

Where  $U_i^*$  the utility function,  $\beta$  is the vector of parameters to be estimated and represents the array of secondary services that are found to  $x_i^T$  vector and error is the term  $\varepsilon_i$ .

The parameters of the function of individual services are estimated based on information from answers to questionnaire developed and showed above. According to the model that we want build, Internet access and use are functions of several variables: Internet Access = f (income, technology, social demographic distribution). Using the Internet = g (income, technology, demographic distribution, access Part of further work is the adaptation of an econometric model for Internet access. The model used is based on the idea of maximizing the utility of a customer from accessing the Internet.

## Conclusions

In this paper research we are trying to solve two hypothesis. The indicators of this research are showing in these points like:

1. Our intention in this work was to analyze the internet access and use by students and their families in Vlora region.
2. We considered more than 50 variables to have a detailed picture. More than 1000 students were interview, representing students by faculty and study level.
3. In future, we will try to build a mathematical model explaining the relation between internet access and use by other variables, economical, socio-demographical, individual characteristic related to mode of use, etc.

The literature suggests that Internet users differ from other users of telecommunication about the kind of attributes that are important. This is supported by studies in 2002, when they describe the differences between the phone application and Internet application

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# A Comparative Assessment of the Factors Fostering Innovation in the Small and the Medium Enterprises: the case of Germany, Belgium and Spain

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This research is a comparative assessment of the factors fostering innovation in the small and the medium enterprises (SMEs) of the manufacturing sector for Germany, Belgium and Spain. A LOGIT model is used to assess the propensity for these countries to innovate. The data originates from the Community Innovation Survey IV which was conducted by Eurostat, 2004. Our sample consists of 1 614 observations for Belgium (1 191 small enterprises and 423 medium enterprises). Germany has a count of 1 504 observations (856 small enterprises and 648 medium enterprises). Spain has 9 649 observations (5 648 small enterprises and 3 001 medium enterprises). The value of the Odds-Ratio confirms the positive effects of the assessable factors that augment (R&D, training, funding, etc.) the propensity to innovate by our SMEs. Comprehensive interpretation of our results from the LOGIT regression is limited by the heterogeneity bias. Further research is needed to get a broader perspective on the complexity of factors that facilitate innovation in SMEs.

## **Keywords**

Business economics, Logistic regression, Manufacturing, Innovation, Small and Medium Enterprises (SME)

## **1. Introduction**

The attention paid towards SME has increased notably since the signing of the European Small Business Act in June 2008. This has resulted in the creation of new programs and aids in favour of the SME. The main reason to support the SME is the capacity to create jobs and to promote development. Nevertheless, the specific purpose of the SBA is to promote innovation across the SME, as it is a main pillar in achieving progress and development of Europe.

The goal of this paper is to contribute to the discussion about the factors that generate the innovative propensity in the small and the medium enterprises. According to the Oslo Manual<sup>1</sup> and other research, innovation activities can be boosted by factors that include R&D, the interactions with other firms and public research institutions.

In this study the impact of some of those factors are evaluated on the innovation capacity of the small and the medium enterprises of the manufacturing sector of Germany, Belgium and Spain. I refer to the term *small enterprise* as is defined by European Commission, which is a firm that counts from 10 up to 49 employees, while the *medium enterprise* counts from 50 up to 249 employees. Innovation is the new or improved product that was introduced by the firm in the last two years. This definition corresponds to the concept of innovation of the Oslo Manual<sup>1</sup> and the European Commission.

The selection of these countries is based on several criteria. These countries have similar economic systems and labor markets in addition to uniformly signing the Treaty of Lisbon. However, their propensity to innovate is markedly dissimilar. Some questions that emerge are: Why is there a gap in the innovation capacity between these countries? What are the factors that could explain this discrepancy? We employ a logistic regression model to answer these questions by examining data from the CIS-4 (Community Innovation Survey, Eurostat, 2004).

### ***Facts about innovation in Belgium, Germany and Spain***

Taking one *proxy indicator* of the innovation capacity or the number of demand of patents per million of inhabitants, we see that on average for the period 2000-2007, Germany is the most performing country in Europe with 22 813 demands for patents. Belgium ranks 8<sup>th</sup> place with 1 366 patent demands while Spain is 10<sup>th</sup> with a demand of 1 149 patents per million of inhabitants.

The mean of the EU-27 is 1 991. Note that Germany outperforms with respect to this mean. Conversely, Belgium and Spain underperform in comparison to the EU-27 mean.

Further, if we analyze the innovation at levels of SMEs, we find other results. In the following table we see three *innovation related indicators*.

**Table 1** Innovation related indicators at SME level

	Belgium	Germany	Spain	EU-Average
*SMEs innovating in-house, as a percentage of the total number of SMEs	40.48%	46.30%	24.60%	30.33%
*SMEs with innovation activities	51%	61%	32.70%	35.59%
*Share of SMEs that have new products or income from new products	66.20%	66.50%	53.80%	63.77%

Source: SBA Fact Sheet (2009). Results correspond to 2005-2007.

We point out three facts about the SME sector of the countries studied.

Firstly, SMEs from Belgium and Germany show a performance clearly superior to the EU-Average of the three indicators of innovation: in-house R&D, innovation activities and income from new products. This implies that 4 out of every 10 firms have in-house R&D, and 1 out of every 2 firms has an innovation activity. Also, 6 out of every 10 firms get income from new products.

Moreover, Spanish SMEs perform lower than the EU-Average of the three indicators. The share of SMEs that generate income from new products, perform at a level that is negligibly lower than the EU-Average.

In addition, German SMEs have the highest coefficients for the innovation indicators. Thus, we could expect that their Manufacturing SMEs Sector should behave alike.

## **2. Background**

According to Joseph Schumpeter<sup>2</sup>, capitalism is characterized by permanent disruption processes of creation-destruction that breaks constantly the stationary economy. These continuous disruption processes are the drivers of economic growth with innovation as their core. The introduction of radical innovation (novel or new combination of processes) breaks

the stationary equilibrium of the economy and as a result, new technology replaces the old one. The question that arises is how can we define innovation? Well, the Oslo Manual, influenced notably by the works of Schumpeter, defines innovation as “*the implementation of a new or significantly improved product (goods or services) or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations*” (OECD<sup>1</sup>, p. 46). In addition, the Manual observes four types of innovations; 1) Product innovations, 2) Process innovations, 3) Organizational innovations 4) Marketing innovations. In this paper we are concerned with the definition of *product innovation*.

The Manual underlines that innovation affects enterprises by improving their performance and increasing innovative abilities. For example, improved production capacities make it possible to develop a new range of products. New organizational practices improve the firm's ability to generate new knowledge that can be used to develop other innovations (OECD<sup>1</sup>, p. 29). This is perceived as a kind of virtuous circle of innovation.

What about the factors that foster the innovation capacity of firms? The Manual, as well as other researchers concede that innovation depends on the interaction of several factors which we group into four categories (proposed by the European Community and Eurostat through the Community Innovation Survey):

- Innovation activities that include engagements on intramural R&D; extramural R&D; the acquisition of machinery; the external knowledge; the training of employees.
- We can note that various authors noted positive effects of R&D on the innovation capacity of SMEs [Acs & Audretsch<sup>3</sup>; Lee<sup>4</sup>; Bhattacharya et Bloch<sup>5</sup>; Rogers<sup>6</sup>; Mairesse et Mohnen<sup>7</sup>; Mancinelli et Mazzanti<sup>8</sup>; Rammer et. al<sup>9</sup>]. Others confirmed the positive effects of the engagement in other external knowledge [Fukugawa<sup>10</sup>; Rammer et. al<sup>9</sup>] and in the training on the innovation capacity of SMEs [Matthews<sup>11</sup>; Rogers<sup>6</sup>].
- Public funding of innovation that derives funding from local or regional authorities, from central government or from the EU. With this concern, APEC<sup>12</sup> noticed positive effects of public funding on innovation capacities of SMEs for several countries of that region.
- Innovation cooperation that convey cooperation arrangements for innovation activities with other enterprises within the enterprise group, suppliers of equipment, clients or customers, competitors or other firms, consultants, private R&D institutions, universities, government or public research institutes, etc. Authors like Hornschild<sup>13</sup>; Rogers<sup>6</sup>; De Jong et Vermeulen<sup>14</sup>; and Mancinelli et Mazzanti<sup>8</sup> found positive effects of cooperation with other firms on the innovation capacity of SMEs. Karlsson et Olsson<sup>15</sup> noted positive effects of cooperation with suppliers while Albaladejo et Romijn<sup>16</sup> observed negative effects of cooperation with suppliers and clients. Conversely, Albaladejo et Romijn<sup>16</sup> and Fukugawa<sup>10</sup>, confirmed positive effects on innovation when SMEs cooperated with public R&D institutions.
- Intellectual property rights that comprise the application for a patent, a registered industrial design, a registered trademark or a claimed copyright.
- While Vaona and Pianta<sup>18</sup> corroborated positive effects of patenting on innovation to Mansfield's<sup>17</sup> minimal positive effects, Sakakibara<sup>19</sup> obtained ambiguous results.

### 3. Econometric Methodology

To evaluate how different factors can foster the propensity to innovate on the Small and the Medium Enterprises of the Manufacturing Sector, we use a LOGIT regression model with Belgium, Germany and Spain as our examples.

We select this econometric method because this technique captures innovation issues of the Community Innovation Survey (CIS-4) of Eurostat at a firm level by using



discrete/dichotomous variables. Secondly, the distribution of our sample is skewed or non-normally distributed and this favors the LOGIT transformation (Finney<sup>20</sup>). Thirdly, there is not enough empirical work on application of this technique to the comparative analysis across firm sizes (small vs. medium) and countries.

The innovation is captured through a binary variable (1, 0) where the value of 1 represents the SME introducing an innovation (event occurs) and 0 in the absence of the innovation.

Innovation is our dependent variable, our new or improved product or service that the enterprise introduced in the last two years.

The equation that we run here is the following:

$$\text{Logit}(p_i) = \ln\left(\frac{p_i}{1-p_i}\right) = \beta_1 + \beta_2 X_{2i} + \dots + \beta_n X_{ni} + \mu_i$$

Where,

$\text{Logit}(p_i)$  = introduction of a new product by the enterprise (question no. 2.1. from CIS-4).

$\beta_1$ : Innovation activity

$\beta_2$ : Public funding of innovation

$\beta_3$ : Innovation cooperation

$\beta_4$ : Intellectual property rights

The block of *innovation activity* (from question no. 5.1. of the CIS-4) is defined as follows:

- 0 = No innovation activity at all (No\_INNO)\*
- 1 = Engagement in intramural R&D (RRDIN)
- 2 = Engagement in extramural R&D (RRDEX)
- 3 = Engagement in acquisition of machinery (RMAC)
- 4 = Engagement in other external knowledge (ROEK)
- 5 = Engagement in training (RTR)
- 6 = Engagement in market introduction of innovation (RMAR)
- 7 = Engagement in other preparation (RPRE)

Then, we define the block of *public funding of innovation* (from question no. 5.3. of the CIS-4);

- 0 = Do not receive any public funding for innovation (No\_PFUN)\*
- 1 = Public funding from local or regional authorities (FUNLOC)
- 2 = Public funding from central government (FUMGMT)
- 3 = Public funding from the EU (FUNEU)

The block of *innovation cooperation* (from question no. 6.1. of the CIS-4) is composed by the following variables:



- 0 = Do not have any cooperation for innovation (No\_COOP)\*
- 1 = Cooperation arrangements on innovation activities (Co)
- 2 = Other enterprises within enterprise group (C14\_All)
- 3 = Suppliers of equipment, etc. (C24\_All)
- 4 = Clients or customers (C34\_All)
- 5 = Competitors or other firms (C44\_All)
- 6 = Consultants, commercial labs, private R&D institutes (C54\_All)
- 7 = Universities or other... (C64\_All)
- 8 = Government or public research institutes (C74\_All)

Finally, the *intellectual property rights* (from question no. 9.1) block is integrated by;

- 0 = Did not apply for any IPR (No\_IPR)\*
- 1 = Applied for a patent (PROPAT)
- 2 = Registered an industrial design (PRODSG)
- 3 = Register a trademark (PROTM)
- 4 = Claimed a copyright (PROCP)

\* This is the reference category.

## 4. Database and Descriptive Statistics

We use the Community Innovation Survey (CIS-4, conducted in 2004) to estimate the impacts of the capacity to innovate (i.e. introduce a new or significant improved good in the market upon the propensity of manufacturing small and medium enterprises of Belgium, Germany and Spain to innovate

The database provides four blocks of explanatory (covariate) factors such as the innovation activities (e.g. intramural R&D), their public funding (e.g. funding from the EU), their cooperation for innovation (e.g. universities) and their intellectual property rights (e.g. application for a patent).

The micro data for the econometric analysis has 1 614 observations from Belgium, of which 1 191 (74%) are small enterprises, and 423 (26%) are medium enterprises. For the case of Germany we count 1 504 observations, of which 856 (57%) are small enterprises and 648 (43%) are medium enterprises. Lastly, Spain has 9 649 observations where 5 648 (71%) are small enterprises and 3 001 (29%) are medium enterprises.

The following table provides the summary of the descriptive statistics for the three countries. We observe that German Small and Medium enterprises introduce more innovations in comparison to the Belgium and Spanish Firms. Almost one of every two German firms (small and medium) introduces an innovation, a proportion which is largely superior to the other countries.

**Table 2** Descriptive statistics

	Belgium		Germany		Spain	
	Small	Medium	Small	Medium	Small	Medium
<b>InPdgd (1,0)</b> = Introduced onto market a new or significantly improved good	18%	30%	45%	57%	22%	28%
<b>Innovation activity:</b>						
Engagement in intramural R&D (RRDIN)	20%	36%	37%	50%	28%	36%
Engagement in extramural R&D (RRDEX)	9%	20%	13%	22%	14%	22%
Engagement in acquisition of machinery (RMAC)	26%	38%	47%	58%	30%	33%
Engagement in other external knowledge (ROEK)	7%	11%	15%	17%	7%	10%
Engagement in training (RTR)	23%	37%	35%	48%	23%	30%
Engagement in market introduction of innovation (RMAR)	14%	24%	22%	34%	17%	21%
Engagement in other preparation (RPRE)	11%	18%	39%	49%	15%	18%
<b>Public funding of innovation:</b>						
Public funding from local or regional authorities (FUNLOC)	22%	26%	11%	10%	15%	13%
Public funding from central government (FUMGMT)	10%	14%	11%	9%	9%	12%
Public funding from the EU (FUNEU)	5%	12%	5%	5%	3%	3%
Funding from EU's 5th or 6th RTD (FUNRTD)	2%	8%	4%	3%	12%	5%
<b>Innovation cooperation:</b>						
Cooperation arrangements on innovation activities (Co)	36%	57%	14%	17%	25%	32%
Other enterprises within enterprise group (C14_All)	38%	59%	2%	7%	2%	5%
Suppliers of equipment, etc. (C24_All)	70%	80%	5%	9%	5%	7%
Clients or customers (C34_All)	55%	63%	8%	10%	4%	4%
Competitors or other firms (C44_All)	26%	28%	4%	5%	2%	3%
Consultants, commercial labs, private R&D institutes (C54_All)	43%	45%	2%	5%	3%	4%
Universities or other... (C64_All)	31%	46%	9%	12%	4%	6%
Government or public research institutes (C74_All)	25%	32%	6%	6%	1%	1%
<b>Intellectual property rights:</b>						
Applied for a patent (PROPAT)	4%	11%	12%	26%	8%	11%
Registered an industrial design (PRODSG)	2%	3%	13%	21%	7%	9%
Register a trademark (PROTM)	7%	12%	12%	20%	15%	19%
Claimed a copyright (PROCP)	2%	2%	5%	9%	1%	2%

We note also that globally SMEs from Germany and Spain carry out more innovation activities (i.e. engagement in intramural R&D, engagement in training) than their counterparts. On the other hand the Belgian SMEs are more committed to innovation cooperation than the other countries. German and Spanish SMEs show overall a lower engagement in innovation cooperation. German SMEs display more interest in intellectual property rights. On the whole, the significance of the different factors that contribute to the innovation propensity assigned by SMEs is widely divergent. A profound reason is the role of policy at the country (and sector level). For a brief presentation of the different policies and programs, across the countries, in favor of SMEs see the OECD<sup>21</sup>.

## 5. Results and discussion

We use the software SPSS to calculate the propensity of the SMEs to innovate by considering the impact of the covariates previously mentioned.

The Chi-Squared Goodness of Fit Test for the null hypothesis, show significant values for the model of SMEs of all three countries.

The Cox & Snell  $R^2$  test and the Nagelkerke  $R^2$  test, deliver a coefficient of determination  $R^2$  that explains the degree of variation illustrated by the covariates. For the case of small enterprises of Belgium, the covariates explain 36.2% - 48.3% of the variation in innovation propensity, while for the medium enterprises the coefficient is between 42.4% and 58.3%.

For Germany, these coefficients show that the covariates account for 37.6% - 51.1% of small enterprises and 40.4% - 53.9% for the medium enterprises.

For Spanish small enterprises the coefficients range from 21.4% - 28.6% and 18.0% - 24.3% for their medium enterprises. Observe that Spain presents the lowest coefficients meaning that there are other factors which account for her propensity to innovate that are not captured by our LOGIT model. Corresponding figures (tables) for these tests although calculated and interpreted are not presented here.

The following figure summarizes the outputs (Odds-Ratios) of the LOGIT regression. This table summarizes the impacts on the propensity to innovate for our SMEs.

**Table 3** LOGIT Regression Output

		Belgium		Germany		Spain	
		Small	Medium	Small	Medium	Small	Medium
<b>InPdgd = Introduced onto market a new or significantly improved good</b>							
<b>Innovation activity:</b>							
<b>No innovation activity at all (Reference)</b>							
Engagement in intramural R&D (RRDIN)	Exp(B)	3,73		2,51	2,09	1,95	1,61
	Sig.	0,03		0,00	0,01	0,00	0,08
Engagement in extramural R&D (RRDEX)	Exp(B)	-	-	-	2,79	-	-
	Sig.	-	-	-	0,02	-	-
Engagement in acquisition of machinery (RMAC)	Exp(B)	-	-	3,36	2,39	1,64	-
	Sig.	-	-	0,00	0,00	0,02	-
Engagement in other external knowledge (ROEK)	Exp(B)	-	0,13	-	-	0,49	-
	Sig.	-	0,04	-	-	0,02	-
Engagement in training (RTR)	Exp(B)	-	17,64	-	1,90	-	-
	Sig.	-	0,01	-	0,03	-	-
Engagement in market introduction of innovation (RMAR)	Exp(B)	3,13	-	4,18	3,78	2,18	4,11
	Sig.	0,03	-	0,00	0,00	0,00	0,00
<b>Public funding of innovation:</b>							
<b>Do not receive any public funding for innovation (Reference)</b>							
Public funding from local or regional authorities (FUNLOC)	Exp(B)	-	-	-	-	1,75	-
	Sig.	-	-	-	-	0,01	-
Public funding from central government (FUMGMT)	Exp(B)	-	-	-	-	1,74	-
	Sig.	-	-	-	-	0,02	-
Public funding from the EU (FUNEU)	Exp(B)	-	-	-	-	0,34	-
	Sig.	-	-	-	-	0,00	-
<b>Innovation cooperation:</b>							
<b>Do not have any cooperation for innovation (Reference)</b>							
Cooperation arrangements on innovation activities (Co)	Exp(B)	-	-	-	-	2,04	-
	Sig.	-	-	-	-	0,04	-
Other enterprises within enterprise group (C14_All)	Exp(B)	0,33	-	-	-	0,34	-
	Sig.	0,05	-	-	-	0,02	-
Suppliers of equipment, etc. (C24_All)	Exp(B)	-	4,75	-	-	-	-
	Sig.	-	0,05	-	-	-	-
Clients or customers (C34_All)	Exp(B)	3,78	-	-	-	-	-
	Sig.	0,01	-	-	-	-	-
Competitors or other firms (C44_All)	Exp(B)	-	-	-	-	-	-
	Sig.	-	-	-	-	-	-
Consultants, commercial labs, private R&D institutes (C54_All)	Exp(B)	-	-	-	-	-	3,12
	Sig.	-	-	-	-	-	0,03
Universities or other... (C64_All)	Exp(B)	0,25	0,14	-	-	-	-
	Sig.	0,04	0,03	-	-	-	-
Government or public research institutes (C74_All)	Exp(B)	2,75	11,99	-	-	0,16	-
	Sig.	0,04	0,03	-	-	0,00	-
<b>Intellectual property rights:</b>							
<b>Did not applied for any IPR (Reference)</b>							
Applied for a patent (PROPAT)	Exp(B)	6,88	9,18	-	-	-	3,01
	Sig.	0,04	0,05	-	-	-	0,00
Registered an industrial design (PRODSG)	Exp(B)	-	-	-	-	1,93	-
	Sig.	-	-	-	-	0,05	-
Register a trademark (PROTM)	Exp(B)	8,68	-	-	-	-	-
	Sig.	0,01	-	-	-	-	-

Sig. = \* Significant at 5%.

Our LOGIT model corroborates the findings of previous studies such as positive effects of R&D, external knowledge, training; public funding; cooperation with other firms, suppliers, clients, public R&D institutions; patent rights' [see point 2].

The covariates of the four blocks of explaining factors show a positive impact in the propensity to innovate across the firms and countries. Nevertheless, there are covariates that show a higher coefficient or greater impact in terms of engagement in intramural R&D or in the market introduction of innovation.

In addition, for the small and medium enterprises of Germany, neither the public funding on innovation, nor the innovation cooperation nor the intellectual property rights show a

significant coefficient. Thus, these blocks have null impact upon the propensity of SMEs to innovate.

Note that heterogeneity of results exists not only between the estimations but also among firm sizes and our countries.

For the small Belgian firm, statistically the factor that has a higher impact on their propensity to innovate is the register of a trademark. We interpret this covariate as follows: a small enterprise that registers a trademark has 8.68 times of a better chance to introduce a new product, followed by patent application. This is understandable since in Belgium there is a policy that promotes innovation among SMEs by fostering commercialization of the academic research base. The small firm may want to protect an invention before introducing it to the market. (See OECD<sup>21</sup>).

For small German enterprises, the covariates that have a higher impact belong to the block of innovation activity. One such factor is the engagement in market introduction of innovation. A firm has 4.18 times better chances to introduce a new product. The second covariate is the engagement in acquisition of machinery that improves the firm's chances to introduce a new product by 3.36 times.

For Spain, the two most important covariates are the engagement in market introduction of innovation with an estimate of 2.18 and the engagement in intramural R&D with a covariate value of 1.95.

At a medium enterprise level we observe that most of the coefficients were dropped, because they were not significant.

Further, for Belgium we find that the engagement in training exhibits the largest coefficient. This implies that when a medium enterprise is engaged in training, this firm is 17.64 times more likely to innovate.

Another important factor that fosters the innovation capacity in medium enterprises is the cooperation with the government or public research institutions. A medium firm that cooperates with other institutions is 11.99 times more likely to introduce an innovative product. Indeed, the OECD<sup>21</sup> recognized that this type of cooperation is important for the Belgian SMEs.

For the German medium enterprises, like her smaller counterparts, engagement in market introduction of innovation increased a firm's innovative capacity by 3.78. Engagement in extramural R&D introduced innovative capacity by 2.79.

For the Spanish medium enterprises, the estimate for engagement in market introduction had a covariate of 4.11 while the value for engagement with consultants, commercial labs, private R&D was 3.12. This result may be partially explained by a policy where the Spanish government is supporting the technological innovation and quality and joint innovation projects (see OECD<sup>21</sup>).

## Summary

- We corroborate the findings of previous research.
- The propensity to innovate of SMEs of Belgium, Germany and Spain is positively influenced by the innovation activity due to engagement in intramural or extramural R&D, the acquisition of machinery, etc. This confirms that R&D, knowledge and training are essential variables to foster innovation.
- Public (government) funding improved the propensity Spanish small enterprises to innovate.
- The cooperation in innovation and the intellectual property rights engender innovative capacity of SMEs from Belgium and Spain. The Belgium Government has established a policy to commercialize academic research so we can expect that firms will apply for patents before introducing a new product in the market.

- A main limit of our research was the heterogeneity across the enterprises and the sectors. It is therefore important, to do further research in order to get more comprehensive results that are less biased and more significant. For future work we would like to consider a detailed analysis of the subsections of the manufacturing sector of similar firms with low, medium and high innovative capacity.

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# Why do Scientists create Academic Spin-offs? The Context influence

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**The aim of this work is to investigate why scientists create academic spin-off in order to commercialise their research results, instead of choosing another mechanism of exploitation. Most economics and management literature on the topic investigated the technological characteristics explaining such a choice, putting less attention on the social dimension of the matter. We conjecture that in Emilia-Romagna numerous academic spin-offs have been created by young scientists under temporary positions within the academic environment, in order to secure for themselves a longer-term perspective occupation within their field of expertise. Our analysis shows that, given the funding constraints that the Italian academic environment is experiencing, the low level of demand of PhD within the Italian public and private sectors, and the presence of favourable supporting policy tools, the academic spin-off phenomenon in Emilia-Romagna may represent a way of escape from the bottlenecks of the academic system, allowing some young scientists to work in their field of expertise and possibly with a profitable job position.**

## **1. Introduction**

In recent year's scholars of innovation put great attention to the technology transfer from university to industry. Among the wide variety of direct and indirect mechanisms by which academic knowledge is transferred into the market place, much attention has been directed toward the creation of academic spin-offs (ASOs), that is those firms whose business is the exploitation of research results developed within the academic environment. Among other reasons, ASOs are considered so important because they are seen as bridge-organisation between university and industry allowing newly developed tacit knowledge to reach the market as a product (Fontes 2005, Chiesa and Piccaluga 2000).

This work seeks to investigate why scientists chose to create an ASO instead of transferring the knowledge from university to industry via other mechanisms, such as licenses, research contracts, consultancies, and so forth. The literature on the topic mainly address such issue looking at the characteristics of the technology to be exploited, and argue that different mechanisms of knowledge transfer are mainly engaged as an answer to the specificities of the technology to be exploited. Some studies have also been directed toward the investigation of other reasons moving scientists in undertaking such practice. The present work goes in this direction and aim at enriching the comprehension of the matter. In particular we seek to investigate which is the social technology (Nelson and Sampat 2001), if any, parallel to the development of the physical technologies exploited by ASOs.

The second paragraph will briefly explain the literature review on the topic. The third section seeks to describe the job market situation of young scientists in Italy and in Emilia-Romagna respectively. The fourth section will put forth the conceptual framework on which the section that follow will base the empirical analysis, conducted in two sections: a quantitative description of the ASO situation in the region, and a qualitative investigation on the motivations bringing scientist to go ASO. Finally some concluding thought will be presented.

## 2. Literature Review

Academic literature concerning the motivations under the decision of an individual or a team of individuals of starting up a firm from the research results developed within the academic environment, has significantly increased in the last two decades. Works have mostly been concerned with the analysis of the characteristics of the technology to be transferred. However more recently some studies have also been directed toward the analysis of non-technological motivations leading scientists to undertake such a path of research results exploitation.

One of the main claim regarding the decision of building up a firm concerns the very early stage of development of the technology to be exploited. The need of further development required by such technology in order for it to be ready for the market place, may create many obstacles to a direct transfer from the academic to the industrial environment. On this regard Shane (2002), adopting a transaction cost economics approach, finds that the higher are the transaction costs involved in licensing a technology directly from university to industry, the higher will be the probability that the technology will be licensed back to its inventor and he will develop it further for the market by creating a firm with that proper aim. Similar conclusions are reached by Fontes (2005), which addresses to the scientist the important function of reducing agency costs, by directly going into the market place to transfer some tacit knowledge from academia to industry.

A sort of taxonomy of motivations to go ASO has been put forth by Minshall and Wicksteed (2007): by asking when ASO is chosen by technology transfer offices (TTOs) as the way of exploitation instead of other mechanisms of technology transfer, answers have been the following: for platform technologies, for technologies with several and different applications, when the technology is not ready for the market and finally when the scientist is willing to bring its results to market. It is possible to note that four of such motivations regard the sphere of the technological character, while the last one refer to personal reasoning not directly related to technological issue.

Although less explored compared to its technological counterpart, non-technological motivations explaining the choice of undertaking an ASO route of exploitation can be divided in two main groups. The first represents the pecuniary reasons and seems to represent the main explanation, often considered as implicit. The basic assumption is that scientists are incentivised in undertaking such path because they pursue higher profit compared to the academic environment. Such reasoning is also confirmed in terms of monetary incentives toward the overall technology transfer activities, and argue that the higher is the financial incentives of going commercial, the higher will be the likelihood that the scientist will pursue a commercial exploitation route (Friedman and Silverman 2003).

In the second group we find a variety of reasons (Birley and Westhead 1994), that we could sum up as the non-monetary motivations. According to Hayter (2010), non-monetary reasons are far more important than monetary ones. In this group we find explanations to go ASO such as the need for independence (Birley and Westhead 1994), tax avoidance (Birley and Westhead 1994), the demand for recognition by peers (Bercovitz and Feldman 2008, Stuart and Ding 2006), the search for research funding (Hayter 2010), individual willingness to bring some research to market (Minshall and Wicksteed 2007) and the university and peer style of thinking that push academics on such path (Stuart and Ding 2006).

The literature investigating such non-monetary motivations not only pointed to the role of peers, but also stressed the role of the environment in shaping particular pattern of behaviours able to push scientists to commercially exploit their research result under such mechanism (Mayer 2003, Bercovitz and Feldman 2008, Stuart and Ding 2006). On this regard Chiesa and Piccaluga (2000) highlighted the high level of risk aversion of Italian scientists, and the consequent low numbers of ASO created compared to other scenarios such as the Anglo-Saxon one. In other words, the influence of the context in which the

phenomenon is analysed may reveal specific reasons lying under the decision of a scientist to go ASO.

This work seeks move a step in this direction and aims at enriching the literature on the topic by the analysis of a specific context, the one of the Emilia-Romagna region (Italy). In order to accomplish such task, a brief picture of the Italian scenario will be put forth, and then the analysis will deeply investigate the regional situation and evolution about the phenomenon.

### 3. The Job Market for Doctors

#### 3.1 The Italian scenario

In this section our aim is to give a picture of the job market situation in Italy for PhD graduates. In particular we will do so by analysing existing data when available and referring to some reports on the topic. The Italian statistical office, Istat, started to collect data about R&D personnel educational level only in 2005. From such data, as reported in the tables below, we can note that in 2008 there were employed in the R&D function 6636 doctorates, half of which working in public organisations and the other half working in the private sector. Particularly low seems to be the share of people with a PhD employed in firms' R&D function, being 1.8 in 2005 and 2.6 in 2008.

**Table 1** Number of PhD and graduates employed in R&D function, by type of organisation

		PhD	Graduates	Total	Total R&D working force
2005	Public organisation	4475	15147	19622	32684
	Firms	1306	32393	33699	70725
	University	....	....	....	66976
	Non-profit private organisations	499	3129	3628	4863
	<b>Total</b>	<b>6280</b>	<b>50669</b>	<b>56949</b>	<b>175248</b>
2006	Public organisation	2454	19358	21812	36165
	Firms	1510	37200	38710	80082
	University	....	....	....	67688
	Non-profit private organisations	711	4246	4957	8068
	<b>Total</b>	<b>4674</b>	<b>60804</b>	<b>65479</b>	<b>192002</b>
2007	Public organisation	2309	19860	22168	35474
	Firms	1773	38271	40044	93760
	University	....	....	....	71063
	Non-profit private organisations	618	4134	4752	8080
	<b>Total</b>	<b>4700</b>	<b>62265</b>	<b>66964</b>	<b>208376</b>
2008	Public organisation	3029	18743	21771	37472
	Firms	2817	47372	50189	106643
	University	....	....	....	86979
	Non-profit private organisations	790	4006	4797	7922
	<b>Total</b>	<b>6636</b>	<b>70121</b>	<b>76757</b>	<b>239016</b>

Source: Istat

However it is possible to observe from table 2, that the share of doctorates working in firms and in the private sector in general, increased compared to the shrink in the employment of PhD graduates in public organisation. The overall number of PhD graduates working outside university decreased from 3.6 to 2.8 percent from 2005 to 2008.



**Table 2** Share of PhD graduates force in the private, public and non-university environment

Year	Share of PhD working in firms' R&D function	Share of PhD working in private sector's R&D function	Share of PhD working in public sector's R&D function	Share of PhD working outside university in R&D function
2005	1.8%	2.4%	13.7%	3.6%
2006	1.9%	2.5%	6.8%	2.4%
2007	1.9%	2.3%	6.5%	2.3%
2008	2.6%	3.1%	8.1%	2.8%

Source: our elaboration on Istat data

The increase in the share of PhD employed in firms and even more in the private sector could be seen mostly as the consequence of the shrinking of public funding to research organisations, than to an increase of the valorisation of such figure in the private sector. In fact we can observe from the tables above that PhD graduates working in public organisation decreased from 4475 to just over 3000 from 2005 to 2008, in contrast of an overall small increase in PhD employed in R&D function from 6280 to 6636.

However if we weight the number of PhD graduates working outside university on the whole working force in the R&D function we can see a decrease in its share, from 3.6% to 2.8%. Same thing happens if we weight the number of PhD working outside university with the number of people working in the R&D function outside university, going from 5.8% to 4.4%. We can therefore state a decline in the job market share for PhD graduates.

Such scenario is corroborated by the results of some surveys conducted in Italy in very recent times, where some no profit associations are building up some sort of PhD career monitoring actions. According to the Istat (2010) investigation about the rate of employment of doctors (people with a PhD), in 2009 almost 6% of people that obtained their PhD in 2004 and 7.2% of people that obtained their PhD in 2006, still does not work. This report also shows that 52% of the 2004 doctorates and 38% of the 2006 doctorates has at the end of 2009 a permanent position. For the rest, the type of employment is the following: 12.6% of 2004 doctorates work in post-doctoral positions, 8.7 are employed with some form of collaboration, 12.8 % are autonomous worker and 13.8% are employed under fixed term contracts. For the 2006 doctorates the picture is even worst: 22.2% are employed in post-doctoral positions, 10.3% with some form of collaborations, 14% are autonomous workers and 15% are employed with fixed term contracts.

Furthermore the report highlights that among people with an occupation, around 24% in each group is employed in a job not at all consisting of R&D, and less than half of them work in a prevalently R&D type of position. It is also observed that in 2009, 6% of 2004 doctorates are employed abroad and that share raise to almost 8% for 2006 doctorates. Moreover around 11% of people that obtained the PhD in 2004 and 13.3% that obtained it in 2006 are in 2009 thinking in searching for jobs outside Italy.

From such data three main points can be raised: (i) a significant share of doctors are employed in non-R&D function, (ii) an even higher share already work or think of moving abroad in order to be employed in function related to their academic career, and above all (iii) the route to secure a permanent position in the Italian academia is long and risky.

Such considerations are further corroborated by other studies. ADI (2005) (a volunteer Italian Doctoral Association) conducted a survey to people that obtained a PhD between 1998 and 2003 in four Italian universities: Pisa, Siena, Salerno and Pavia. There has been 20% of answers, for a total of 464 doctorate. The main findings of such survey, in our perspective, regard the aspirations of PhD students. In particular 82% of the respondents would have liked to remain within the university environment when still studying for the PhD, but only 45% forecast they will be able to do it when answered the questionnaire, that is between 2004 and 2005.

Such considerations are also reached analysing the evolution of the academic recruitment processes that have been taking place in Italy at least since late nineties: in fact from 1999 to 2007 more than 12 thousands of permanent positions have been created. More than half of them were directed toward Full Professor positions, and the rest were mainly directed toward the opening of position of *Ricercatore*<sup>59</sup> for a total of 4385 (MIUR 2008). The Italian regulation system has de facto favoured the career movement of already permanent staff, that is from *Ricercatore* to Associate professor or from Associate to Full professor, compared to the creation of new *Ricercatore* positions (MIUR 2008). The report also highlights the bottlenecks the university recruitment system is facing in the last decade or so. It in fact states that the age at which individuals become *Ricercatore* is shifting ahead: after obtaining a PhD, individuals tend to remain employed with temporary positions within the university for longer period compared to the recent past. Among the factors leading to such a shift, an important role is played by the low number of *Ricercatore* positions opened in proportion to Full and Associate professors position (MIUR 2008). Consequently the age of people working under post-doctoral positions is rapidly moving ahead.

Finally some other considerations emerged from these reports. In particular it has been highlighted that doctorates do not consider the PhD experience as particularly useful in order to find a first occupation. In fact more than nineties percent of the respondents of the ADI (2005) survey said that the doctorate title does not offer appropriate perspectives in terms of professional entry. In particular it emerges that the doctorate reveals to be a very weak title toward the private sector, and better valorisation processes regarding this situation seems to be a urgent requirement indicated by doctors (MIUR 2008).

### **3.2 The Emilia-Romagna region**

The PhD job market situation in Emilia-Romagna seems to resemble the Italian one. Although the region does not represent a closed economy, the difference in the amount of doctors and of new positions of *Ricercatore* created within the academic environment in the last decade, we think, can offer a picture of the situation.

In fact, if from 1999 to 2009, 1863 new positions of *Ricercatore* have been created in the region, from 2001 to 2008 more than six thousands of PhD have been graduated (MIUR data). In other words, each year, averagely, the region produced almost 900 doctors and opened less than 200 *Ricercatore* positions. If we moreover consider that in 2009 there are more than 700 active post-doctoral positions and more than 2000 active PhD students, we can appreciate that the share of academics willing to obtain a tenured position at university is much higher than universities possibilities.

Nevertheless the Emilia-Romagna region represents one of the richest region in Europe in terms of GDP (Hollanders et al. 2009), and place above the average levels in terms of innovative indicators. In the Regional Innovation Scoreboard for year 2009 (Hollanders et al. 2009) Emilia-Romagna is classified as a medium-high innovator; only Lombardy shares the same position in Italy, while all other regions show at least a level behind. In the national context the region places in top positions both in terms of GDP and in terms of personnel involved in R&D functions (MSE 2009, Unioncamere data). In terms of technology transfer from university to industry indicators, such as number of university patents, of spin-off firms creation and of research income, Emilia-Romagna places again in the top Italian regions (Netval 2009).

Italian regulation recognized technology transfer activities as important in the economic growth of the country in the late 90s, by the enactment of law number 297 in 1999. This law gave life, via the operative D.Lgs. 593/2000, firstly to the generation of university internal regulations in order to manage issues related to patents, licensing and academic spin-off,

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<sup>59</sup> First level of permanent position in the Italian academic recruitment system in the time interval analysed here

and secondly to the generation of several local actions in different Italian regions with the aim of incentivising or at least disciplining such practices.

From that time Emilia-Romagna has been one of the most active regions in Italy in promoting technology transfer activities (Ramaciotti 2008). The region, in the sphere of the POR (Regional Operative Programme) under the third objective of the ESF (European Social Fund), first activated in 2000 the “Spinner programme” in order to promote the occupation in research and technological positions. The consortium Spinner was formed by the regional higher education institutions of public research, represented by five universities and three public research institutions. Spinner objective is the realization of projects aimed at the valorisation of human capital, promotion of research, technology transfer and innovation activities, also and above all by the creation of new ventures, not necessarily spin-off. Among various measures within the Spinner programme, the most important regarded the provision of resources and complementary services to conduct a feasibility study of the duration of one or two years. The first Spinner programme took place in the time period 2000-2006, while the second is started in 2007 and will last until 2013.

#### **4. ASOs in Emilia-Romagna: a Special Pattern of Behaviour**

In this section the aim is to show how the creation of an academic spin-off can be seen as the result of a peculiar pattern of behaviour. We conjecture that creating an ASO allow doctorates to exit the academic environment but at the same time to undertake a career path linked to their academic background. The context of analysis is particularly relevant and the institutional framework dynamics seems to have played a central role in shaping the incentive mechanism toward the creation of high-tech firms. Let us now explore the history of the academic spin-off in Emilia-Romagna.

Firstly we need to define what we mean for academic spin-off: as our intention is to study the transfer of academic knowledge in the market place via new firm creation, we can rely on a broad definition of ASO. We therefore consider ASOs all those firms created by at least one academic permanent researcher, on an idea of business generated within the academic environment. Such a broad definition is similar to the definition used by Netval (Network for the valorization of public research) and by Osiride (Observatory of Emilia-Romagna spin-offs), and this allow us to refer to their available data in order to map the regional ASO. Matching the information of those two sources, with university and research centres websites, we mapped 92 ASO in the Emilia-Romagna created from 1996, year of the first ASO in the region, to the 31st of 2007. The table below shows the number of firm created per year from 1996 to 2007.

**Table 3** ASO created in Emilia-Romagna per year of constitution (1996-2007)

<b>Year of constitution</b>	<b>Number of ASO created</b>
1996	1
1997	1
1998	0
1999	5
2000	4
2001	5
2002	5
2003	16
2004	16
2005	22
2006	8

2007	9
Total	92

We can clearly see that from 2003 there has been an important increase in the number of ASO created compared to before. Surely the effects of law 297, an indirect stimulation to create ASOs, that has been put in operation by the government only in 2000 via the D.Lgs 593, have been revealing its effects with some years of lag. Moreover the implementation of the Spinner programme played an even more important role. As said, the first Spinner programme took place from 2000 to 2006. Four calls for proposals have been activated in this interval: the first one at the end of 2000.

Considering that ideas have to be tested for one or two years, its effects on the number of firm created, for an important part, can be seen only from 2002-2003. However some few business ideas awarded by the Spinner programme constituted as firms even before the end of the testing phase: therefore some ASOs benefited from Spinner and constituted since 2001.

The following section aims at investigating the reasons that moved the founders to start a business from the university research outcome. In particular we will proceed basing our considerations on two sources: firstly we will analyse the Spinner data in order to understand detailed characteristics of the founders, and secondly we will rely on 12 face-to-face interviews to different ASOs, some of which did not benefited from the Spinner programme and some of which have been constituted before its implementation.

## 5. Empirical analysis

### 5.1 Data

In order to examine our conjectures, we rely on two main sources of data: the Spinner database, and a multiple case study research (Yin 2003) based on 12 face-to-face interviews with selected ASO firms. The Spinner database comprehends not only ASO firms, but also general high-tech start-ups whose business has not been directly generated within the academic environment. Therefore our first source of data is a dataset composed by the ASOs that have benefited from Spinner.

The table below shows the proportion between ASOs population and ASOs that benefited from the Spinner programme. We can see that 51 ASOs have benefited from the Spinner programme: such group represents 62% of the total population from 1996 to 2006, and 72% of the population of ASOs generated from 2001 to 2006, that is during the presence of the Spinner programme.

Year of constitution	1996-2000	2001-2006	1996-2006
Total ASOs	11	71	82
ASOs created via Spinner	0	51	51
Percentage of ASOs created via Spinner	0	72%	62%

We then conducted 12 face-to-face interviews in order to understand which were the reasons that moved the founders to create an ASO firm, and to understand how the team of founders evolved in the early stages of development of the firm, in order to see which, if any, human capital dynamics took place. The interviews were therefore directed to understand why a group of people decided to go ASO, how did it happen, and how and why did the firm evolve in some particular way (Yin 2003).

In order to select the sample of firms to be interviewed, we followed some main steps. A first selection was made by concentrating on university spin-offs: 12 of 82 ASO has been

generated within a public research institutions that is not a university. Of the 70 left a second choice was made from a sector type selection. The overall ASO database was first divided into four groups, according to the origin of the university and then each group was divided into sub-groups by sector. A sub-database was then created. For each university group, only the most populated sector was taken into account until there was half the number of university ASOs. Such selection process has been done in order to investigate our research conjectures in those fields in which the process is more consolidated. That is, we chose to concentrate in those sectors in which creating and ASO represent a sort of common practice. This selection process resulted in a new database of 45 ASOs. Each university group was made from a number of ASOs, ranging from 8 to 12 firms. At this point, gathering data mainly from local Chambers of Commerce, indicators of performance, including turnover volume, turnover growth rate, number of employees (where available), presence of patents, and presence of Venture Capitalist funding were analysed in order to create a sort of hierarchy of ASOs in terms of performance (Eisenhardt 1989). Once the list of potential ASOs had been produced they were contacted by phone. At least two firms per university were reached and directly interviewed using a semi-structured questionnaire. Before each interview was conducted, background material from the Chambers of Commerce, from firm website and from university's TTOs was collected. The average time of the interviews was one hour, ranging from 40 minutes to more than 2 hours. The interviews have been always directed to a manager or executive of the team. In two cases the interviewed was not a founder, and we therefore had a following phone interview with a founder in order to refine the interview's answers.

Finally, in order to provide triangulation (Yin 2003), we had a three hour interview with the Spinner Programme director, that was at the same time the university manager of the TTOs of one of the four universities of the region. Such figure played a crucial role in all the selection process of Spinner ideas of business, and was deeply involved in the ASO creation phenomenon taking place in the region.

## **5.2 Spinner data analysis**

The analysis on the Spinner dataset aims at investigating the founders occupation at the moment or previous to the firm creation, that is if academic or not, and the type of positions they were employed, that is if temporary or permanent.

First of all it has to be noted that the number of personnel involved in the ASO teams decrease significantly from the first to the second survey, that is from the moment of constitution to the moment in which the firm is more or less settled in the market place. This is due to two main reasons: first of all a selection process led to the survival of only a part of constituted firms. It is acknowledged by the literature that high-tech firms in general reveal an high rate of failure in the very early stage of development (see e.g. Santarelli and Vivarelli 2007). In particular, from the dataset, we can see that of the 51 ASO firms that constituted, only 44 survived for more than one year after constitution. Secondly, it may be the case that market feedback led to a decrease in the number of personnel involved in the businesses.

The table below gives us a picture of the situation in the two points in time of the firm development at our hand. In particular three main aspects are observable in our perspective: first of all the share of individuals coming from academia on the totality of individual involved goes around 90%, meaning that ASOs are almost entirely constituted by university personnel. Secondly the share of temporary workers on the totality of individuals coming from academia is high, around 60%. Third, as the firm get settled in the market place, the share of workers coming from academia and above all, the share of academics and of temporary workers coming from academia, increase.

	Number of individuals involved	Coming from academia	Share of individuals coming from academia	Temporary workers coming from the academia	Share of temporary workers coming from academia	Tenured academics	Share of tenured academics
Constitution	227	198	87%	117	59%	81	36%
After constitution	157	142	90%	90	63%	52	33%

And fourth, the number of academics with a permanent positions decreases when the firm get established in the market. We will seek to investigate why this is the case by the interviews: however it may be assumed that the technological support that academics can give to a firm is higher in the very beginning when the firm's products are not well defined yet, and become less important when the product is already on the market place, and its further development is mostly the answer to market feedback than edge-science-based improvement.

Summing up, from the analysis of the characteristics of the ASO firms founders that have been created under the incentives of the Spinner programme, it emerge that ASO firms are almost entirely a university matter, in which the involvement of young scientists is consistently higher than the involvement of tenured academics. Moreover the dynamics of the proportion of young academics compared to tenured ones seems to indicate that such firms are mostly organisation for the exploitation of young scientists' competences. In other words it seems to us plausible to argue that such firms could mainly have been created by young researchers that sought a way to exit the university environment, but remaining employed in the former field of study. Let us now test such conjecture via the interviews.

### 5.3 Interviews

In the previous section we saw that a significant share of regional ASO firms is constituted mainly by young researchers. In order to better understand the motivations that pushed such scientists in undertaking such a career, we conducted 12 face-to-face interviews.

The interviews revealed that the difficulties in remaining within the academic environment played an important role in the decisions of creating an ASO. One of the interviewed ASO, that has been created during the Spinner programme but that did not received nor applied for the Spinner support, revealed that the reasons lying under the decision of creating the firm were entirely pecuniary. This ASO is a sort of black swan within the regional environment, because of its high capacity of getting venture capital financing compared to the other regional ASOs and because it resemble the typical case study research ASO, created to further develop a research result and IP products. After 5 years of existence such firm still does not put in place any operational activity and the objective of the manager is clearly to develop the technology until it will be exclusively licensable to a big multinational company. Such ASO is composed almost only by tenured researchers and external managers.

All other ASOs revealed different patterns of creation and development. From the interviews emerged that the behavioural patterns moving a team of founder to go ASO varies among our cases under study. Let us explore them in more detail.

Two of the ASOs interviewed have been created before the Spinner programme was put in place. One of them explained their decision of undertaking such a path of exploitation in this way.<sup>60</sup>

<sup>60</sup> All interviews were conducted in Italian and the translation presented has been done by the author.

“Professor X, given his fame and expertise in diagnosis technologies applied to electrical equipment, was asked by the rector to do a spin-off. The research group was a leading group in the field since decades and the eye on the market applicability of what we were doing was very well known by Professor X, head of the research group.”

In the proceeding of the interview we asked how was the team of founders and collaborators, if any, composed. This is an extract of the answer:

“The CEO of the firm has been from the very beginning the most brilliant PhD student of Professor X. The idea was to create a firm on the competences of the research group and, at least in the very beginning, to make it work thanks to the networking assets of the Professor. The objective was to create a venture able to hire the best students coming out from the department. And this is what more or less happened.”

Although the uncertainty in the university system was not the direct induce motivation of going ASO, it appears clear that the firm would have represented an important source of jobs for the young scientists of the department. On the contrary the other ASO generated before the Spinner explained the reasons under the generation of the firm as follows:

“Mr. Y. was a PhD student at the faculty of physics. His father was running an established business accustomed to buy core technology used in its main products from foreign companies. The idea was to make Mr Y. develop an opposite technology for the father’s company products. This is what Mr Y. did, at least in part, in its PhD programme. Once finished the PhD the university sold the technology to Mr Y. and a firm was created with the university partnership.”

We can see that in the above described cases, the main reasons to go ASO do not lie within the young researcher that wants to find a job and thinks in building a business, but in the external to the young researcher environment that pushed for the exploitation of his technological competences. In fact the university influence in the first case and the family push in the second played the major role. Nevertheless, the basic assumption of creating an interesting work position for young researchers represents an important part of the matter. The remaining 9 firms interviewed were created with the support of the Spinner programme. One of this has been generated on motivations similar to the first case analysed:

“In 2004 a large corporation contacted the research group of our professor in order to finance the study of 20-60 molecules: an important volume of work. The professor has a precise idea of academic research: it has to be half pure and half applied. This research contract would have shifted the research group’s attention to the applied research (more or less 80% applied versus 20% pure) going against the philosophy of the professor who was head of the research group at the time. However there was an opportunity, and it would have been a shame losing it. The difficulties in being employed at university, and the possibility for our professor of doing something for the society, something to tell around, to increase his prestige, and possibly to make some payoffs, lead the two

of us to become the founders of this firm. And we started the business feasibility study under the Spinner programme at the same time we were working for that company.”

Of the other 8 ASOs one have been created in 2001, and the Spinner programme was implemented when the idea of business was already in place within a group of young temporary scientists:

“When we decided that we would have created a firm, there was no Spinner, nor an ASO regulation within the academia we were working as freelance, both in the research and teaching domains. When the first Spinner call for proposals came out, we already had a well defined idea of business. We in fact constituted the firm even before the end of the feasibility study to do under the Spinner programme.”

In this case the intention of young researchers to escape the university environment was clear even before to know of the possibility of creating an ASO firm or of participating to the Spinner programme. In a subsequent passage of the conversation the two founders we interviewed stated:

“We were all temporary workers at university, and three of us [out of five] already had business experiences. The uncertainties linked to the academic environment together with the opportunity of providing to the local territory an integrated set of services moved us to the choice of setting up a business. Our professor therefore become part of the team, in order for us to create a spin-off.”

Basically, in all the remaining ASOs analysed it is evident the direct involvement of young researchers of creating a business in order to find alternative career paths in respect to the academic one. One of these ASO affirmed:

“Differently from other ASOs we had to look for a senior researcher that wanted to participate in our idea. We needed a professor in order to create a spin-off. And we wanted to do a spin-off because when nobody knows you presenting yourself with the university logo can make the difference.”

Among this group of ASOs, created (also) in order to secure job positions for young researchers, a peculiar case is the following: the idea was to create a company in which hire the best students of a master course managed by the professor. However the evolution of the firm revealed pretty soon some bottlenecks to such an idea. The CEO of the team, that was not a founder stated:

“When I was hired we were four. Me, professor Z., his student, and professor V.. The initial idea of setting up the business and let it be run by the best master students revealed pretty soon to be unworkable. In this business you have to be very connected with the environment. I was lucky because I used to work both for competitors and for clients: I knew the matters of the business. You needed experienced people to run this business, and you need to maintain the firm as flexible as possible. I basically took the situation at hand, and after some



months, professor V. left the company and the student is mostly carrying out administrative activities.”

In this case the business does not represent a way of escape to the academic environment, although that was the mission when the idea came to life. Moreover, from this bit of interview we can also see an explanation of the decreasing share of tenured researchers in the ASO team once the firm was operating in the market since some time. On this point another ASO said:

“The other two [senior] academics involved basically did not do anything. At the beginning the idea was much broader and now their role is mostly useless. We are working to make them leaving the company.”

From the interviews we can understand that different reasons lie under the decision of creating an ASO, but all of them except one, are evidently connected with the difficulties for young scientists to find a permanent position within the academic environment. In the case studies analysis we find evidence that some ASOs have been generated under already cited in the literature reasons, such as peer recognition, social approval and environmental push: however such reasons are always placed side by side to the difficulties for young researchers to enter the academia or the private sector. In other words the interviews we conducted basically confirmed our conjectures, and indicate that the ASO phenomenon in Emilia-Romagna, a region that offers to young researchers strong incentives to create high-tech firms, for an important part at least, represents a way of escape from a critical academic job market situation.

## Conclusions

In the last decade in Italy the supply of PhD graduates aiming to undertake a related to R&D career significantly excess the demand for them. Young graduates undertaking a PhD career largely aim at remaining within the academic system after the PhD. Numbers reveal this is quite of an utopia: in Emilia-Romagna universities are graduating a number of PhD that is four to five time larger than opening tenured positions. Moreover the private sector in the whole Italy does not valorise the doctorate title, and offer a poor alternative to university. Although the university system of the region not at all a closed system and several doctors tend to move abroad for pursuing their career objectives, the overall information provided in this work seems to indicate a critical scenario for young researchers wanting to do research both in academia or outside it.

The region analysed represent a rich and significantly innovative region. A consolidated high level of division of labour and the elevated intensity of formal and informal institutional activities, contributed to the development of a mechanism of creation of ASOs very much linked to the difficulties of being recruited in R&D positions. Moreover, the large expectation in terms of economic growth placed on the ASO phenomenon in the late nineties (Lambert Review 2003) that led government to directly and indirectly incentivise the undertaking of such practice, and the risk aversion of senior Italian scientists of leaving their tenured position (Chiesa and Piccaluga 2000), we believe, played an important role in shaping such pattern of behaviour in the region.

We saw that the Emilian ASO is pretty much a small firms, where the academics involved in the venture are mainly young and temporary researchers, whose share in the firm increase while the firm get settled in the market place. The present work sought to contribute to the understanding of the ASO phenomenon in two main ways. First of all our study enriched the literature on the non-technological motivations pushing scientists to go ASO, and secondly by showing how the context in which the process takes place, made of both organisations and formal and informal institutions, play a fundamental role in the development of the

academic entrepreneurship phenomenon and, above all, in the generation of patterns of behaviour. Or at least in Emilia-Romagna it does.

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# Innovation and SMEs in the new entrepreneurial environment of crisis

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The role of innovation as a vital driving force of economic development has been acknowledged widely. Additionally, Small and Medium Enterprises (SMEs) and entrepreneurs are considered to be the linchpin of all economies for creating innovation. Especially in an era of economic turbulence, innovation can be seen as the only realistic process that can lead enterprises out of the crisis. Based on the innovation taxonomies identified in the Oslo Manual namely organizational, marketing, process and product innovation a survey was carried out in a Greek region adapting the fourth Community Innovation Survey questionnaire. Based on the four taxonomies of innovation and their importance to the firm and to the country, a descriptive analysis is offered and preliminary results on the firms' innovativeness are derived. The study further captures the effects of economic recession on the firms' innovativeness. The survey was addressed to a sample of 43 SMEs business managers. Questionnaires included both open-ended and closed questions. The objective of this paper is to present a conceptual framework on how innovativeness can be affected by the economic environment in which enterprises are operating highlighting the specific elements that can prove beneficial to the enterprises' survival and growth especially during an economic crisis. The findings suggest that enterprises are more resistant to the effects of the financial crisis as long as they are introducing innovations in organizational, marketing, process or at a product level. The study contributes to the innovation literature by providing evidence showing that the enterprises' reaction towards a change in the economic environment is highly important to revitalizing the economy.

## Keywords

Economic crisis, Innovativeness, Measuring innovation, SMEs

## Abbreviations

CIS	Community Innovation Survey
GDP	Gross Domestic Product
OECD	Organization for Economic Co-operation and Development
R&D	Research and Development

## 1. Introduction

Innovation - being organizational, marketing, process and product innovation - is the engine of competition and of industry competitiveness [1], [2]. Companies innovate primarily by introducing new products in the market and innovating is a way of scoring points against competition. Nevertheless, innovation on its own cannot make a businesses blossom since market success and development is highly influenced by the economic environment (Workman, 1993) [3].

There is a consensus among economists on the innovative actions to be taken during an economic recession and crisis (Gulati et al., 2010; Hyytinen & Toivanen, 2005) [4], [5]. In that sense, these actions can be seen as the only realistic process that can lead enterprises out of the crisis. Also it is particularly relevant to study innovation in order to understand whether the crisis potentially affected firms' innovation and, in this way, their capacity to improve their competitiveness.

This paper seeks to examine whether innovative activities can be maintained in a difficult economic situation and if so will they constitute a valid way to cope with crisis and recession periods. The paper is organized as follows: In the next section, we put forward the theoretical background of the empirical analysis. Section three presents the data sources and the methodology. Section four presents a descriptive analysis and preliminary results on the firms' innovativeness in a Greek region. Finally, the last section contains discussion and conclusions.

## 2. Theoretical Framework

In the context of the green paper on innovation , innovation is taken as being a synonym for the successful production, assimilation and exploitation of novelty in the economic and social spheres. Innovation, at an aggregate level, represents the successful exploitation of ideas that are new to an adopting organization, into profitable products, processes and / or services [6].

The list of innovation taxonomies is really broad. It starts from architectural, modular, improving and evolutionary innovations, to radical, incremental, really new, discontinuous and imitative innovations [7]. In the literature the two categories of radical and incremental innovations are referred as the most embedded taxonomies [8], [9], [10]. Radical innovation refers to major changes in technology / knowledge that stem from the discovery of something new, while incremental innovations are major advances to an established technology / knowledge [7]. In Organization for Economic Co-operation and Development (OECD's) Oslo Manual, which provides guidelines for collecting and interpreting innovation data, innovation is defined as the implementation of products or production and delivery processes with new or significantly improved characteristics. The third edition of the Oslo Manual extends the definition to include new organizational methods in business practices, workplace organization, or external relations [11].

There are essentially four types of innovation as identified in this third edition of Oslo Manual for measuring innovation: product innovation; process innovation; marketing innovation and organizational innovation [11].

- Product Innovation, which involves a good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional

characteristics. In the education sector, a product innovation can be a new or significantly improved curriculum, a new educational software, etc [11].

- Process Innovation, involves a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and / or software. In education, this can for example be a new or significantly improved pedagogy [11].
- Marketing Innovation, involves a new marketing method engaging significant changes in product design or packaging, product placement, product promotion or pricing. In education, this can for example be a new way of pricing the education service or a new admission strategy [11].
- Organizational Innovation, involves introducing a new organizational method in the firm's business practices, workplace organization or external relations. In education, this can for example be a new way organization of work between teachers, or organizational changes in the administrative area [11].

### 3. Methodology

The authors conducted a survey research based on the Community Innovation Survey (CIS) 4 questionnaire concept in one Greek region, the Region of Western Macedonia. This research describes the four forms of innovation in the region, namely, product innovation; process innovation; marketing innovation and organizational innovation.

The sample that was used was random and face to face interviews were used as a method to gather information. From the analysis of the data gathered through face-to-face interviews the following key point areas were assessed:

- the number of staff, since usually small companies in terms of employees very rarely innovate,
- existence of Research and Development (R&D) activity indicating innovative policy and technological development orientation,
- proportion of workers with tertiary education as a prerequisite for the minimum sufficient level of human resources to manage the innovation process,
- existence of minimum "digital compliance" with the use of computers and internet, since today no business operates without them not to mention an innovative business,
- to date and future intended introduction of a new product, service, technology or organizational innovation, as it highlights an innovative orientation that may have existed or has sound foundation for it to grow in the foreseeable future,
- geographical markets for its products - services, since typically only companies with a supra-range (at least by national and especially international scope) develop or use extensively organizational and technological innovations.

The effort to use a multi-criteria evaluation for each criterion (question), was assessed as inelastic in the sense that it removes the value of empirical knowledge on entrepreneurship and entrepreneurial activity in the region and instead the empirical and synthetic analysis was preferred, taking into account each and every single criteria - questions with special reference to the ones highlighted above.

This survey was based on the CIS 4 questionnaire 2008 which collects information about product and process innovation as well as organizational and marketing innovation. The questionnaire included eleven sets of questions examining the following:

1. General information about the company;
2. Organizational innovation;
3. Marketing innovation;
4. process innovation;
5. Innovative products and services;
6. Abandoned innovation activities;

7. Activities (internal, external, etc.);
8. Expenditure related to innovation, inventory information sources and collaborative innovation activities;
9. The impact and the extent of innovation outcomes;
10. Hampering innovation activities; and
11. Requests vesting copyright.

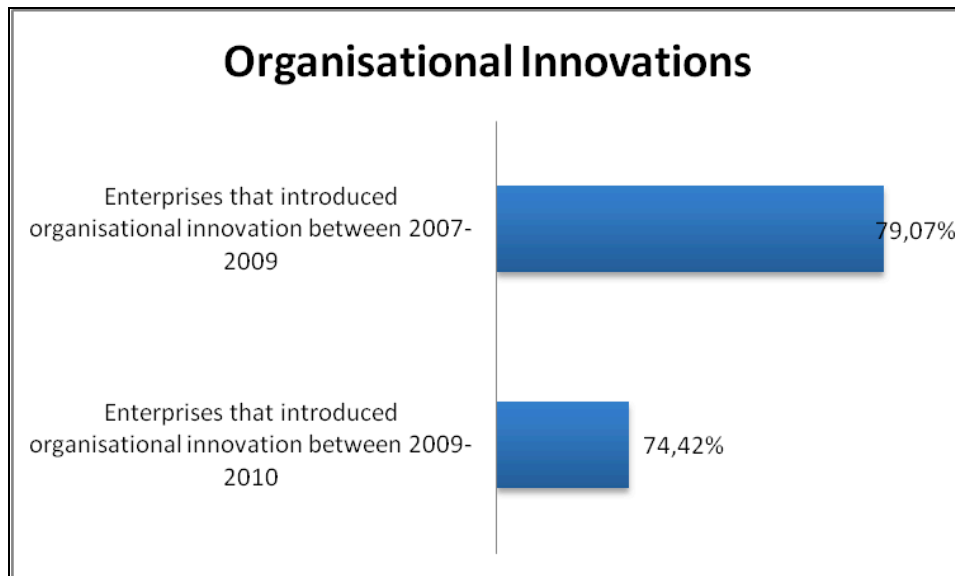
## 4. Descriptive Analysis

In Western Macedonia, the organizations that can support the regional innovation system are the Western Macedonia Development Agency (ANKO SA), the University of Western Macedonia (UOWM) and the Technological Educational Institute (TEI), which has set-up the Western Macedonia Research Institute. The region's economy is based heavily on the secondary sector (Table 1) due to the mining activities, the production of electric power (70% of country's total power is produced in the Region) and the fur-leather sector (Regional Innovation System of Western Macedonia, Program TeRIS, 2006).

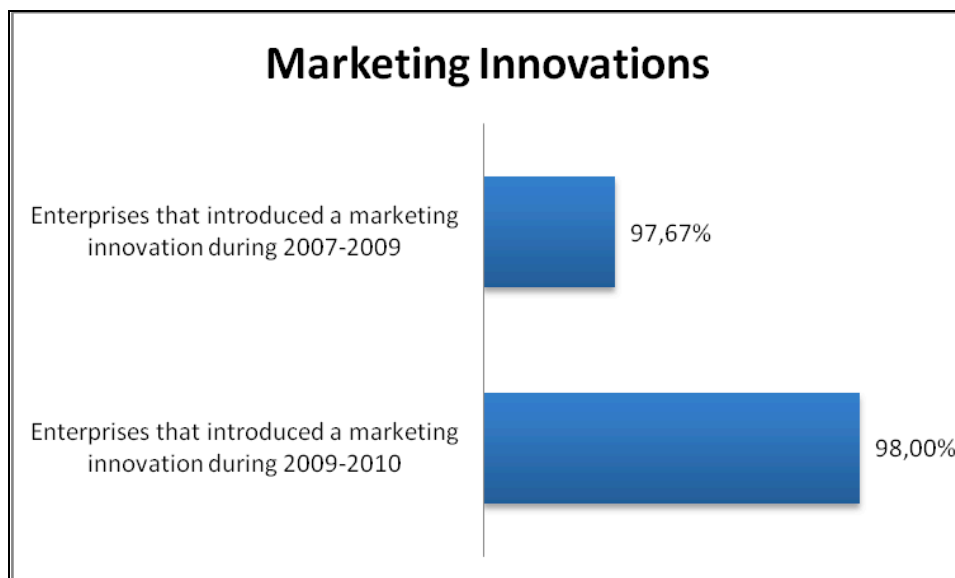
**Table 1** Western Macedonia Gross Domestic Product (GDP) and Employment by sector of activity [12]

	<b>Regional GDP</b>	<b>Employment</b>
Primary sector	13.4%	23.5%
Secondary sector	47.5%	32.9%
Tertiary sector	39.1%	43.6%

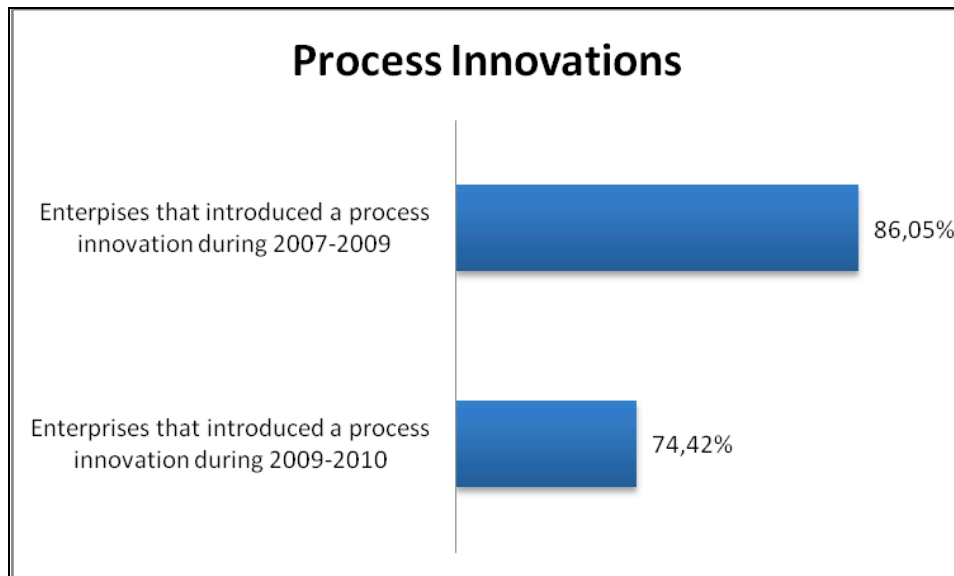
Initial results of the analysis of the data showed that in total of 43 enterprises that were studied for the two periods 2007-2009 and 2009-2010 the majority of the enterprises have introduced organizational, marketing, process and/or product innovations. However, the financial crisis has variably affected the introduction of innovation in the four categories. As shown in Figure 1, organizational innovations were introduced in a higher percentage of enterprises before the crisis than after it. Figure 2 shows that marketing innovations were introduced at a much higher percentage during the period 2009-2010 than before the crisis. Figure 3 shows that process innovations were introduced at a much higher rate during the period 2007-2009 than after the crisis. Figure 4 shows that product innovations were introduced at the same percentages during both periods.



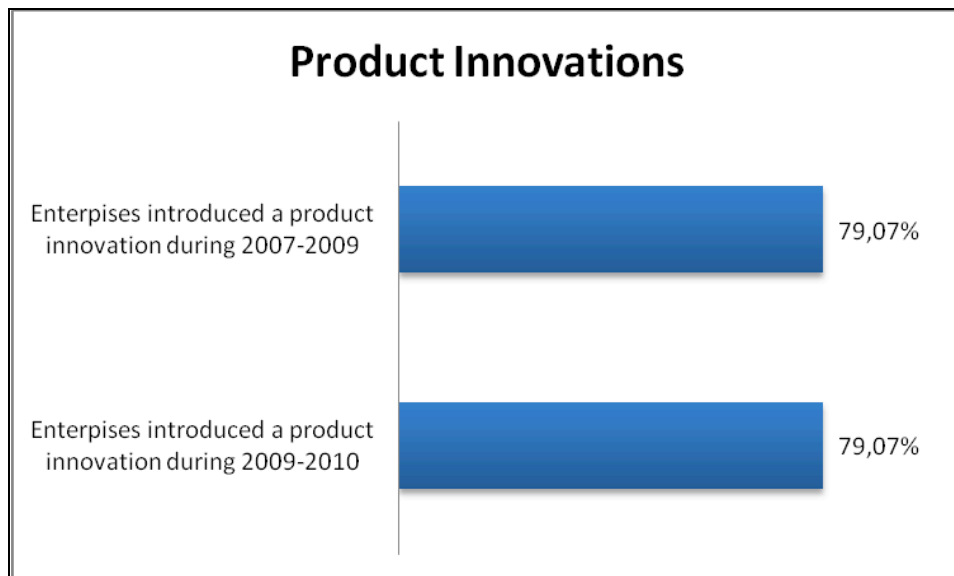
**Figure 1** Enterprises that introduced organisational innovations



**Figure 2** Enterprises that introduced marketing innovations



**Figure 3** Enterprises that introduced process innovations



**Figure 4** Enterprises that introduced product innovations

The initial data analysis showed that during the period 2009 - 2010 which is characterized by limited recourses due to the global and also the national economic crisis, the enterprises were more likely to introduce innovations in marketing or products. Innovations in marketing and products may have been considered a way to overcome the decrease in sales and therefore a way out to prosperity.

## 5. Conclusions

This study has been motivated by a need to improve our understanding of the current crisis's results on the four innovative taxonomies used to measure innovation in SME's. Using the CIS 4 questionnaire to a sample of SMEs, this study has sought to investigate whether innovative activities can be maintained in a difficult economic situation and if so will they



constitute a valid way to cope with crisis and recession periods at the SMEs of a Greek region.

In the present study what we observed is a difference in the augmentative growth of product and marketing innovation, and the decreasing tendency in organizational and process innovation. This is a result of the direct need of SMEs to cover their lost turnovers caused due to the recession. On the contrary the companies should be investing more to organizational and process innovation in order to reorganize their operations, improve their processes in order to survive the crisis and become more competitive overall in the new coming markets worldwide. The study's initial results indicated that a more in depth analysis should take place in order to investigate further the parameters of innovation within the crisis.

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# Doha Round negotiations of the World trade organization and the growth of the global economy

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Doha Round negotiations of the World Trade organization (WTO), or Doha Development Round, or Doha Development Agenda (DDA), starting in November 2001 as a continuation of generally successfully completed Uruguay round of GATT (The General Agreement on Tariffs and Trade), to realize the crucial goal: through further liberalization of global trade to enable fast and stable growth of the overall global economy. The economic growth is generally defined as the increasing capacity of the economy to satisfy the wants of the members of society. Economic growth is enabled by increases in productivity, which lowers the inputs (labor, capital, material, energy, etc.) For a given amount of output. Lowered costs increase demand for goods and services. Economic growth is also the result of population growth and of the introduction of new products and services. Central issues for the Doha Round negotiations are questions of agricultural products, tariffs and non-tariff industrial barriers, service activities and trade remedies. The strongest differences between the Member States participating in WTO Doha Round negotiations formed the basis of their economic development. Thus, formed two blocs of countries with strongly conflicting economic interests: the developed countries-US, EU and Japan and developing countries, led by emerging economies of the BRICS club-Brazil, India, China and South African Republic, but without Russia, which is a member of the World Trade Organization, and with the addition of South Korea. Also, at this stage of negotiations within the Doha round, must have received the most publicity quite strong confrontation between the US and the EU in terms of subsidizing agricultural production in the EU. US accused the EU that it is essentially subsidizing the import non-tariff barriers in world trade in agricultural products, because by subsidizing agricultural products from the EU receive shop better position that has no real economic content, respectively, through subsidies to break down competition which must be set on the basis of quality and productivity. In any case no doubt as to the liberalization of trade in agricultural products has been confirmed as the central and most important question so far, and likely future course of negotiations within the Doha Round. The essential problem of the negotiations within the Doha round was manifested at the Ministerial Conference of WTO, held between 10 to 14 September 2003 in Cancun, Mexico, when participants failed to agree even on the general framework for the continuation of negotiations. The last serious attempt to resume negotiations was made in Geneva in July 2008th But then no progress. The problem was again the rules of global trade liberalization in agricultural products. Since then a separate call to resume negotiations and find out some mode of their termination, but without success.

## **Keywords**

Doha round, Uruguay round, trade liberalization, World trade organization, global economic growth

## **Introduction**

Favourite thesis of all theoreticians and the groups of supporters of liberalization and deregulation of global trade relations, and in general the overall global economic relations, is that thus laying the foundations of a reliable, high and stable global economic growth. In any case, they argue that any negative effects of the processes of liberalization and deregulation of global trade and overall economic relations are minimal and transient in comparison with indisputable high relevance sides and positive effects of these processes.

This thesis for the high level of positive correlation between liberalization and deregulation of the total global economic, including trade, relations and global economic growth lies at the root of all existing theoretical mod-defined and practically implemented political processes of liberalization and deregulation of the overall global economic including trade relations. The organizational and institutional level these processes of liberalization and deregulation of global economic relations are defined theoretically and practically - political implemented first by GATT (The General agreement on tariffs and trade), and then through the WTO (The World trade organization).

In fact, negotiations to liberalize world trade relations of the real effective way its basic organizational and institutional structure got through the establishment of GATT, and as the highest level of organizational and institutional centralization in the circumstances of very strong opposition to the individual/group of state and/regional interests and objectives of the members of GATT, ie the participants in the negotiations.

Generally successful completion of negotiations under the GATT, or generally successful completion of the Uruguay Round of GATT, allowed to move to higher and more specifically the level of negotiations to liberalize world trade relations. Moreover, generally successful completion of the Uruguay Round of GATT and enable organizational and institutional raise a qualitatively higher level such as the World Trade Organization.

The generally successful completion of the Uruguay Round in reality established a general framework of the significant level of liberalization of world trade, of course within the consensus reached between real pretty significant conflicting interests of the participants in those negotiations. That means the side of the conflict between developed countries and developing countries, on the side of the conflict inside the club of developed countries. In any case, of course causes and genesis of these conflicts are directly in the zone of conflicts their national or regional economic and trade interests.

Generally, the successful completion of the Uruguay Round lay the foundations and set the path to be set and we should move next round of negotiations to liberalize global trade relations, now under a higher organizational and institutional form-WTO. This new round of negotiations to liberalize global trade relations is the Doha Round (or Doha agenda), named so after the Emirati capital of Qatar (some call this round and round Qatar or Qatar agenda), which is held its initial meeting general agreement and commencement.

Commencement and conduct of the current Doha Round, the nature of the conflict of interests of various participants in these negotiations, its particular agenda and certain similar questions are in fact the core theme of this paper.

## ***Global trade liberalization and economic growth***

Generally speaking, free trade or trade liberalization represents the wealth of free market offers and demands, respectively, in this sense speaking, free trade, free movement

represents, ie free allocation, market resources (more on that in this paper: Klenow, 1997). In this way, free trade is differentiated in terms of regulated and trade restrictions (more on that in this paper: Kaempfer, 2002), and when it comes to internal trade (trade within a country or a national economy), and when it comes to foreign trade (trade between two or more countries and global trade). We can conclude that freedom or obstruction of the various trade relations are ultimately determined by the states, their economic and commercial interests, or by their specific economic policies are trade-whether those interests will determine the policies of free or regulated trade (more on that in this paper: Irwin, 2010). State regulation, or regulation by certain unions of states and international / regional organizations may also refer to the availability of certain goods and services and their cost (usually limited as the maximum price) at which must be sold in the markets.

As a rule regulating the markets, that their closure is intended to guide policies of protectionism, policy of protection of national or regional market entities protected so only the market can realize their interests (more on that in this paper: Efere, 2002). These are market entities in specific market conditions do not possess adequate market competitiveness could be their interest to implement a free competitive market. Protectionist market policies, state interventionist policies by the theorists of the concepts of free markets, or by the theoreticians of the concept of liberalization of global trade are critiqued on how their policies could eventually bring only limited and short-term economic benefits, but never can bring longer, sustained and substantial economic benefits, that will be a function of market competitiveness, economic growth and ultimately the general social welfare (more on that in this paper: Trachtman, 1998).

Looking from a historical perspective, one can conclude that the actual process of liberalization of trade relations began in the middle of the 20th century. Then begin to define and implement trade policies of reduction or complete abolition of the various obstacles present and then applied in trade relations, especially tariff barriers in international trade. Of course, that despite the trend of liberalization and deregulation of global trade relations, states or regional organizations never gave up on taking certain trade policies to protect their economic entities (non-tariff barriers, subsidies, quotas, taxes...) or their specific economic and trade interests, the conflict set on some other national or regional special economic and trade interests (more on that in this paper: Winters, 2004).

Of course, theorists of high importance to the policies of deregulation and trade liberalization on economic growth (speaking in the national and international context) set his theories and define in a broader economic and commercial context, whereas strong say a huge impact on the real liberalization and deregulation of trade relations on economic growth (more on that in this paper: Thirlwall, 2000) may come to the fore and to manifest their full positive results, only if liberalization and deregulation be coupled with some other necessary and necessarily complementary economic/social-economic policies as, for example, the policies of liberalization and deregulation of financial markets, reform and privatization of public/state economic entities/companies, introduction and strengthening of competition and antitrust practices, protection of industrial and intellectual property. . . That is, policies of deregulation and full liberalization of the overall economic relations (more on that in this paper: Parikh, 2004).

From all this emerges clearly seen that the theories of liberalization and deregulation of trade and economic relations of the total, practical, and relevant policies and theories and specific policies for the high positive correlation between economic and trade liberalization and deregulation and economic growth, actually (neo)liberal theories and policies. Theories and policies in the current financial crisis and economic circumstances strongly criticizing the theoretical and political practice are reviewed, and how theories and policies in a very direct way and with very strong influence are in the midst of crisis. On the contrary, economic theory and practical economic policies which have aimed at resolving the crisis situation in its essence theories and policies of state interventionism, theories and policies of state regulation of economic, financial and trade relations, theories and policies to regulate the

markets even theories and policies of certain protectionist views and practices (more on that in this paper: Sasajkovski, 2009).

This place must be stated and emphasized that, for example, constantly in official statements from ministerial meetings or summits of the G-20 is especially emphasized, it is proposed and required solutions of various output current financial and economic crisis, economic theory and practical-political not perceived and not out of line eventually closing in their state or regional economic and trade terms, ie not to set up and eventually realize the line of taking various measures and mechanisms of interference the functionality of the existing level of liberalization and deregulation of global trade relations. So as they modern global trade relations are set on the basis of generally successfully completed Uruguay round of GATT and are grounded and regulated by the current principles and rules of WTO. In this sense usually indicates, by the (neo)liberal economic theorists and by the (neo)liberal ideological profiled governments, parties and politicians in a very negative experience undertaken isolationist and protectionist measures of the U.S. government of then president Herbert Hoover took an important element of the complex of measures for overcoming the Great Depression (1929-1933). Moreover, one of which pontine commonly used is the one that draws parallels with the comparative and the then current level of established of globalization and the total, not just strictly a trade, economic/socio-economic relationships (more on that in this paper: Macdonald, 1997). In that sense strongly emphasized that if so many years before the economic and trade protectionist measures are not adopted, even a short-term, serious and significant positive results, then these positive results can never be expected, even in a very short term, in today's world of high level of global trade and overall economic / social-economic interdependency (more on that in: Globalization for Development ..., 2008).

At this point in covering the topic of this paper should go over the kind of elaboration and concretization and processing of separate elements of the complexes of liberalization and deregulation of global trade relations contained in the Uruguay round of GATT (round which generally meet and satisfy expectations and hopes of the liberal economic theorists and liberal ideologues and politicians) as well as the elaboration and concretization and processing of separate elements contained in the complex agenda of the Doha round of negotiations within the WTO for further liberalization and deregulation of global trade relations (round which is actually blocked in extremely strong conflict of conflicting interests, national and regional participants in these negotiations-the Member States of the WTO). That way you will clearly see who/which should be in the future specific elements of complexes of liberalization and deregulation of global trade relations that have a direct and strong impact on global economic growth, and thus and thus on global welfare-at least as they claim (neo)liberal economic theorists and (neo)liberal ideologues and politicians.

### ***Uruguay round of GATT***

Uruguay round of GATT is actually composed of eight separate rounds of multilateral trade negotiations (Multilateral trade negotiations/MTN) who went under the General Agreement on Tariffs and Trade (General Agreement on Tariffs and Trade/GATT), in the period 1986-1994, and by the 123 signatory countries to the GATT (Uruguay round agreement, 1994). This round of negotiations on the liberalization and deregulation of global trade round is called Uruguay since its inception took place in Uruguay in the city of Punta del Este, in September 1986, and certain stages of negotiations were held in Montreal, Geneva, Brussels, Washington and Tokyo and the final document of this round of negotiations, the Marrakesh Agreement, signed in April 1994 in Marrakesh (Morocco). In fact, generally the successful completion of the Uruguay Round negotiations for liberalization and deregulation of world trade has enabled the establishment of the World Trade Organization (WTO) as an organizational and institutional capacity building of GATT (Marrakesh Agreement, 1994). Agreed content within the Uruguay Round came into force, began to be implemented and

conducted in the period from 1995 to 2000, and in 2001 began negotiations within the Doha Round negotiations of the WTO.

The agreement reached in the Uruguay Round generally successfully liberalized certain significant commercial areas of the complex of global trade.

However, the main area of the overall structure of international trade relations, which was separately subject of negotiation, was trade area in agricultural products (this area is also the main area of negotiation in the framework of the Doha rounds of negotiations) and in respect of such trade area are manifested the strongest separate conflicts between trade and economic interests of the countries/regions participating in the negotiations (The Uruguay Round Agreement on Agriculture, 1994). The Uruguay Round to allow conversion of quantitative restrictions on trade customs rules, as well as allow phased reduction of tariff rates. Furthermore, the agreement reached under the Uruguay Round negotiations and imposed rules and disciplined behavior in terms of state funding/subsidizing the export of its own agricultural production and general subsidization of domestic agricultural production, as well as the obligatory taking of necessary sanitary and phytosanitary measures, necessary to achieve the necessary and required quality and safety of agricultural production. The liberalization of global trade in agricultural products has emerged as a central issue in the Uruguay Round negotiations, of course, because that question, as objective and realistically looking at the issue in respect of which the strongest way were confronted views of countries participating in the negotiations, but beside him on the agenda of these negotiations even more prominent place had separate issues of the existing restrictions on foreign investments and start the process of trade liberalization in areas of banking and insurance services, and the issue of initial request to sanction contempt's and abuse of intellectual property.

### ***Doha round of WTO***

In general the successful completion of the Uruguay Round of GATT in reality set the general fundamentals of the system of rules for deregulation and liberalization of world trade rules and how the WTO (more on that in this paper: Finger, 2001). These common grounds must then be developed in certain fields of global trade relations. It actually is the mission and task of the Doha Round or the Doha agenda, the WTO (more on that in this paper: Hufbauer, 2010).

Doha Round was launched in Nov. 2001 at the Conference of Ministers of WTO member countries and continues to last until today without any more success (more on that in this paper: Bhagwati, 2011), although they are held several ministerial conferences, which was particularly noticeable real debacle of the ministerial conference held in Cancun (Mexico), in September 2003 (more on that in this paper: Baldwin, 2004).

At this conference was to agree the framework for future negotiations continued, mostly, quite understandably, in the area of global trade in agricultural products, simply because that trade area is certainly first and foremost point of conflict negotiation in the Doha Round.

Can identify and define several important direct causes of the collapse of the ministerial conference in Cancun. In this sense, it may be noted that the EU withdraw some of the claims which previously insisted in the liberalization of trade in agricultural products, but keeping up the developing requirements of the United States. Besides this reason, the conference showed that some countries do not come to negotiate seriously, that did not show any significant flexibility in the negotiations. The conference clearly and obviously proved particularly differences between developed countries/regions and countries/regions in development too large, and that at the moment of holding the conference is not possible to find a mode of consensus among them. There are also indications that the conference could not go with the hardest issues to resolve, but, by contrast, should first be reviewed and negotiated on issues where the differences are smaller and probably easier that could to reach an agreement (more on that in this paper: Hanrahan, 2006).

In 2008 made an interesting attempt to revitalize the negotiations with the participation of the United States, China and India, which ended in failure, with the cardinal intended to define some specific modalities of the negotiations, through which could eventually facilitate negotiations and to break crisis in the negotiations and their disruption. So, let's be completely clear, then not only not done even the slightest approximation to the essential differences between Member States of the WTO, but even more, ended without success and failures, the purely formal level, to define the (formal) modalities for negotiation. Of course, in this case the failure to define the modalities of negotiations on liberalizing world trade in agricultural products was the center of the conflict situation. Namely, the form of negotiations or modalities of the negotiations, the relationship was not reached agreement, refer exactly to the negotiations for the liberalization of global trade in agricultural products.

Negotiations under the Doha Round is the real victim of the high level of conflicting commercial and economic interests of Member States and regional organizations, the WTO participating in them. These are the conflicting interests that exist at the level of developed countries and regions versus countries and developing regions (group BRICS-Brazil, China, India, Russia, but not because she is not yet a member of the WTO), and also it are conflicting interests within the group of developed countries and regions, and especially in the triangle between the United States, Japan and the EU. The biggest question that came to full expression of conflicting interests of participants in the negotiations within the Doha round is still the issue of liberalization of global trade in agricultural products (more on that in this paper: Whalley, 2008).

After the failure of the attempt in 2008 to restore the negotiations within the Doha Round, although the level and importance of negotiating and reaching agreement on modalities and productive forms of real fruitful and effective negotiation, in 2010 an initiative was launched by this Director the WTO, Pascal Lamy (may be an interesting fact that this feature came from the position of Commissioner/Minister for Foreign trade Commission/Government of the EU), and then left Brazilian President Luiz Inacio Lula da Silva, who urged the presidents and prime ministers of member states significant WTO, and the club of developed countries and the club of developing countries, but specifically targeting the U.S., for establishing and practicing extremely serious approach to the renewal of negotiations, so this round of negotiations to ended with consensus/agreement by the end of 2010. Certainly no need to stress that results from this call are negative.

Specifically speaking, the subject of negotiations within the Doha round further reduction of trade barriers that affect limiting the freedom of modern global trade relations. The reduction of these trade barriers within this round of talks primarily and specifically refers to areas of the commercial agriculture, industrial tariffs and non-tariff restrictions industrial, services and trade remedies (more on that in this paper: Harbinson, 2009).

In this regard it should be noted that special interests strongly opposed the US-EU on the liberalization of global trade in agricultural products. U.S. accused the EU through the high and various subsidies to agricultural products in the EU, and non-economic and non-market seeks way to increase the trade competitiveness of agricultural production in the EU, ie the competitiveness of agricultural products from the EU is built on the basis of their quality and productivity of agricultural production in the EU (more on that in this paper: Lovett, 2002).

Because this conflict is conducted a thorough reform of the Common Agricultural Policy in the EU (CAP). As the basis of this reform is established and adopted Agenda 2000 as a seven-year budget plan for the EU 2000-2006. With the Agenda 2000 agricultural policy is directed not to subsidize almost obligatory overall agricultural production in the EU, but, quite contrary, through the budget of the New Agricultural Policy of EU finance/subsidize agricultural production with the required quality and the necessary productivity dictates that global (liberalized) market for agricultural products. The Agenda 2000 is actually the common agricultural policy and agricultural production in the EU are set on the basis of quality, productivity and global competitiveness, sustainability ("green" component of NCAP) and the total support of rural development. The determination of the overall rural development

agenda in 2000 in its holistic nature, the approach to rural development agricultural production with its required quality, productivity and global competitiveness are seen only as one of the components and dimensions of the overall rural development, in addition, for example, components of rural tourism, small rural entrepreneurship, rural crafts ... (Agenda 2000, 2000).

With full right to say that within the Doha round of WTO negotiations with success (with consensus/agreement) completed negotiations (on August 30, 2003) the issue of Trade-Related Aspects of Intellectual Property (Trade-Related Aspects of Intellectual property Rights/TRIPS), and with special respect to trade-related aspects of intellectual property rights of pharmaceutical companies and their products/medical patents. This means that the issue of conflicting interests between the safe side of the developed countries/regions and countries/regions in development has not yet objectively weighing the conflicting interests (economic, commercial, financial) to the issue of trade in agricultural products. Quite generally speaking we can say that there is agreement that, at least in general, has satisfied the interests on the one hand, the pharmaceutical companies to retain rights to their patented products, on the other hand, the needs of public health developing countries to use modern and effective medicines (TRIPS Agreement, 2003).

## **Final Point**

Due to the limited space of this paper, this place just left us to strongly underline the basic knowledge of previous analysis of the topic of labor.

Namely, it is sufficient and only superficial understanding of fundamental topics as the agenda of negotiations under the Uruguay round also, and more than that, when you realize the main topics on the agenda of negotiations within the Doha round, without any such dilemmas and very obvious conclusion to assert that trade liberalization in agricultural products is the most important topic for future (ie the successful completion of) the negotiations for the liberalization and deregulation of world trade.

The liberalization of global trade in agricultural products, surely not coincidentally, was the main topic under the Uruguay Round and in the Doha Round negotiations to liberalize global trade relations. This fact is without any doubt indicates further conclusion that it is the global trade in agricultural products is one area of the total complex of global trade relations, which, in comparison with other global trade areas, is highly regulated by various national / state regulations (primarily with subsidies, such as production and exports of agricultural products) that impede the realization of the extent of free trade reached some others, too many important areas of the structure of global trade relations.

This fact, also without any doubt, leads to very natural and consistent conclusion drawn from the overall experience of the negotiations within the Uruguay and the Doha Round, that the resistance of the individual/selfish national/state interests as they see these interests and define national/state elite/establishment, the liberalization of global trade are the strongest and most hard right in the national/state agricultural economies, ie the area of trade in agricultural products.

It is obvious that in this area of trade in agricultural products is the biggest difference in the levels of competitiveness of national/state agricultural economies in the global market for agricultural products compared with the difference in the levels of competitiveness of national/state economies in some trade areas. It is quite logical conclusion stems from the fact unambiguously confirmed through experiences gained from the current negotiations under the Uruguay and Doha Round, that the level of conflicts of interests of the state/regions participating in the negotiations is the largest and strongest precisely in terms of intentions and efforts to liberalize global trade in agricultural products.

Central position in the negotiations on liberalization of global trade in agricultural products, also indicates quite clearly and utterly logical conclusion, and thus strongly arguing it, just



that the liberalization of global trade in agricultural products is one area of the overall structure of global trade relations, which in the circumstances of the diverse levels of liberalization of separate trades, with its high level of regulation, gives the widest/most productive space, through its liberalization, the positive impact, the growth of global trade relations, also the growth of global economic relations and the growth of global socio-economic prosperity.

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# Green Layers: Improving the Innovative Capacity of SMEs in the Dutch Greenhouse Horticulture Industry

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The Dutch greenhouse horticulture industry has a reputation to uphold of world leadership in high-tech innovation. The sector is characterized by innovation in production systems and automation, reduction in and greater efficiency of energy consumption as well as sharing limited space. Aspects of marketing and product innovation are more underdeveloped. In this paper we first try to establish a pattern in the ways that entrepreneurs in the Dutch greenhouse horticulture industry innovate, where their sources of information to innovative ideas lie and whether these (open) innovation strategies contribute to innovation performance. We continue by focusing on the question how the grower in the greenhouse horticulture chain can create added value and gain competitive advantage through market-driven innovation strategies and to what extent collaboration with others, both in gathering relevant information and in the implementation of innovative strategies, has influenced organisational success. The paper introduces an innovation and entrepreneurial educational programme. This programme aims at strengthening multidisciplinary collaboration between enterprise, education and research. Using best practice examples, the paper tries to identify barriers for market-driven innovation by looking at the resistance from the existing chain, the amount of support from (local) government, the knowledge infrastructure, knowledge development and knowledge dissemination. The paper illustrates how companies can realize growth and improve the innovative capacity of the organization as well as the individual by linking economic and social sustainability. The paper continues to show how participants in the programme develop competencies by means of going through a learning cycle of single-loop, double-loop and triple loop learning: reduction of mistakes, change towards new concepts and improvement of the ability to learn. Furthermore, the paper discusses our four-year programme, whose objectives are trying to eliminate interventions that stimulate the innovative capacity of SMEs in this sector and develop instruments that are beneficial to organizations and individual entrepreneurs and help them make the step from vision to action, and from incremental to radical innovation. Finally, the paper illustrates the importance of combining enterprise, education and research in networks with a regional, national and international scope, with examples from the greenhouse horticulture sector. These networks generate economic regional and national growth and international competitiveness by acting as business accelerators.

## **Keywords**

Branding, entrepreneurship, greenhouse horticulture, innovation, marketing, value creation

## **1. Introduction**

The Dutch government believes in the power of entrepreneurship. It aims to continue to build on the strengths of Dutch trade and industry to contribute to an innovative, prosperous and

sustainable society. Enterprises are encouraged to grow and to innovate in a country where knowledge flows and sustainable solutions are developed. It is the government's ambition to be among the top 5 of knowledge economies in the world [1]. For this purpose, nine so-called Top Sectors have been defined; two of which are Agro & Food and Horticulture & Plant Materials and stakeholders from the Golden Triangle (government, industry and knowledge institutes) are stimulated to deliver action plans to fulfil the ambition. The action plan for the horticultural industry [2] proposes a substantial growth of added value for the sector through consumer and market driven innovation. This added value is to be developed along the lines of intensive collaboration throughout the value chain and by playing a leading role in international entrepreneurship. Furthermore, fundamental, strategic and applied research should lead to viable innovations.

This paper focuses on the Dutch greenhouse horticulture sector, which is generally characterized by small scale, often family run businesses. For their revenues growers often depend on the Dutch auction system or confront the purchasing power of the large retail chains. Many suppliers frequently operate independently and horizontal and vertical collaboration throughout the value chain is limited. Knowledge transfer in this industry is often fragmented and innovation through collaboration takes up a mere 25-30% of the opportunities [3]. On the other hand, the Dutch greenhouse horticultural industry is characterized by world leadership in high-tech innovation [4]. The dynamics of the sector are innovation in production systems and automation, reduction in and greater efficiency of energy consumption as well as sharing limited space. Earlier analyses show that entrepreneurs in the greenhouse horticulture industry have traditionally focused on cost leadership strategies. Over recent years however, the industry has experienced the strong pressure of international competition. This means that competitive advantage and sustainable growth of individual enterprises are no longer a certainty. Yet, the sector's ambition is to innovate better, grow faster and become more sustainable than the competition in the rest of the world. Realizing this ambition requires strengthening the knowledge base, stimulating entrepreneurship and innovation (not just technological, but especially business process innovation). It also requires educating and professionalizing people. To help realize this ambition we have developed several regional innovation programmes.

## **2. Theoretical Background**

Historically, the Dutch greenhouse horticulture industry is renowned both for its export of products, and for its export of knowledge and entrepreneurship. As a small country The Netherlands closely follow Spain and the United States as third largest exporter of horticultural food products, well in front of China and the rest of the world [2]. The Netherlands are leading in cut flowers, flower bulbs and greenhouse technology.

A sector analysis [5a] [5b] shows that entrepreneurs in the greenhouse horticulture sector concentrate primarily on the technological, process driven innovations. This type of innovation focuses on production methods and this focus is characteristic for mature sectors of industry. Subsequently, for growers these technological innovations are closely linked to cost competition strategies and often result in low profit margins. Aspects of marketing and product innovation are more underdeveloped. The challenge lies in marketing innovation, in customer relationship, in developing new product/market combinations and in innovative entrepreneurship. Innovations in these fields are difficult to implement and require efforts outside the traditional comfort zone of the individual greenhouse horticultural entrepreneur, while return on investments is less predictable than it is for innovations in more advanced technology. Two innovation strategies are considered important in the mature stage of a sector's development [5] They involve initiating new life cycles through product innovation and realizing higher margins through product differentiation based on marketing innovations. The authors of that study propose that one important reason for directing more attention to

these innovation strategies is that, if successful, these generally generate greater economic gains than the current process innovations and cost competition strategy.

Initiating new life cycles is a niche strategy and can only be pursued successfully by a small number of entrepreneurs. Encouraging this type of innovation can best take place by building a new innovation system outside of existing institutions and structures. If effective, this new innovation system will help to bring about a cultural change in the entire greenhouse horticulture sector. Product differentiation as the second innovation strategy is considered more suitable for the entire Dutch greenhouse horticulture sector. It offers a means of shifting away from cost competition towards product competition, internationally as well as within the home market.

The virtual absence of reliable consumer information makes it hard for horticultural entrepreneurs to take strategic decisions on product innovation. Market research is often executed for the sole benefit of wholesalers or large retail organisations and seldom shared with growers. Conversely, the individual grower is often too insignificant an enterprise to be able to afford large-scale consumer market research. Furthermore, product innovations in the horticultural sector are notoriously difficult to implement. Creating new varieties or cultivars can easily take five years or longer and often is only successful at great cost. Marketing these new products raises the issue of how to brand them. Branding is the norm for manufactured and processed products, but horticultural products are generally fresh and unprocessed and have no brands associated with suppliers, growers or producers. For consumers to buy a product it should provide a number of cues on which the decision to purchase is based [6]. These cues can be intrinsic or extrinsic [7]. Intrinsic cues are those that would change the product itself if they were changed (e.g. taste, shape or colour), whereas extrinsic cues are not linked to the product itself (e.g. label, price or image). It is important to realise that extrinsic cues can be influenced by the producer or seller, yet for intrinsic cues that is much more difficult, if not impossible. If we wish to influence the consumers purchase decision, it would be easiest by influencing the extrinsic value of a horticultural product, thereby focusing on those cues that are most important for consumers to buy horticultural products. These are generally intrinsic and they pose further challenges as they can be either hidden or revealed [8]. Hidden intrinsic cues cannot be properly identified prior to purchase (e.g. flavour, taste or durability) and revealed intrinsic cues can be visually identified (e.g. shape, size or colour). The buying process usually develops along hierarchical lines [9] and before the decision to purchase is definite, subsequent cues are eliminated one by one [10]. By far the easiest way of influencing the extrinsic value of a horticultural product is labelling it. Labelled products are expected to fetch higher prices than unlabelled products. Consumers would be prepared to pay for labelled products if these products are difficult to inspect or too expensive to sample [11]. Most horticultural products are not too expensive to sample, but they are difficult to inspect. Labelling can reduce inspection problems. For products where labelling does not assist consumer decision making, the producer will only increase costs, without the corresponding increase in revenue, by labelling such products [12].

Greenhouse horticultural products such as fresh vegetables, fruits and potted plants are usually marketed as generic products. Labelling in these cases is done to provide information on country or region of origin, e.g. New Zealand kiwis or Dutch cucumbers. Labelling is also seen for products that are produced by a collective group of growers, e.g. FreshQ tomatoes or Air-so-Pure potted plants. Labelling products by names of the individual grower comes very close to actually branding the product. Even though the development of a brand name for consumers can be expensive [13], branding has gained increasing recognition as a marketing instrument to differentiate products in the horticultural industry [14]. Most agricultural brands enable producers or firms to distinguish themselves from their competitors in the chain. Once a brand is established it provides a differentiated product for the consumer and increases the added value for the producer [15]. Brands usually aim to meet consumers' desire for variety, quality and service, and usually allow producers to retain

higher profit margins [16]. A complicating factor in the horticulture greenhouse industry is that large retail chains are not interested in buying branded products, because they prefer to brand under their own private label. In spite of this, horticultural brands have been established in recent years around the world. The Dutch greenhouse horticulture sector has developed brands over the past decade such as Tasty Tom (tomatoes), Les Meilleurs (strawberries), Salanova (lettuce), Tinkerbelle (sweet peppers) and Koppert Cress (mini vegetables).

A measure that has been widely used to analyse consumer behaviour to differentiated agricultural products is consumers' willingness-to-pay. Market researchers rely on measures of consumers' willingness-to-pay in estimating demand and in designing optimal price schedules given that this measure is the best indicator of individual preferences available to specialists [17]. An evaluation [15] of consumers' willingness-to-pay for a brand that guaranteed peaches produced by integrated pest management techniques showed that consumers were more willing to penalize unbranded peaches than to pay for a branded product. From a marketing viewpoint, the model showed a limited possibility for increasing the added value of peaches but a high potential for enlarging the marketing margin through proper market segmentation and communication. A study [18] into the potential economic impact of the locally grown campaign in South Carolina showed that the first season of the promotion campaign increased consumers' willingness-to-pay for produce by 3.4%.

Branding, only when combined with effective marketing, can help agricultural producers develop awareness and create consumer loyalty, increasing price premiums, which can lead to long-term and sustainable competitive advantages [19]. For horticultural growers, understanding how promotion programmes influence branded horticultural products is essential to understanding demand for these products. It is equally important for knowledge institutes and innovation brokers to understand the market orientation of horticultural growers if they wish to assist these growers in product innovation processes [20] [21]. For this reason marketing in small firms needs to be distinguished from marketing in medium sized and large firms [22]. Marketing is a set of processes for creating, communicating and delivering value to customers and for managing customer relationships in ways that benefit the organization and its stakeholders. Marketing as an academic discipline has focused on large corporate organizations and has overlooked small firms [23]. However, small firms are different from large firms and, consequently, marketing in such firms is likely to be different too. Compared to large firms, small firms and thus most horticultural growers, are more likely to 1) lack economies of scale, 2) experience severe resource constraints, 3) have a limited geographic market presence, 4) have a limited market image, 5) have little brand loyalty or market share, 6) have little specialized management, 7) make decisions under more imperfect information conditions, 8) have limited time per major management task, 9) rarely have professional managers, and 10) have a mixture of business and personal goals [23] [24] [25] [26] [27].

In order to implement these market-driven innovation strategies successfully it is important to create an innovation climate that supports entrepreneurs and helps them to overcome barriers they experience. Entrepreneurs innovate within the context of an innovation system [28]. Such a system consists of all actors and organizations as well as all rules and instruments that contribute directly or indirectly to the sector's innovative capacity. Examples of actors and organizations are greenhouse growers, suppliers, supermarkets, banks and greenhouse grower organizations. Examples of regulations and instruments are subsidy schemes, rules governing the trade in fruit, vegetables, flowers and plants but also the culture and customs within the sector as a whole.

Chesbrough's open innovation model [29] emphasizes that the innovation process should be flexible and may cross-organisational boundaries, so that it enables the transfer of knowledge and capabilities to and from other independent organisations. In spite of the recent emphasis on open innovation by innovation management scholars, the empirical evidence of its relevance to innovating firms has so far surprisingly been limited to mainly high-tech industries. An increasing number of innovating firms adopt an open innovation

strategy [21] and there appears to be an increase in cooperation between different types of partners, such as suppliers, customers and knowledge institutes. The most prevalent cooperation partners are actors from within the supply chain and it appears that small and medium-tech firms are catching up with large and high-tech firms in pursuing open innovation strategies. For open innovation to be successful people in organisations need to be socially innovative [30]. This theory appears to be supported by the results of a large-scale study [31] among 11.000 Dutch enterprises (not exclusively in the horticulture industry). Organisations develop significantly (-5%) fewer new products and services and invest in social innovation (working, managing and organising in a smarter, more dynamic and more flexible way). Furthermore, organisations implementing social innovation show better results for innovation (+31%), productivity (+21%) and growing market share (+20%) than those that do not [31]. Social innovation requires more informal leadership, a higher adaptability profile and greater mutual trust. Social innovation appears to be a prerequisite to make good use of external knowledge. This implies that enterprises should become more socially innovative to be able to collaborate better with other enterprises and knowledge institutes [32] [33]. In order to assist the entrepreneur in this process we have developed an innovation and entrepreneurial education programme, KITE120.

### 3. Innovative Entrepreneurship

Considering the above dynamics of increasing complexity and global dependency, the need for innovation and entrepreneurship is becoming more and more important [30]. This requires true flexibility and adaptability of people and organisations. Recognising opportunities and translating these into new products, processes and services is as essential as integrating these in innovative organisations.

The most widely tracked components of innovation are overall company profitability, overall customer satisfaction and incremental revenue from innovation [34]. Companies consider themselves most effective at measuring innovation *outputs* (such as revenue growth, shareholder returns and brand impact). They consider themselves far less successful at tracking innovation *inputs* (for example dedicated resources, such as people and funds invested) and the quality of their innovation *processes*. This suggests that organizations can truly influence their profitability and incremental revenue from innovation as well as influence customer satisfaction. For the greenhouse horticulture industry this appears not to apply to the same extent, considering the Dutch auction system and strong retail influence prevents the grower from meeting the consumer. Also considering that it is extremely difficult for the grower to match his supply with the demand and the difficulty the individual grower experiences with brand positioning.

Ultimately, improving a company's innovation performance boils down to leadership and leaders' willingness to put in place the necessary processes and tools to help employees deliver on the targeted objectives [34]. In this respect innovation is no different from any other company priority. And, like other things that matter, innovation can and must be measured and linked to both financial and non-financial incentives to ensure that it receives the attention and focus it requires. Here the greenhouse horticulture industry appears to conform to generally applicable findings in the sense that greenhouse horticulture is a production industry, struggling with international competition, problems relating to economies of scale and a considerable reduction in product range. The impact of leadership on process and product innovation in the greenhouse horticulture industry might be of a different nature compared to other industries, considering the fragmented value and supply chain.

In The Netherlands the various actors in the innovation playing field are mostly 'stuck in self-created institutions' [4], so there is an urgent need for more knowledge management and knowledge circulation within the greenhouse horticulture sector. Great value may be added

to innovation networks by innovation brokers, especially when the innovation broker takes the lead in innovation initiation, network composition and innovation process management [20]. Within the greenhouse horticulture industry several players are active, such as Productschap Tuinbouw, LTO Glaskracht, Syntens or SIGN, often operating within their own associated networks.

In times of negative economic growth it is essential for entrepreneurs to take difficult decisions and to boldly tread unexplored, innovative paths. Maintaining the status quo is generally not the road to sustainable business development. This means that entrepreneurs in an SME context should possess analysing, pursuing and networking competencies [35].

It is furthermore suggested that relatively few people have a clear image of what goes on in the greenhouse horticulture industry, resulting in limited interest among school leavers and graduates to work in this industry. It is expected that in ten years' time the sector will experience a lack of qualified employees. Closely related to this aspect of negative image is the difficulty experienced by current owners of greenhouse horticulture companies in finding adequate succession. Equally crucial to a sustainable business are the problem of fragmentation and the lack of space for growth; not only in literal terms of square footage but also in a figurative sense: restrictive regulations. Another important challenge facing the horticultural greenhouse industry is internal greenhouse climate management. The use of (alternative) energy sources for lighting, electricity, heat, water and CO<sub>2</sub> require innovative strategic thinking.

Many growers realize the key to innovative entrepreneurship lies not only in knowledge of the produce they grow. They indicate that knowledge of shortening time-to-market, improved customer relationship management, developing new product/market combinations, using less (alternative) energy sources and state-of-the art production automation are just as vital to innovative entrepreneurship. Managers and owners of companies in this industry suggest that they are able to make choices at a strategic level, but not quite able to translate these into new products or processes. Neither are they able to implement their strategy satisfactorily. One of the more important issues in the horticultural greenhouse industry is the 'cognitive discrepancy' [36] with SMEs between the (lack of) knowledge of end-users' demands and the (in-)ability to recognise opportunities and implement viable business proposals. It is suggested [37] that contractual research planning may be well-designed for operationalising end-user demand steering. Following indications [35] that the networking domain represents social competence in relation to the entrepreneurial task, we hope to contribute to the notion that in the horticultural greenhouse industry knowledge of end-user demand should be used for research steering.

## 4. Research Questions

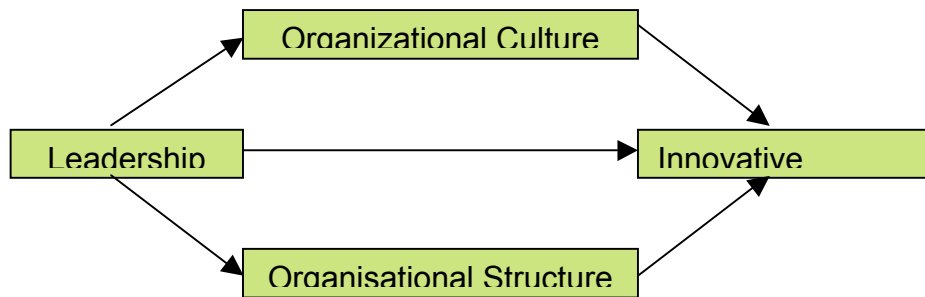
The above aspects have led to formulating the central research question:

- How do leadership, organisational structure and culture influence the innovative capacity of the greenhouse horticultural enterprise? This is visualised in Figure 1.

Related questions are:

- How can the grower and the supplier in the greenhouse horticulture chain gain sustainable competitive advantage through improving their networking capabilities?
- Which interventions contribute to a more constructive innovation process in order to make the step from strategic innovation to implementation?





**Figure 1** Research model visualised

The answers to these questions illustrate how companies can realize growth and improve innovative capabilities of both the organization and the individual in that organization by linking economic and social sustainability. Resulting from these answers we hope to find support for two hypotheses:

- The bigger the innovative capacity in the greenhouse horticultural industry, the stronger regional development.
- The stronger regional development, the bigger the innovative capabilities in the greenhouse horticultural industry.

## 5. Materials and Methods

The current KITE120 innovation and research programme aims at strengthening multidisciplinary collaboration between enterprise, education and research. Using best practice examples of a group of 30 companies in the greenhouse horticulture industry, a model is developed that might serve as a driving mechanism for process and product innovation and that fits the nature and characteristics of the companies in this industry. The research in progress is longitudinal and explorative and aims to gain a practical insight in the day-to-day operations of the participating companies and to elicit claims that prove valid for the entire greenhouse horticulture industry and possibly for other industries as well. In short, it is a way of looking at current operations and combining them with entrepreneurs' ambitions in order to arrive at generally applicable theories. The activities in the greenhouse horticultural industry are embedded in a wider research programme that is partly funded by a grant from the European Fund for Regional Development (EFRO) and encompasses three other sectors that are of importance to the regional economy in and around the town of The Hague in The Netherlands: the service industry, the legal and paralegal cluster, and the ICT/multi-media industry. The programme is known as KITE120, which is an acronym for Knowledge and Innovation Towards Entrepreneurship. 120 Companies in the four clusters serve as research objects for the programme. Its aim is to stimulate innovative capacity within organisations and to stimulate regional economic growth.

The KITE120 programme fits into the tradition of post-modernism that, as opposed to positivism, is not based on traditional scientific thinking but acknowledges the context related nature of knowledge following from experiences [30]. We believe that the behaviour of complex phenomena, such as innovation processes, confronts academics with peculiar insights that tear at the foundations of what till recently has been regarded as the mainstream academic tradition: the Newtonian equilibrium theory and the linear behaviour of systems. This implies that the future can be predicted on the basis of experiences that occurred in the past. If we analyse and understand these occurrences we will be able to fathom the future. Especially companies are interested in predicting the future since it can give them certainty about something that, within reason, seems uncertain. Complex phenomena show that behaviour is dynamic and non-linear and that order emerges bottom-

up through a process of self-regulation. This is contrary to how most companies operate and innovation processes are managed.

For the programme a number of enterprise objectives were formulated, primarily focusing on the formation of networks and dissemination of knowledge, aimed at embedding sustainable results in the industry on completion of the programme. The main aim is to support enterprises and assist them in making an important step forward with their organisation by guiding them through the process from ambition to action. In KITE-terminology, we help them make a metaphorical 'Amazing Jump'.

Apart from the enterprise objectives, educational goals were formulated for students and faculty, who participate in the programme. These concern professionalizing and raising the quality of education and knowledge circulation. The latter aspect deserves separate attention, as it is characteristic to research in the applied sciences. Professionalizing faculty should be seen in the light of the commitment of universities of applied sciences to stimulate knowledge circulation through practice-based research. Apart from knowledge of facts and figures and practical expertise, explanatory and conceptual knowledge are important to the professional.

Professionalizing staff is characterized by the development of knowledge and skills that allow faculty to better reflect on, define and conceptualise professional practice. Undertaking research is an important part of this. During that process lecturers apply knowledge and in so doing bring it up to date. Subsequently, it is embedded in their teaching modules and curricula. It is vital for faculty and students to be critical consumers of scientific texts as well as to learn to apply practical and scientific knowledge for the purpose of developing new knowledge. In this way they not only improve their own capacities and capabilities as a lecturer, coach and student but also contribute to improving industry. Simultaneously, a process of knowledge circulation is created that is conditional to improved links between education and industry.

In the pursuit of these aims we contribute to the Lisbon agenda of the European Union in which entrepreneurship is considered a fundamental requirement for creativity and innovation (e.g. [38]).

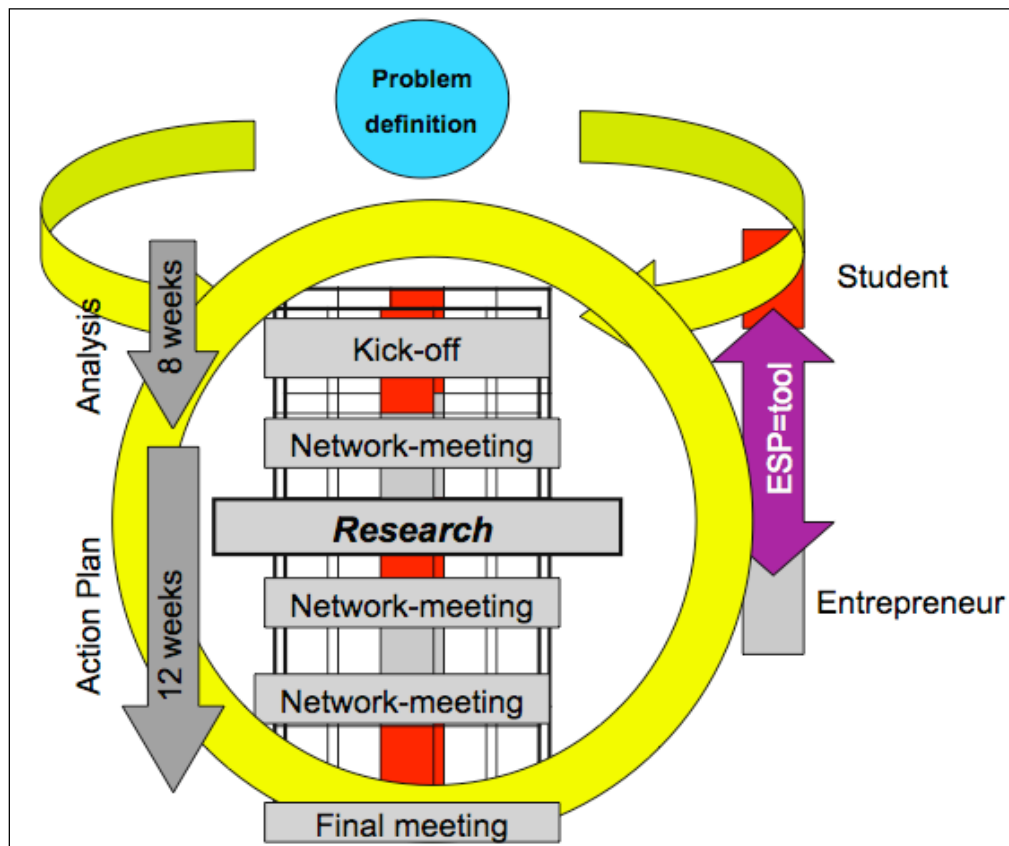
Conversely, the EU [39] indicates that entrepreneurship education is especially important for people from non-economic backgrounds. Studying entrepreneurship should be more integrated in the curricula of institutes of higher education. Especially from technological, social or creative departments new business concepts should emerge. Irrespective of their career choice or personal situation individuals will benefit from a better understanding of entrepreneurship and of an innovative approach to problem solving [40].

Considering these aims, we had to find a way of linking entrepreneurs, students and faculty. Our method consists of three elements:

- a process model in which entrepreneurs, undergraduate students and faculty are brought together and collaborate,
- a research model addressing several methods of data collection,
- a theoretical model that provides a framework for companies.

### ***The process model***

The process model (see Figure 2) was developed to ensure that students are linked to entrepreneurs within a fairly rigid system of the academic timetable in universities of applied sciences. A period of 20 weeks provides the basis for this model. In each of which one or two students are matched with one of the entrepreneurs in the greenhouse horticultural industry, following an intake by one of the faculty members.



**Figure 2** process model for innovation programmes linking universities and SMEs

In network meetings entrepreneurs, students and faculty gather to address topics that are relevant to more than one company or that can serve as best practice models to others. Preferably these meetings take place on location, i.e. at one of the participating organisations, rather than at the institute of higher education. Topics vary from leadership and innovation through lean production to multi-functional and multi-level use of space.

### ***The research model and theoretical framework***

The research model is complementary to the process model. To determine the strategic themes and problems in the sector, key-players and stakeholders were interviewed. Knowledgeable people with proven expertise and experience within the greenhouse horticulture industry were interviewed by the research team to elicit key issues in the sector. A semi-structured questionnaire was used to confirm (or reject) published sources or popular opinion. The strategic topics and trends were subsequently clustered into four research themes: internal greenhouse climate management, organisational growth, knowledge of entrepreneurship, and time-to-market.

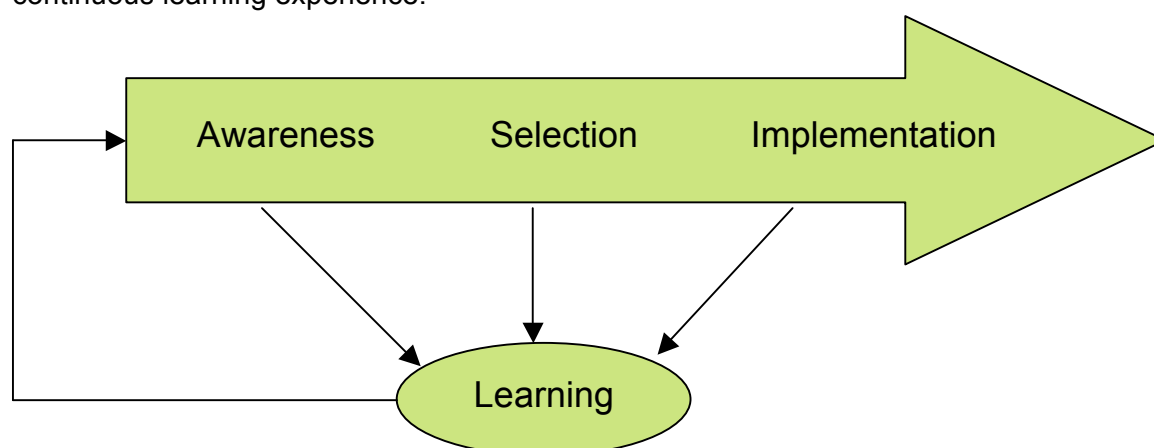
The next step is to define problems and research questions related to the research themes. In general terms we are interested in establishing how SMEs in this sector innovate and what are barriers for innovation. For the theoretical model we use the broader definition of innovation that innovation is purposefully changing and renewing products, processes and work methods, resulting in increased profitability [41a] [41b]. This definition fits in well with the theory of the innovation space within an organisation [42]. Four types of innovation can be distinguished: paradigm, position, process and product innovation. These innovations can be incremental or radical and according to their contribution to organisational growth and continuity can be classified as more or rather less successful. Innovation according to them

is directly linked to the entrepreneurial skills of the owner / managing director who needs to recognise opportunities and assess their innovation value.

After having defined the research question, data collection takes place through the inductive approach. Data triangulation is leading in the approach, as it contributes to the robustness and reliability of the data. We have selected several ways of collecting data. In spite of the inductive approach we decided to build a theoretical framework through desk research. Not so much as to validate that theory, nor geared at the development of a new theory, but to bring focus to the research and serving as 'a pair of glasses' through which to look at our study object [43]. The innovation model of Tidd and Bessant [42] acts as a framework for that purpose. They describe phases that an organisation should go through from strategic innovation to implementation. Four aspects are important according to the authors:

- looking for opportunities and recognising them
- selecting opportunities and formulating a strategy
- implementing the strategy
- learning from that implementation

We use a modified version of the Tidd and Bessant model (see Figure. 3) as we introduce reflection and learning stages after each of the steps in the model, thus introducing a continuous learning experience.



**Figure 3** modified innovation management model of Tidd and Bessant [42]

Innovation is seen as a continuous process supported by routines and methods that contribute to a successful process and outcome. Against the background of the research question this has proved to be a valuable method to observe reality in similar research projects we have undertaken in the manufacturing and construction industries. The aim of the research is to establish whether the findings of our research and the model developed for that purpose, are equally useful within the greenhouse horticulture industry.

Observations of interventions in organisational structure and / or culture are complemented with data collected from in-depth interviews based on a semi-structured questionnaire should lead to an understanding of what works and what does not.

From the data collected, the entrepreneur, the student and the member of faculty involved collectively select one or two aspects within the enterprise that can be formulated into an innovation action plan. Studying the implementation results the entrepreneur can acquire knowledge and insight into radical innovation processes.

To illustrate the scope and layering of our innovation programme, some of the KITE120-projects are given here as examples: They fit the designated problem areas in the greenhouse horticulture industry.

- Promoting the use of direct current in the greenhouse horticulture industry. Together with a hardware producer we are looking for a stable infrastructure in and around the greenhouse to reduce installation cost and operational expenses for the grower.
- Finding new business models for branding greenhouse horticulture produce in order to achieve competitive advantage for the grower
- Developing new ways of reverse chain management in collaboration with a greenhouse horticulture consultant. Growers should benefit from this scheme through increased product demand
- Finding a business model for innovative water reservoirs that solve problems deriving from the impending restrictions on reverse osmosis and waste brine disposal.

## 6. Discussion

If we observe changes and improvements within the industries of similar research programmes we have undertaken, our findings [32] [33] [44] show that innovation is both product and process innovation and in most cases incremental. Rather: what we do, we do a little better and / or faster. This is a recognizable pattern with entrepreneurs who develop their products to the demand of customers or end-users. Innovation here is re-active. We expect that the greenhouse horticultural industry does not innovate in this fashion, simply because there is a notable lack of knowledge on customer / end-user demand in comparison to the other sectors mentioned. Whether this means that this industry innovates pro-actively remains a matter for further research. Pro-active innovation in other sectors frequently goes together with larger companies having R&D departments. In the greenhouse horticulture industry this type of organisation is rare. Here the individual entrepreneur plays a crucial part, because it is the individual entrepreneur who started the company and consequently has an enormous impact on its development.

Although almost all companies innovate, our first observations show that there is no conclusive opinion on definition and importance of innovation for business growth among entrepreneurs. Most of them focus on product innovation, with the greenhouse horticulture industry as a notable exception. This is interesting, as it appears to be contradictory to Tidd and Bessant's finding that process and product innovation are closely interlinked, especially where the step from strategic innovation to implementation is concerned [42].

Considering the model of Tidd and Bessant as the 'looking glass' and framework through which we research and analyse the sector the following observations can be made:

To most entrepreneurs in the greenhouse horticulture industry scanning external developments and looking for opportunities is not an integrated part of everyday entrepreneurship. And if it is, entrepreneurs have difficulty in adapting and applying their findings to their own situations. The question is why so little attention is paid to external influences, knowing that they are an important source of information and are the basis for recognising opportunities. There are several reasons for this attitude: it is not considered important enough, entrepreneurs pretend or presume to know developments, it is too great a burden on the entrepreneur due to lack of time, and competencies and interests of the entrepreneur quite often do not lie in the field of research or strategy.

During the next phase in the innovation process, that of selecting opportunities and formulating strategies, the entrepreneur should select opportunities and translate them into a strategy that fits his organisation. This requires not only looking at people's competencies, at financial feasibility, but also at processes that offer the best chance to realise the formulated strategy. Within smaller organisations it is the entrepreneur who is crucial to decisions taken and to the culture in the organisation that influences the innovation process. The smaller the organisation, the bigger the influence of the entrepreneur appears to be.

Innovation intermediaries can assist agricultural entrepreneurs with innovation processes [37], bridging the managerial knowledge gap [45]. This is on the assumption that innovation

is within the focus of the entrepreneur; that the entrepreneur is the “agent of change”, who has sufficient absorptive capacity [46] to learn how to innovate and be able to influence the innovative capacity of his organisation. Furthermore there is evidence of fragmentation in (types of) innovation intermediaries, from public to private, from for-profit to not-for-profit organisations [37], yet, in his study, Klerkx does not focus on the role universities and colleges of higher education can play as both sources of knowledge and innovation intermediaries. Recent developments of this are the Green Knowledge Cooperative and the Greenport Campus Initiative.

Our research [32] [33] [44] shows that in spite of an independent analysis or external advice, the entrepreneur easily disregards the outcome of the analysis or advice if it does not fit his own perspective. This would seem to reduce some of the added value of innovation brokers in the agri-food business as advocated by Batterink [29].

When implementing product innovation strategies, the entrepreneur should realise that process and people management play an equally important part. Through a clear implementation plan, such as the stage-gate model [47] it is decided in advance which restrictions apply during product development stages and how to monitor progress. The process has built-in ‘go’ and ‘no go’ moments that should lead to successful market introduction of the new product or service. In fact this is the moment where ambition turns into action. This is quite a step where radical innovation is concerned, because there is a high degree of uncertainty about the success rate. In the case of incremental innovations the risk involved is considerably less.

However, our earlier research [32] also shows that in innovation processes in smaller enterprises a structured approach appears to be the exception to the rule. It is the entrepreneur who plays a pivotal role, at the expense of learning lessons and embedding experiences for future projects. It is our aim to develop the entrepreneur’s competencies by means of going through a learning cycle of single-loop, double-loop and triple loop learning: reduction of mistakes, change towards new concepts and improvement of the ability to learn. This can more easily be effected when an entrepreneur withdraws from the daily routines and takes time to develop processes to professionalize his organisation and his employees.

## **7. Implications**

In this paper we have described a model through which we aim to contribute towards regional development and improve the innovative capacity of SMEs in the greenhouse horticulture industry. The programme we developed to that end is aimed at gaining insight in the way SMEs in this sector innovate, and simultaneously professionalize lecturers and involve students in research. The multi-layered objective of our KITE120-programme is to try and eliminate innovation barriers among SMEs in the greenhouse horticulture industry and to develop instruments that are beneficial to organizations and individual entrepreneurs. A secondary aim is to help them make the step from ambition to action and from incremental to radical innovation. Metaphorically speaking we want entrepreneurs to make an ‘Amazing Jump’. Realizing this ambition requires strengthening the knowledge base, stimulating innovation, entrepreneurship and education. It also requires professionalizing people. It appears equally important to bridge the gap between the sub-sectors of Flowers and Food by developing and strengthening elements in the value chain, or conversely, by shortening the value chain. More interaction with sectors outside the glasshouse horticultural industry is welcome. This will bring on the need for more and better knowledge management and knowledge circulation.

We have illustrated the importance of combining enterprise, education and research in networks with a regional scope, with examples from the greenhouse horticulture industry. These networks generate economic regional and national growth and international competitiveness by acting as business accelerators. Subsequently, the need arises for

programmes that focus on improving the image of the sector, if the sector is to remain attractive for entrepreneurs and their employees to work in. For the near and distant future most is to be gained from flexibly managing expectations and predictions and by reacting quickly to changing circumstances. Including organisational culture in times of innovation and including employees in the process are critical success factors. It is clear that effective innovation management starts at the top [48]. Managers should never delegate innovation processes. Moreover, it is essential they themselves are committed to the change, if not, success is highly unlikely. By changing first and setting an example, management itself becomes the instrument of change. It helps if teams and individuals are open to more than one opinion, set great store by collaboration with others and opt for experiment and growth.

An economy's ability to innovate is decided by a combination of the component parts of a national innovation system: its market, knowledge infrastructure, intermediary organisations and the collaborative interplay between these parts [49].

What we need are visionary entrepreneurs; people who are prepared to think out of the box and who can come up with radical alternatives, charismatic leaders, who inspire and help their organisation forward. Ongoing research is necessary to provide a better insight into the ways innovation processes can be organised, considering the size of the greenhouse horticulture enterprises, considering the limitations in human and financial resources and considering the options for collaboration across the value chain.

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# Innovation and Use of Technology in Manufacturing Industry

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Based on the general practice, it is known that in small places derived from a monist system such as R. of Macedonia which has faced the imperative export, the most appropriate model is the development model- the small open economy. But for an open economic development, the development of technology is needed. One of the most important elements in the economic development is the Innovation in the productive sector, as well as, the service sector. The process of Innovation is based on the knowledge which has a great effect in industry. In order to come to the realization of an innovative process or a new technology, we have to be based on building skills, strategic planification and human resources, so the managers can increase the competition and survival of their companies. The entrepreneurs are those who apply these innovations so they can have economic increase. In this international workshop we will determine the innovation in the manufacturing industry with modern technology which is needed in the involvement of European and regional integration, as a fundamental concept for the modern economic development in a state.

## Keywords

Innovation, technology, strategic planning, enterprise, entrepreneurs, regional

## 1. Introduction

Since the process of transition is causing major changes, our country needs to get involved in the development of technological progress, or should be required to be at the center of motion science and industrialization.

For the realization of these important developments is the innovation. Innovation in the manufacturing sector means of continuous product improvement, a new design, an additional element in the product, a change or improvement of packaging, a new label and more informational, a new technique of management, a remodeling of the firm or a working staff training. Therefore innovation does not entirely mean that changing the product or the necessity of a new product. For the implementation of an innovative process or a new technology we need to focus on building skills in strategic planning and human resources so the managers will find. Ways to add competition and survival of their enterprises.

Effective competition is crucial in an open market economy; it promotes technological innovation, price reduction, increases the quality and adds consumer choice. Competition is a dynamic concept, is the ability of the economy to produce goods and services that meet the requirements of international markets, and simultaneously increases the well fare of the citizens of the country. Macedonia represents a deficit for innovation, with a weak performance, which affects the competitiveness of its enterprises.

The development of the economy, increase in the economic growth and domestic and foreign investments, as conditions for opening new jobs and better life of the citizens, are the main objectives of the Government for the next four years. The model of economic development promoted by the Government of the Republic of Macedonia is based on

competitive and integrated economy that provides equal opportunities to everybody and that will be successful in the realization of the economic objectives: macroeconomic stability, rapid economic growth, and new employments, achieved through technological innovation. Such model, taking into consideration the specific features and the priorities of Macedonia for integration in the EU, is based on the EU strategy for economic development.

Foreign technology, investment trade, experiences, is the most important incentives for innovation. It is known that innovation is approaches based on the firm, the market-promote but also dependent on number of other factors such as expertise and access to financing, the establishment of an innovation system that will provide key actors in activities to support enterprises.

## **2. Innovation in Economic Development**

Macedonian strategy of innovation as a perspective oriented to business and the market, promotes the policy of the fulfillment of a lack of engagement and development that are SMEs. Macedonia has registered a rapid increase in the number of enterprises, however, continues to remain behind other countries in terms of innovation. This jeopardizes the competition and of the sustainability of economic growth and employment. Even the World Bank report and the OECD II-that the growth of competition, notes that the number of enterprises in Macedonia show a report that they have entered in the market a new product in recent years compared with regional countries.

From the main sectors of the manufacturing sector feature the sectors for construction, Pharmaceutical and the Textile, high quality energy that will talk about below.

For the manufacturing sector but also for those that serve innovation today they have become extremely important. In productions increasingly dominate intellectual activities such as: research and development, design of processes, logistics, market research, management and technological innovation.

These are the permanent innovations that serve to achieve the strategy for placing new products; it primarily has to do with some small improvements in the framework of a job, for what the Japanese are more distinguished. Innovation and revolution in Toyota technology occurred in the early years of the 50-of the 20-century later were created flexible production lines that are run by computers, which represents a technological innovation which enabled a unique product for the buyer from many industrial branches.

The meaning of innovation is very dimensional and therefore defending different ways. According to Paul Trot's manufacturing innovation means developing a new product to the market economy. The industrial revolution in economic development can improve the material life of human beings. If you look at the word from China for example, you will see hundreds of millions of people in recent years have come from the middle Ages and their villages have gained jobs and, above all, hope. This is a historical process and definitely positive.

While our situation is anything but satisfactory. Balkan countries in addition to technology, the three most successful industries of the past fifty years have been financial, pharmaceutical and energy. Surprisingly all three sectors are very unpopular in regional performances, are regarded as major causes of inequality, cynicism and pollution. Once sufficed two important technological breakthroughs such as computer and information all technology to remove pessimism from Western-educated classes in the late '70s. at that time seemed to move energy toward the end, the markets seemed saturated, consumers appeared tired and thought of the finished development.

But since then the world has done an unimaginable journey, and the words were designed to never be pronounced recession as being spoken today in the Euro Area countries.

Industrialization in Macedonia can only survive with competitive and innovative manufacturing in the current difficult times, where the European market is open export 60%

of dedicated, through competitive products and industrialization and economic promoters who help companies filing Macedonia in foreign markets, respectively annual production.

Program for implementation of industrial policy for the year 2012, the Ministry of Economy has as vision to local business financial entities to help, to create competitive products-productivity, commercialization of new products, market development, strategic marketing, technological development, training of ECO products for the employment of young researchers for primary research in attractive markets and training to participate in international programs. During the term of Bulgaria in 2004 as head of the OSCE, the organization paid special attention to the issue of institutional capacity building, human development and economic cooperation.

Whose vision was to increase the competitiveness of enterprises within the context of national, regional and global level, encouraging and supporting effect innovation and technological, informational, infrastructure and other species, by improving condition structure, creating a favorable environment for business innovation and strengthening the National Innovation System?. The main mechanism to survive in the competitive market and string them strong for small businesses to innovate, therefore to come up with new products or to be more innovative in the process of work or in management. Small businesses are most successful in industries that have low capital intensity, low concentration and industries that are characterized as highly innovative.

Policy Innovation and Technology Business aims to: develop innovation in key sectors of the Macedonian economy-raise awareness enterprises about the need for innovation and technology development; initiate, import, modify and disseminate new technologies in the enterprise, enhance the capacity of organizations supportive business to assist in the innovation of enterprises, assist directly with technical information, assistant enterprises to gain external funding for innovation activities, enable the creation of new innovative firms, their survival and prosperity.

Creating a logical link and filling the gap between policies for business development and promotion of SMEs and policy for Science and Technology Development. Follow such policy and as mentioned above are of some manufacturing industries where the aforementioned are like Fragmat and Pharmaceutical Alkaloid Skopje, which has global and regional access, at the ceremony held on November 2, 2011, on the occasion of the "European Entrepreneurship Day" and "2011 European Week of Small and Medium-Size Companies", organized by the European Business Association and supported by the Ministry of Economy of the Republic of Macedonia, CEO and President of the Management Board of "Alkaloid", was proclaimed the 2011 MK Business Leader.

FRAGMAT MAK is a mixed Slovenian-Macedonian company which deals with a production of EPS (expanded polystyrene) - Styrofoam. The company was established at the end of 2003 and it has started its production in March 2004 with 12 employees, whose number has increased and today there are 19 employees.

The business strategy of the FRAGMAT MAK Company is based on following the world standards when it comes to expanded polystyrene. Only imported raw materials from producers that possess ISO 9001 and ISO 9002 certificates are used in the process of the production, which guarantees quality of the final products. FRAGMAT MAK is a part of the FRAGMAT group, which also consists of FRAGMAT TIM, FRAGMAT IZOLIRKA and DEMIT from Slovenia, then OKIPOR - Zagreb and Split, Croatia, FRAGMAT IZOLIRKA Gracanica, Bosnia and Herzegovina and TIM IZOLIRKA Sid, Serbia, which means that the FRAGMAT group covers a large part of the South-Eastern European market. These products find wide range of usage in the building construction, in Macedonia, as well as in Bulgaria and Serbia.

Besides the production of EPS, FRAGMAT MAK also deals with the selling of all facade materials for facade construction: adhesives for EPS, glass net, plastic edge profiles as well as materials for final coverage: mineral, acrylic and silicate facade of the well-known producers ING-LULI Macedonia, ROFIX and BAUMIT Austria. FRAGMAT MAK with its products covers huge part of the Macedonian market and about 28% of the total selling is

disposed on the markets in Bulgaria, Kosovo, Albania, Serbia, and about 10% of the total export is realized on the German market.

The major programmed of the FRAGMAT MAK Company as a member of the FRAGMAT group is the production and selling of thermal insulation. The major purpose of these products usage is reflected on the lower consumption of energy in the buildings (the consumption of the natural resources and correspondingly decrease of the pollution).

Our policy principles of quality and management with the environment are: to justify our clients' expectations, to satisfy the legal regulations' standards and demands, to produce and obtain under circumstances that will provide success in the business, to decrease the negative influence on the environment, to decrease the energy consumption and to decrease the formation of waste material, to improve of the quality of the system for environment managing and technological processes. Our administration commits/obliges to constant improvement of the company's efficiency thus providing secure, high and net profit.

All our employees are fully aware and we understand the policy of quality and environment management. We obey and grant all the legal security requests for the protection of the environment, which have been proved with our work.

The policy is followed by all our employees and those who work in or about our company, through the media of the society. Our work is focused on the realization of this policy and the framework objectives for efficient improvement of the quality and our environment management.

According to the State Statistical Office data, the turnover index in industry in the Republic of Macedonia in November 2011, in comparison with November 2010, was 133.6. The index of domestic turnover in industry in November 2011, in comparison with November 2010, increased by 33.1%, and the index of non-domestic turnover in industry increased by 33.9%.

The turnover index by Main Industrial Groupings in November 2011, in comparison with November 2010, was higher in Energy by 61.4%, Intermediate goods industries, except energy by 12.6%, Capital goods industries by 174.5%, Durable consumer goods industries by 82.4% and Non-durable consumer goods industries by 10.7%.

The turnover index in industry in the Republic of Macedonia in November 2011, in comparison with October 2011, was 111.4, while in the period January-November 2011, in comparison with January-November 2010, the turnover index in industry was 125.5<sup>61</sup>. The industrial production by Main Industrial Groupings in January 2012, in comparison with January 2011, was higher in

Intermediate goods industries, except energy by 5.6%, but lower in Energy by 22.6%, Capital goods industries by 9.1%, Durable consumer goods industries by 34.4% and Non-durable consumer goods industries by 4.8%. According to the State Statistical, the industrial production volume index in the Republic of Macedonia in January 2012, in comparison with January 2011, is low, see table nr.1.

**Table 1** Assessment of the production volume, expectation for the production volume and for the number of employees

	I.'11	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	I.'12
Assessment of the production volume	9.7	11.7	15.5	16.7	15.4	7.1	7.4	8.7	7.9	6.6	2.3	1.8	1.7
Expectations for the production volume	20.7	21.4	26	28.8	31.1	23.5	24.0	27.1	24.9	20.9	17.1	18.9	23.9
Expectation	-2.9	-0.2	1.5	1.8	1.4	4.2	3.1	3.1	1.4	1.4	0.4	3.9	6.8

<sup>61</sup> 1 Publisher: State Statistical Office, R of Macedonia, 17.01.2012, No: 6.1.12.02

s for the number of employees													
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Expectation for the production volume, assessment of the production volume, and for the number of employees, graphically see fig. 1.

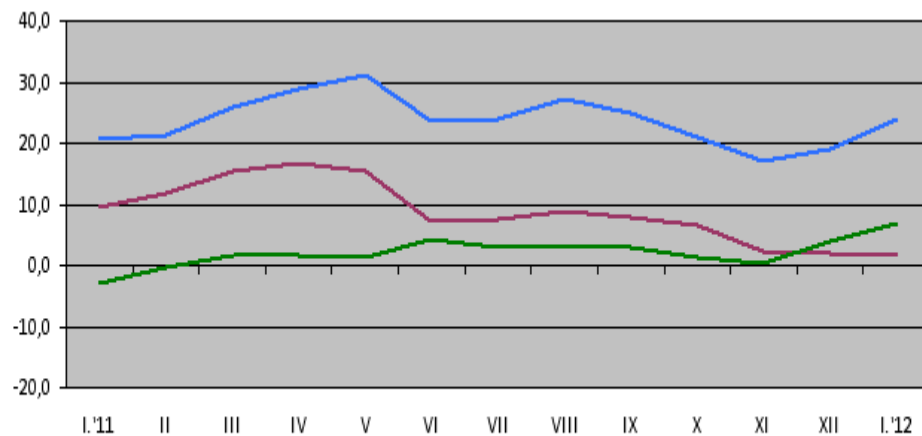


Figure 1 Assessment of the production volume ( — ), Expectations for the production volume ( — ) and Expectations for the number of employees ( — ).

**Figure 1** Assessment of the production value

### 3. The Summary

Innovations such as fundamental concepts which develops economy which are of special importance to any modern economy, is also for that of Macedonia. With strategic development for innovations 2012-2020, under the Ministry of Economy and Organization for Economic Cooperation and Development (OECD), has aims to contribute to the process of creating strategy for future innovations. This incentive program is based on anything as to local economy and further, that the main function of which is to develop scientific research institutions and universities, and also to the private sector, as the common view in the future. Although the report by the World Bank says developing economies will continue to grow faster than the economies of most developing countries. Finally, innovative processes restructure the chain value through the verification of certain production processes, in the Craft external entrepreneurs. These are structural innovations that enable a substantial rationality works.

Known characteristic of small businesses in the world are innovations. Therefore small enterprises are often the source of materials, processes, ideas, products and services, while large enterprises are reluctant to provide it. Small enterprises are forced to be innovative in order to ensure market competition. However, science, technology and innovation, as well as developing factors in competitive economies, based on know ledge, in our country are vulnerable, and small value determined by GDP. As a result, the innovative capacity of SMEs is very limited. For today in the world though that the development of small and medium entrepreneurship and support can be an excellent shock absorber in terms of high unemployment and that precisely this sector is one of the drivers, who can create new jobs because Giant Corporation have already reached suboptimal size. With the promotion of the competition and innovations in Europe and broader, which ensures approach to innovative technology as well as information for the financing sources is the informational and innovative system in Macedonia (SEIIM).

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# University - Industry Knowledge Transfer in non-core Romanian Regions

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The aim of this study is to fill in the gap in current research focused rather on most advanced regions or lagging regions in advanced countries, by adding new insights from non-core Romanian regions. Within the paper, university - industry knowledge transfer is conceptualized as the process of transferring research, skills and ideas to the business sector through both commercial and non-commercial activities. As a post-communist country in transition, Romania faces numerous constraints to development trajectories, especially the weak regional innovation systems and the less intense university – industry linkages. The paper explores first the factors behind failures to support science – industry links and knowledge transfer in European transition countries and highlights the gaps between core and non-core regions in terms of competitiveness and innovation. At the same time, it provides a summary of key characteristics of non-core regions and revises the frameworks that can be applied to “ordinary”, less successful regions. In its second part, the study explores the differences in university - industry knowledge transfer across Romanian regions, using data collected from 58 universities outside the capital region that refer to their knowledge transfer potential in terms of number of patents, new products and services, contribution to new policies, knowledge transfer income, spin-offs, number of external partnerships, knowledge dissemination etc. The findings advocate for a step-by-step policy that supports the creation of an innovation culture and stimulates first informal interactions between higher education institutions and regional companies, as pre-conditions to successful university – industry linkages. Finally, the paper stresses the role of intermediaries in bridging the gaps between the innovation actors that miss the collaborative experience.

## **Keywords**

Knowledge transfer, non-core regions, transition countries, university – industry linkages, policy implications

## **1. Introduction**

Knowledge transfer from universities have been vastly encouraged by governments since the early 90's and in several European countries a number of initiatives have been aimed at developing efficient infrastructures to ease the transfer of knowledge between universities and companies. Since then, academic technology/ knowledge transfer offices (KTOs) have been created, dedicated employees have been hired and specialized services have been developed for assessing disclosed inventions, patenting, licensing, funding of spin-offs or approaching firms for collaborations. At the moment, European KTOs are on average 14 years and employ on average 7.8 Full Time Equivalent Staff [1].

Knowledge transfer takes place in a variety of channels. Within this paper, it is conceptualized as the process of transferring research, skills and ideas to the business



sector through both commercial and non-commercial activities. A typical (but not exhaustive) classification of channels of knowledge transfer include networks, continuous professional development, consultancy, collaborative research, contract research, licensing, spin-outs, teaching and other measures (e.g. physical migration of students to industry, publications etc.) [2].

Key studies in this area have sought to explore the multiple and interrelated combinations of channels for knowledge transmission, the frequency and importance of links, as well as factors influencing their likelihood and intensity [3]. Perkman and Walsh [4] suggest a general typology of knowledge transfer mechanisms based on the extent of the relational involvement: from high involvement in research partnerships and research services to medium involvement in human resources transfer and academic spin-offs towards the lowest level of involvement in commercialization of intellectual property rights. Indeed, patenting and licensing were found by many authors of relatively lower importance for knowledge transfer vis-a-vis other channels [5, 6, 7, 8]. On the contrary, open channels such as publications, conferences, informal links, consultancy activities [5, 6, 8], contract research [8], collaborative research [9, 10], and, to a lesser extent, personnel mobility [10] are intensively used.

According to Polt [11], the relative importance of knowledge transfer channels will vary with the type of innovation activity carried out, the type of knowledge demanded, the absorption and transfer capacities of enterprises and science, the type and extent of market failures prevailing on knowledge market and so on. Given this context, transition countries are expected to envisage a different pattern of university – industry knowledge transfer, as they face numerous constraints to innovation and development trajectories and experience different market failures.

When referring to the case of Central and Eastern European (CEE) countries, a number of contextual factors should be considered. During the socialist period, these countries were characterized by a linear innovation model according to the soviet-type science push mode and horizontal co-operation was therefore strongly limited or had a complementary character. Moreover, interactive learning processes and the feed-back of users' requirements were either under-developed or non-existent [12]. In line with this tradition, the policy actions of a number of CEE countries during 1990s are good examples of the linear innovation model thinking, where the underlying idea is that policy should focus on commercialising the results of the R&D system [13]. In addition, the role of universities in R&D sector is different and relatively weak in these countries: traditionally, both basic and applied research were mostly concentrated outside the universities, in academies of sciences or in applied research institutes in industry and universities did not play the central role in the basic and applied research [14]. On the business side, innovation activities are restricted to a few larger enterprises, investing comparatively high shares of their revenue into innovation, or to micro- or small newly established firms representing, due to their size, only small fraction of the overall R&D and innovation activities [15]. Under all these circumstances, university – industry links are far from being a Triple Helix.

The perspective of university – industry knowledge transfer becomes particularly important for the less developed regions in transition and developing CEE countries. As portrayed in the literature, it is at the regional level where innovation is produced through regional networks of innovators, local clusters and cross fertilizing effects of research institutions. Within this context, universities are regarded as active actors in regional innovation systems [16], playing different roles that range from source of skilled labour to knowledge providers in university – industry linkages to “engaged” actors in regional development [17].

The aim of this study is to fill in the gap in current research focused rather on most advanced regions or lagging regions in advanced countries, by adding new insights from non-core Romanian regions. The reminder of the paper is the following: in Part 2, we will bring some insights from those research studies addressing the specific problems and difficulties in the lagging regions, while highlighting some possible policy reactions. In Part 3 and Part 4 we

present the methodology of the study, together with the results of analyses aimed at pointing out the similarities in university knowledge transfer across seven Romanian regions. Finally, conclusions and policy implications envisaged by our study are presented.

## **2. University Knowledge Transfer in non-core Regions. A Brief Survey of the Literature**

Some authors have focused their interest specifically on the influence of universities in non-core regions, assuming the idea that for every successful region there exists a number of average, lagging or what can be termed “ordinarily uncompetitive” regions [18, 19, 20]. According to Lagendijk and Lorentzen [21], regions may be peripheral in their own country, being located outside the main metropolitan areas, or, to different degrees, they may be peripheral to the main growth centres or economically marginal. In their opinion, peripherality in the various cases can be attributed to rather weak financial capabilities of firms, the use of “second best” technologies, and dependence on important knowledge sources of the core.

As a general rule, non-core regions lag in terms of headline indicators such as economic output per capita and employment levels, as well as knowledge-based indicators such as innovation, patenting, and proportion of knowledge-intensive firms [19]; moreover, they are often described as being organisationally and institutionally “thin,” with a lack of innovation-driven public or private sector entities, often with a high dependence on SMEs exhibiting low-growth trajectories and operating with only fragmented connections to external sources of knowledge [18, 19, 20]. In line with the new growth theory, such places face difficulties in accumulating sufficient knowledge capital to create economies of scale to retain and attract firms whose activity is the driver of local economic development [22]. However, it would be clearly a misrepresentation to suggest that peripheral regions do not possess knowledge – intensive firms and organizations [21], but often the critical mass for dynamic cluster development is not reached, while the emphasis is put on incremental innovation and on process innovations [18]. Finally, the low absorption capacity of the regional firms brings into existence the regional innovation paradox that refers to the apparent contradiction between the comparatively greater need to spend on innovation in lagging regions and their relatively lower capacity to absorb public funds earmarked for the promotion of innovation. In particular, firms in lagging regions often articulate little interest for R&D, do not demand innovation services and tend to lack a tradition of cooperation and trust both among themselves and with regional innovation actors, such as universities. At the same time, the regional research and technological infrastructure is not embedded in the regional economy, and therefore suppliers of innovation services (technology, training/ education, venture capital) are unable to identify the innovation needs and capabilities of firms in the regional economy. Thus, there is a lack of integration between regional supply of innovation services and demand for innovation [23].

Empirical studies bring evidence on the weaknesses of knowledge interactions between universities and firms in non-core regions. Garcia – Aracil [24] explored university – industry interactions in a peripheral European region – Valencia, Spain - and found that firms prefer interactions related to the training of students and education of personnel rather than performance of contract R&D and joint R&D projects. As expected, the level of interaction increases in firms in high technology sectors. Huggins and Johnson [19] analysed the types of knowledge networks utilised and formed by knowledge – based SMEs in the relatively uncompetitive regional settings of Yorkshire and Humberside in the UK and found that SMEs tend to utilise and value knowledge networks with actors outside the region, even if more innovative SMEs possess a balance of inside and outside the region knowledge workers. A similar conclusion was drawn by Doloreux [20]: in his study of regional innovation systems in manufacturing SMEs in the peripheral region of the Beauce in Quebec, Canada, he found that many of the studied firms were getting access to knowledge through external linkages reaching outside their peripheral region, while local networks were weak.

As regarding the less developed regions in transition and developing CEE countries, some cases are available especially from Hungary and the Czech Republic. Based on case studies mainly from the non-metropolitan regions of Hungary and the Czech Republic, Gal and Ptacek [14] highlight the traditionally weaker role of university – based experimental research, the mismatch between economic and knowledge sectors, the weak regional innovation systems and the less intense university – industry links. Because of historical path dependence, most of the universities outside the capital cities can be classified as midrange, where the R&D potential and density of contacts are much lower and possible spillover effects emerge more sparsely. Gal and Csonka [25] explored the constraints of knowledge transfer in the case of mid-range universities located in the South Transdanubian region and found an overall low intensity of participation in knowledge interactions, together with a low level of utilization of research-based results. Bajmoczy, Lukovic and Vas [26] studied the link between the presence of higher education institutions (HEIs) and the innovation and economic performance in Hungary's extra-Budapest regions and found that the local innovation effects of universities on the productivity of the host region's enterprises were not significant. In Hungary, for the period studied (1998-2004), HEIs cannot be considered as real resources of local development, especially because regional innovation systems are not able to link knowledge producing ability to the knowledge-exploitation. Finally, Constantin L. [27] revealed several success cluster initiatives in lagging or declining regions, such as the Moravian-Silesian region in the North-West of the Czech Republic, the Dél Dunántúl region in the South-West of Hungary, the Lublin region situated in the Eastern part of Poland, pointing to the importance of networked learning.

Various research studies addressing the specific problems and difficulties in the lagging regions have identified possible policy reactions. For a number of years, many of the policies relating to the development of less competitive economies have concerned the utilisation of the cluster model of development, with a focus on hard infrastructure, such as science parks, business incubators, laboratories etc. Huggins and Johnson [19] recommend a shift from cluster policies to encouraging networks, value and supply chains, which proved to be of high importance to value-added SMEs in uncompetitive regions. The same opinion is shared by Coenen [28], who advocates for the adoption of broader framework that can be applied to ordinary, less successful regions, that go beyond technology transfer strategies centred exclusively on science parks and incubator centres. According to Todtling and Triple [18], in peripheral regions, the key challenge is to strengthen and upgrade the regional economy by fostering "catching-up learning"; adequate policy measures include amongst others the attraction of external companies, attempts to embed them in the region and to strengthen potential clusters. To support new firm formation and enhance the innovation capabilities of existing companies is important, too. Lastly, in less developed regions which do not have the critical mass to engage in world class research, universities have to take on new roles, with a stronger regional engagement in medium-tech innovations and in social and organizational innovations [14].

### **3. Methodology**

As observed by Huggins and Johnson [19], there has been little systematic analysis of differences in the relative contribution of HEIs across regions. Based on the case of UK's region, the authors have found significant differences in the wealth generated by universities according to regional location, concluding that universities in competitive regions were more productive than those in less competitive regions. The aim of this study is similar to Huggin's and Johnons study: by using different statistical techniques, we intend to compare performances in university – industry knowledge transfer across Romanian regions.

At the moment, there are eight administrative regions in Romania, including the capital region. Similar to other CEE countries, Romanian regions are dominated by a large city where there is a relatively high concentration of financial and human capital, with the

peripheral districts lagging substantially in terms of competitiveness and innovation. In total, there are 90 HEIs across Romania, with more than one third of these located in the capital region, Bucharest – Ilfov. Our study focuses the 58 universities located outside the capital, in seven administrative regions: Center (C), North East (NE), North West (NW), South East (SE), South (S), South West (SW) and West (W). In a European classification, the seven administrative regions from above are placed in three categories: leading knowledge regions: W and NW, industrial region: C and lagging behind regions: S, SE, SW and NE [29].

The methodology of this study consists of an analysis of secondary data that were made publicly available by the Romanian Ministry of Education, Research, Youth and Sports in 2011, following the first National Assessment Exercise for the Classification and Ranking of Romanian universities and Study programs. We focus our attention on 10 output and outcome type indicators that were selected (from the available database) following different theoretical and political recommendations [2, 30]: 1) patent application in Romania (patents\_RO), 2) patent application at the European level (patents\_EU), 3) new products and services (new\_products), 4) number of spin offs (spin\_offs), 5) number of partnerships with private institutions (no\_partnerships), 6) number of participants to scientific workshops (no\_workshops), 7) R&D income from projects with domestic private funding (incomeRO\_private\_funding), 8) R&D income from projects with European private funding (IncomeEU\_private\_funding), 9) income from industry contract research (Income\_contract\_research) and 10) income from commercial activities (commercial\_income).

In absolute values, there are significant differences in university knowledge transfer resources (inputs) across the seven regions (Table 1) and the differences come first from an unbalanced number of universities, even if the regions do not vary significantly in size and population.

**Table 1** University knowledge transfer inputs across RO regions (absolute values)

Regions	Number of universities	FTE Staff	Research Staff	KT Staff	R&D Expenditure (RON)
C	11	3614	59	124	37502070
NE	11	4980	360	232	74989785
NW	12	7370	449	199	88633557
SE	6	2577	200	13	13605118
S	4	1666	21	38	10408243
SW	3	1922	18	28	16325881
W	11	5337	599	144	48969523

As suggested in the literature, when using university – industry knowledge transfer metrics, there are two potential options to reduce the bias related to the size of the university, namely to normalize the variables relative to the number of Full Time Equivalent (FTE) staff in each university or to the amount of research expenditures. However, research expenditure is not perfect as a normalizing variable, as it is affected by how expenditures are defined [30]. Given these considerations, we have included the normalized score relative to the number of FTE staff in each university. To identify the differences in university knowledge transfer between the regions, we have performed first a comparative analysis using the Kruskal Wallis H test, the nonparametric equivalent of the parametric One Way Analysis of Variance (Oneway ANOVA), as our data didn't follow a normal distribution and failed the Homogeneity of Variance tests. In the second phase, we aggregated the values at the regional level and computed the proximity matrix that allowed us to assess the distances for all pairs of regions and to observe the hierarchy of clusters.

## Results

The results of the Kruskal Wallis H test indicate that there is a significant difference in the medians of our independent samples only for *income from commercial activities*: chi-square (6,  $N = 58$ ) = 13.64,  $p = .034$ . Because the Kruskal Wallis H test doesn't offer post-hoc tests to identify the source of variations, pairwise comparisons among the seven groups (regions) were completed using the Mann-Whitney U test, which yields identical results with the Kruskal-Wallis test for two independent samples. We therefore found significant differences induced by the South East region ( $p = .001$  for SE - NE,  $p = .018$  for SE - W,  $p = .031$  for SE - SW and  $p = .032$  for SE - NW). We looked for explanations and found that only two universities in five in the South East region have reported income from commercial activities, with incomparably lower values than universities in the Centre region, for example. Although reliable, the Kruskal Wallis H test considers only the mean ranks and not the total knowledge transfer potential of universities. From a regional perspective, it is more important to assess differences in the total regional outputs and outcomes than the performances averaged by the number of universities.

Consequently, to explore the patterns of similarity, we aggregated the values of the variables at each region's level following an equal weights scenario. In doing so, we first standardized the variables by assigning a score of 1 to the highest value in each variable and a score between 0 and 1 (relative to the highest value) to the remaining values (Figure 1). This time, the differences between the seven regions become evident, reflecting both the unbalanced distribution of the universities across the regions and the lagging status of the Southern regions.

To statistically validate the observed differences, we computed the proximity matrix of dissimilarities based on squared Euclidian distance measures and found the North West region as the most important source of dissimilarities (4,947 for NW – SW, 4,766 for NW – S, 4,027 for NW – SE etc.). Finally, based on the proximity matrix, we applied the hierarchical clustering analysis to find the relatively homogenous clusters of regions based on measured characteristics (Figure 2). As it can be observed from the hierarchical cluster dendrogram, when considering the average linkage between groups, a single homogenous cluster can be formed by the South and South West regions (.014). The distances between the other groups (regions) are significantly high, especially when considering the North West region.

## Conclusions

At least two conclusions can be drawn from the current study. The first one is that not only the dissimilarities with the capital region, Bucharest Ilfov, are very high, but also the dissimilarities between non-core regions. It would be misleading to judge regional performances in university knowledge transfer by averaging the total outputs and outcomes with the number of universities in the region: when doing so, as our findings suggest, there are no significant differences between the regions, except for the income generated from commercial activities. On the contrary, at the aggregate level, the study found significant dissimilarities among the regions, reflecting the unbalanced regional distribution of universities, but also the evident lagging status of universities in Southern Romania.

Secondly, it becomes very interesting to compare regional performances in university knowledge transfer to other regional indicators. The literature suggests that university knowledge transfer tends to be higher in regions with higher economic outputs per capita or with higher innovation propensity. However, this assumption seems to be contradicted by some Romanian cases (Figure 3). When comparing regional university knowledge transfer to regional wealth measured by GDP/capita [31], the case of the North East region makes an exception to the rule: as the poorest Romanian region, with a GDP/ capita of only 7200€, the North East region has a relatively high knowledge transfer potential. Moreover, when considering the regional innovation scores [32], the case of the South East region seems

abnormal: as the most innovative region outside the capital, the South East region exhibits one of the lowest performances in university knowledge transfer. The South region follows similar patterns to the South East region, while the South West region is lagging behind across all indicators. The Centre region and the West region are the most competitive regions across all indicators and the North West region follows them closely.

This study was only aimed at comparing university knowledge transfer performances across non-core regions, but there is plenty of evidence that these performances are generally low and university – industry linkages are far from being effective all over Romania. The main barriers in cooperation are sourced by the lack of resources for R&D, an unclear or inappropriate offer of R&D providers, poor managerial skills of researchers, a lack of awareness regarding the benefits of research and innovation and, more important, the lack of an innovation culture among SMSs [33]. Only 18,6% of the managers in a recent survey assess favourably the level of communication and cooperation between universities and businesses [34].

As illustrated by the Regional Innovation Strategies (RIS) that were drafted for six Romanian administrative structures, the establishment of regional innovation support structures at the interface of universities and businesses is the sine-qua-non condition of a regional innovation system. These intermediaries should facilitate the formation of networks and “information circles” or meeting places, in order to stimulate the demand-led knowledge transfer. At the same time, they have a straightforward role in changing the misleading perceptions of the utility of scientific research and in creating an innovation-friendly environment. If a sense of mutual distrust persists, then “forcing” university – businesses interactions will only serve to stimulate opportunism in accessing funds and not the promotion of sustainable regional innovation [33].

Finally, any regional innovation and knowledge transfer policy should consider the dissimilarities across the regions and question the situations where regional indicators go in opposite directions, such as in the case of the South and the South East regions in Romania. The very high scores of regional innovation indicators, despite a low performance in university knowledge transfer, should be judged in terms of innovation types, geographical proximity to the capital region, Bucharest Ilfov, industrial specialization etc. Beside these, questioning the real potential of universities to generate regional innovation should not be omitted.

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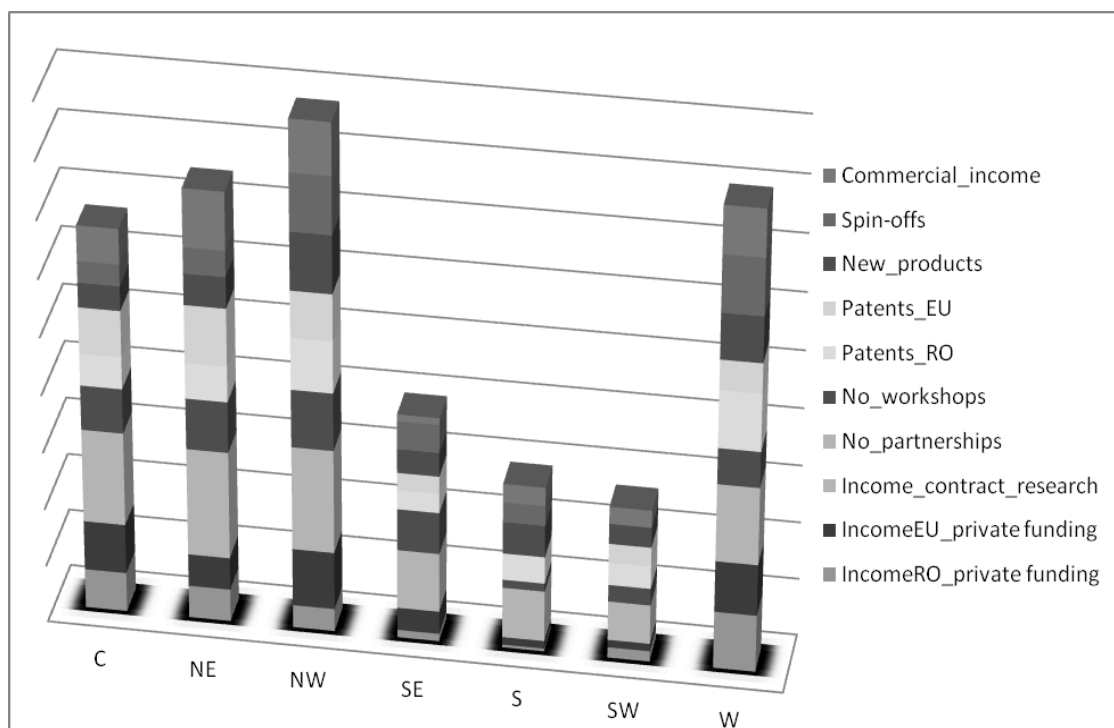
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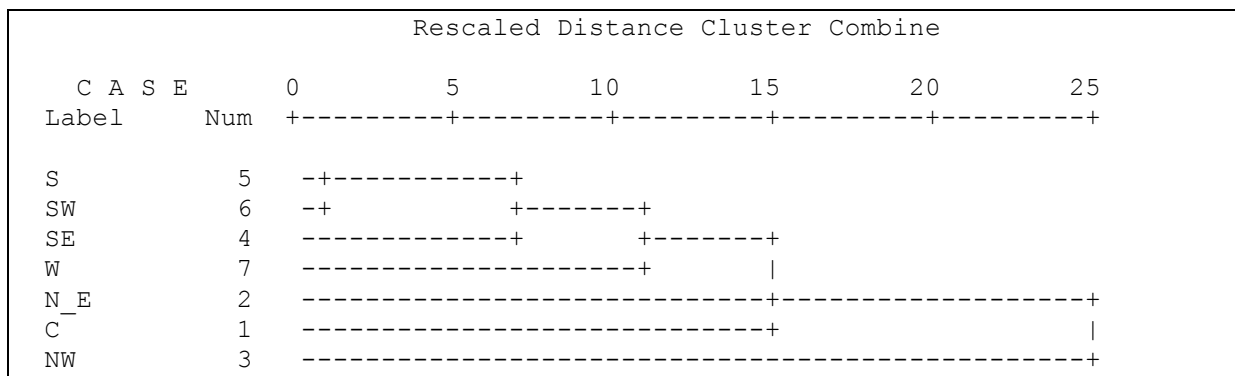
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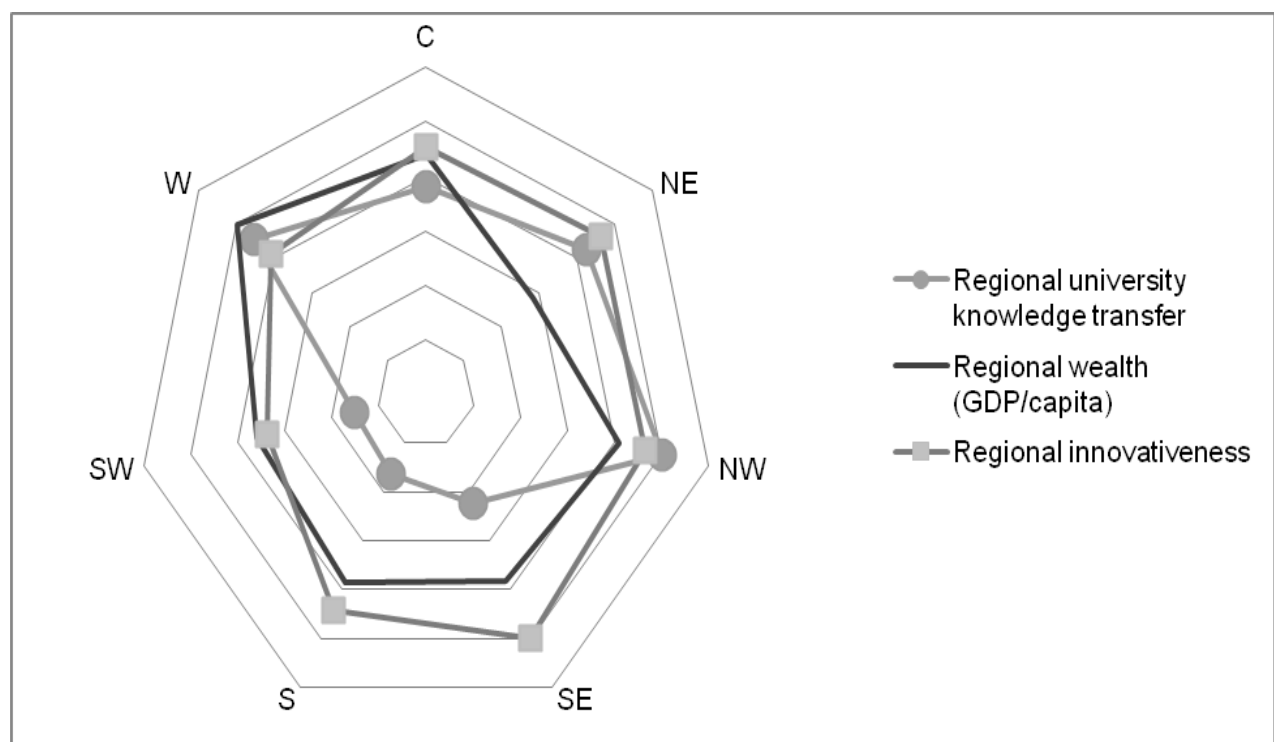


**Figure 1** University knowledge transfer across Romanian regions. Aggregate scores





**Figure 2** Hierarchical cluster analysis. Dendrogram using Average Linkage (Between Groups)



**Figure 3** Regional performances compared

# Competitiveness of Western Balkan SMEs' in Terms of Global Economic Crises

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Since the establishment of a free trade agreement CEFTA 2006, much is expected. At first it was assumed that there will be accelerated liberalization of trade in goods and services between the CEFTA countries, which turned out to be not entirely correct. Specifically, the Western Balkan countries, which made the majority of this regional economic integration, still have many unresolved, above all, political problems. On the other hand, the different status of these countries in the process of integration into the European Union chose the inflow of financial resources and speed necessary economic reforms. It was expected that the investment of foreign capital will be much more intense, and will be directed towards less trade, and more productive and IT sectors. In doing so, it is expected that the new CEFTA, as well as regional integration, to attract more foreign capital than the member states individually. It was assumed that additional foreign capital will accelerate economic growth and development of all countries. However, the global economic crisis has slowed the flow of financial resources, especially greenfield investments, deepened social stratification and mutual political differences between member states. Also, very little has been done to address the major problems of the region - corruption. Economic policies of the region in this respect had to adapt to new conditions in the global market. This paper focuses on measures and incentives that the Western Balkan countries should undertake to encourage the export businesses and improve competitiveness in the global economy.

## **Keywords**

Liberalization, CEFTA, the Western Balkans, foreign direct investment

## **1. Introduction**

The Western Balkan's accession has been mostly driven by the EU, while countries' role in defining their own path to the Union was rather limited. Besides Copenhagen and Madrid criteria that serve as a regular channel for accession to the EU, additional instruments were set for these countries such as benchmarks for progress in chosen areas and initiatives for strengthening of the regional integration in the Balkans. In purpose to get into the EU, the Western Balkan's governments have already shown high degree of commitment to undertake the demanding reforms and willingness to establish deeper regional cooperation. But, expected results are missing. With exception of Croatia that has started the negotiation talks in October 2005 and planned to be in EU in July 2013, the other countries are running to the EU very slowly. Macedonia got candidate status in December 2005 and European Commission's (EC) recommendation to start the negotiations in October 2009. Other Western Balkans countries are lagging behind in the process. Montenegro got candidate status in December 2010, Serbia in March 2012. Bosnia and Herzegovina does not have candidate status and its unknown when it can be, because of political problems within the country.

## **2.Regional Economic Integration**

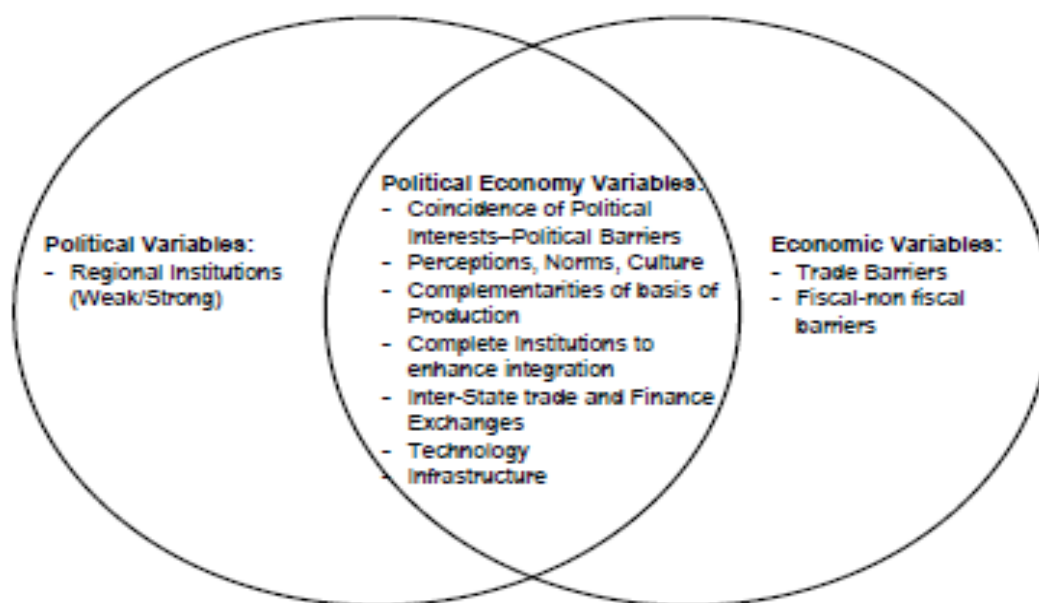
Regional integration and cooperation has been addressed by a considerable number of both scholars and policymakers. Nevertheless, the extensive variety of approaches and perspectives which have been attributed to regional integration has not led to clear definitions and practices. Undoubtedly, evidence links openness – i.e. low trade barriers, transparent operation through the price mechanism - and economic growth. Thus, developing countries have sought to apply these principles either through autonomous unilateral liberalization, or more commonly through participation in regional trading agreements. Indeed, nearly every country in the world is a member of one or more regional integration arrangements (RIAs), and nearly 60% of world trade occurs within such blocs. However, although most preferential trading arrangements are regional in the geographical sense, this does not apply for most of their economic results (1).

Western Balkan countries have persistent problems related to predefined criteria for EU membership include an inefficient judiciary system, corruption proneness, an insufficient capacity of the public administration and low competitiveness of the national economy to cope with the pressures on the EU market. The EU has introduced specific benchmarks for most of the countries, such as fulfilment of the Ohrid framework agreement in Macedonia, settlement of the Croatian-Slovenian border dispute; Serbia's response to the Haag Tribunal requirements, etc. In parallel to the process of setting additional criteria, the EU debate on enlargement fatigue was blooming, providing a basis for countries' frustration regarding the EU enlargement policy towards the Western Balkans.

Also, inter-state trade and financial transactions are limited within the region, although economic integration of the individual states with the EU has significantly progressed. This brings forth the issue of preferential 'north-south' integration, at the expense of 'south-south' integration. The rigidities in the development efforts in the region, which are reflected in inter-industry trade, labor- and materialintensive export sectors, withdrawal of cross-border trade, and excessive trade dependence on the EU. The outcome is lower increase in exports, larger deficits, lower productivity and weaker economic systems, compared to the Central European transition countries.

After 2000 and political reforms in southeastern countries, the competitiveness of the economies of the Western Balkans represents a strategic European interest. Well-functioning market economies resistant to global competitive pressures will further contribute to the political stabilisation of the Western Balkan region, but also to achieving the EU's main policy objective for the years to come: growth and jobs for Europe.

**Figure 1. Capturing the variables of Regional Economic Integration**



**Figure 1** Capturing the variables of regional Economic Integration

Source: Sklias, Pantelis, Tsampra (1)

Enhancing competitiveness and preparing the region for future EU accession will entail attracting investments and promoting private sector development. It is crucial that these objectives be pursued at a regional level. Further regional economic integration will better prepare the economies of the Western Balkans for the EU Single Market as well as increase their appeal as destinations for much needed investment.

In view of the global competition to attract investment, dedicated investment and private sector development policies are needed to enable countries to gain a comparative advantage. It is therefore important for governments to identify what such sources of competitive advantage might be, and to remove sector-specific policy barriers in order to achieve them.

In Western Balkan countries SMEs are base for economic growth and development. Some of them will, after adopting or developing innovative products, new technology or organizational principles already known and used in EU countries, become competitive, even in single market conditions, which is important because of their EU entering process (2). Entering process cannot be only political but also economical. In that process, it is necessary to involve public administration and governmental structures, because SMEs cannot take developing fast track with passive administration. Increasing competitiveness is necessary for preparing countries of Western Balkan to enter European market, where small and medium-sized enterprises play an important role.

It is very important that they can recognize areas where reforms and adjustments are necessary to increase competitive advantages of SMEs. EU considers SMEs very important part of local and interregional economy, and has special programs and funds to promote entrepreneurship and skills, improve SMEs access to markets and improve a growth potential.

### **3. Competitiveness of Western Balkan Countries**

Economies in Eastern Europe and Central Asia were the most active in easing business start-up over the past 7 years, with 93% introducing improvements. More one-stop shops have been established in this region than in any other. In 2002 the Russian Federation integrated several registers under one function, freeing entrepreneurs from having to visit separate agencies involved in business start-up. Since then 19 other economies in the region, including Azerbaijan, Belarus, the former Yugoslav Republic of Macedonia, Serbia and Ukraine, have adopted similar approaches. The changes in the region since 2005 reduced the average number of procedures by 4, the time by 21 days and the cost by 8.8% of income per capita.

Western Balkan countries have identified main issues and they started to make reforms aimed at enhancing SME competitiveness. By adopting EU administrative processes, educational procedures, regulations and funding policy concerning SMEs, Western Balkan countries can enlarge competitiveness, economic potential, technologic capacity and, at the end, value added potential of SMEs.

When talking about competitiveness of EU countries and countries of Western Balkan it should be kept in mind that, on the one hand, it is integration of 27 European countries which, on the level of Community, conduct all kinds of programs and policies according to law legislative of EU, while on the other hand, are small transition countries.

The well being of SMEs is the key to future employment and prosperity, and at the moment, that sector provides 67% of all job places in EU.

When analyzing competitiveness regarding SMEs in Albania, Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro, Serbia and Kosovo under UNSCR 1244/99, it is firstly seen that reform process is necessary and very much needed in an attempt to come closer to business conditions in EU. Because of their lower stage of development when comparing with EU countries, they need a wider range of reform processes and development policies, especially because of their competitiveness position for doing business in the single EU market.

**Table 1** Ranking on the easy of doing business, 2011

DB2011 RANK	DB2010 RANK	ECONOMY	DB2011 REFORMS	DB2011 RANK	DB2010 RANK	ECONOMY	DB2011 REFORM
1	1	Singapore	0	62	61	Fiji	1
2	2	Hong Kong SAR, China	2	63	82	Czech Republic	2
3	3	New Zealand	1	64	56	Antigua and Barbuda	0
4	4	United Kingdom	2	65	60	Turkey	0
5	5	United States	0	66	65	Montenegro	3
6	6	Denmark	2	67	77	Ghana	2
7	9	Canada	2	68	64	Belarus	4
8	7	Norway	0	69	68	Namibia	0
9	8	Ireland	0	70	73	Poland	1
10	10	Australia	0	71	66	Tonga	1
11	12	Saudi Arabia	4	72	62	Panama	2
12	13	Georgia	4	73	63	Mongolia	0
13	11	Finland	0	74	69	Kuwait	0
14	18	Sweden	3	75	72	St. Vincent and the Grenadines	0
15	14	Iceland	0	76	84	Zambia	3
16	15	Korea, Rep.	1	77	71	Bahamas, The	0
17	17	Estonia	3	78	88	Vietnam	3
18	19	Japan	1	79	78	China	1
19	16	Thailand	1	80	76	Italy	1
20	20	Mauritius	1	81	79	Jamaica	1
21	23	Malaysia	3	82	81	Albania	1
22	21	Germany	1	83	75	Pakistan	1
23	26	Lithuania	5	84	89	Croatia	2
24	27	Latvia	2	85	96	Maldives	1
25	22	Belgium	1	86	80	El Salvador	0
26	28	France	0	87	83	St. Kitts and Nevis	0
27	24	Switzerland	0	88	85	Dominica	0
28	25	Bahrain	1	89	90	Serbia	1
29	30	Israel	1	90	87	Moldova	1
30	29	Netherlands	1	91	86	Dominican Republic	0
31	33	Portugal	2	92	98	Grenada	3
32	31	Austria	1	93	91	Kiribati	0
33	34	Taiwan, China	2	94	99	Egypt, Arab Rep.	2
34	32	South Africa	0	95	92	Seychelles	1
35	41	Mexico	2	96	106	Solomon Islands	1
36	46	Peru	4	97	95	Trinidad and Tobago	0
37	35	Cyprus	0	98	94	Kenya	2
38	36	Macedonia, FYR	2	99	93	Belize	0
39	38	Colombia	1	100	101	Guyana	3
40	37	United Arab Emirates	2	101	100	Guatemala	0
41	40	Slovak Republic	0	102	102	Sri Lanka	0
42	43	Slovenia	3	103	108	Papua New Guinea	1
43	53	Chile	2	104	103	Ethiopia	1
44	47	Kyrgyz Republic	1	105	104	Yemen, Rep.	0
45	42	Luxembourg	1	106	105	Paraguay	1
46	52	Hungary	4	107	111	Bangladesh	2
47	49	Puerto Rico	0	108	123	Marshall Islands	1
48	44	Armenia	1	109	97	Greece	0
49	48	Spain	3	110	110	Bosnia and Herzegovina	2
50	39	Qatar	0	111	107	Jordan	2
51	51	Bulgaria	2	112	117	Brunei Darussalam	3
52	50	Botswana	0	113	109	Lebanon	1
53	45	St. Lucia	0	114	114	Morocco	1
54	55	Azerbaijan	2	115	113	Argentina	0
55	58	Tunisia	2	116	112	Nepal	0
56	54	Romania	2	117	119	Nicaragua	1
57	57	Oman	0	118	126	Swaziland	2
58	70	Rwanda	3	119	118	Kosovo	0
59	74	Kazakhstan	4	120	120	Palau	0
60	59	Vanuatu	0	121	115	Indonesia	3
61	67	Samoa	1	122	129	Uganda	2

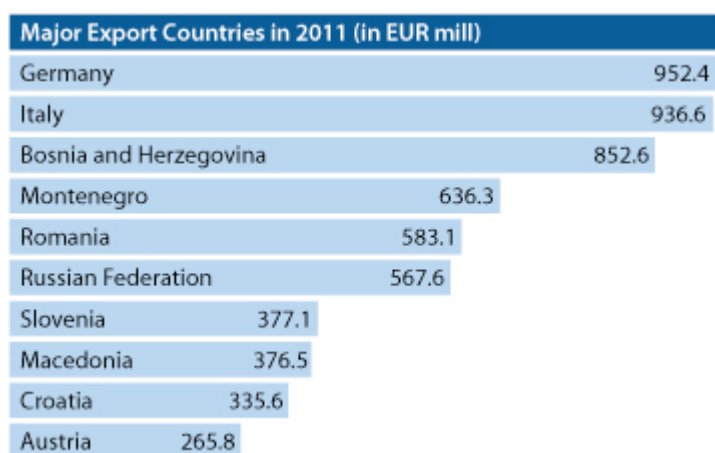
Source: Doing business 2011

At this point most reforms are directed to decrease an administrative burden. Cheap work force, low corporate income tax and their closeness to the EU market are the main advantages of SMEs in Western Balkan countries, while technology readiness, lifelong education and encouraging innovative companies are still not recognized as main competitive necessities in WB countries. WB countries started with reforms that follow EU model for economic growth by implementing policies and starting reforms to provide a better administrative and legislative environment to SME.

Within Western Balkans countries, there are many differences one it comes to institutional and legal framework. Albania, Bosnia and Herzegovina, and Kosovo under UNSCR 1244/99 was characterized by denoting an institutional and legal framework underpinning SME policy still largely reliant on ad hoc intervention and pilot projects, and in need of further concretization. On the other side, FYR of Macedonia, Montenegro and Serbia, described countries that had largely completed the legislative and institutional framework supporting SME policy and had just entered into the phase of policy implementation. Finally, Croatia was highlighted as the most advanced country in terms of SME policy, but still comparative only with new EU member states (4).

The OECD 2009 report indicates that there have been significant policy developments in Serbia across a wide range of dimensions. The country has moved rapidly from the phase of policy elaboration and definition of strategy objectives to policy implementation in areas such as support to innovative companies, start-ups, provision of business services and information dissemination through online services.

Also, Serbia has something that none of the Western Balkans economy dont: Free trade agreement with Russian Federation, which is very important factor for foreign investors, like Fiat, Benneton, Gorenje, etc. Intraregional trade in CEFTA countries is increased, but EU countries still remains the most important trade partner for this countries.



**Figure 2** Serbian exports, by countries, 2011

Source: [www. siepa.gov.rs](http://www.siepa.gov.rs)

Major Import Countries in 2011 (in EUR mill)	
Russian Federation	1,908.1
Germany	1,557.6
Italy	1,293.7
China	1,098.4
Hungary	665.4
Romania	637.9
Austria	509.8
Bosnia and Herzegovina	480.5
Slovenia	427.0
France	387.4

**Figure 3** Serbian exports, by countries, 2011

Source: [www.siepa.gov.rs](http://www.siepa.gov.rs)

In addition, Serbia has improved its performance, in an incremental way, in a number of areas where it already had a positive implementation record, as in company registration and export promotion (mostly due to SIEPA, Serbian investment and export promotion agency). On the other hand, Serbia has one of the most difficult construction procedures.

**Table 2** Dealing with construction permits

<b>Easiest</b>	<b>RANK</b>	<b>Most difficult</b>	<b>RANK</b>
Hong Kong SAR, China	1	Malawi	174
Singapore	2	Burundi	175
St. Vincent and the Grenadines	3	Serbia	176
Belize	4	India	177
New Zealand	5	Tajikistan	178
Marshall Islands	6	Ukraine	179
Georgia	7	Tanzania	180
St. Kitts and Nevis	8	China	181
Maldives	9	Russian Federation	182
Denmark	10	Eritrea*	183

Source: Doing business 2011

In other countries, there have been limited improvements in the overall performance. In FYR of Macedonia and Montenegro just few policy initiatives have been launched over the last two years. Both countries have made significant progress on two dimensions relating to human capital development and, to a lesser extent, on the provisions of business support services. However, they are relatively weak in the key areas of supporting SME competitiveness and technological capacity, as well as in the export promotion area.

Albania's policy performance over the last two years has been remarkable and has allowed the country to join the second group. Albania's record of policy implementation has improved in all ten dimensions; in particular, in all the policy areas linked to the general operational environment (such as company registration, regulatory reform, access to finance and export promotion). The weak points in Albania's performance remain human capital development and technological capacity of SMEs.



Bosnia and Herzegovina and Kosovo under UNSCR 1244/99 are still in a phase of completing the basic institutional, legal and regulatory requirements underpinning SME policy.

#### 4. Concluding Remarks

West Balkan countries have a significant potential in terms of competitiveness, as they are close to the EU market and enjoy almost unlimited entry to the single EU market.

The poverty-stricken and politically unstable countries of the Western Balkans are characterized by over-reliance on traditional industry and agriculture, both lacking international competitiveness; overdependence on FDI, uneven distribution and power asymmetries between small firms and international investors.

A useful contribution of these analysis for the identification of obstacles at the different levels of the regional integration process, would be the establishment of constructive recommendations that will improve the effectiveness of existing coordination and will forge the necessary linkages between the various stakeholders (central governments, border communities, public and private enterprises).

Western Balkans countries have made progress in terms of competitiveness by market liberalization and reduction of the tax burden. It is also important to mention the relatively cheap labor in relation to the EU labor market as main competitiveness advantage. However, a clear indicator of the problems related to competitiveness and basis for the long-term growth is a constant high rate of unemployment that averages 20%, and corruption. In addition to that, there are numerous obstacles that prevent higher level of competitiveness.

The crisis itself presents the opportunity to achieve economic restructuring toward greater competitiveness and provide the foundations for achieving production that consists of more value added in the period afterwards.

In the case of the Western Balkans, regional integration may be achieved only through a top-down approach, namely a European Union/International Community enforced process, rather than through bottom-up initiatives of the individual states in the region. Countries of Western Balkan have a lot more job to do to reach a stage of development so that they can compare and compete with EU companies.

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# Regional Development Capacity of Hungarian Local Governments

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The local governments are key players in the local economic development in Hungary. Characteristics of the local economy are well known by these organizations. The local governments should take part in this process for enhancing the performance of the local economy. They are filling an important role in communication between the interested actors. However, a successful development policy without adequate equipment and sufficient funds could not be achieved. In Hungary, this area of regional development fights with some problems and challenges. The paper would like to discuss these questions and to analyze the potential development plan. It is not an ideal situation by the regional distribution of resources according to various development objectives. In addition, the actual situation will be worsened by that the institutional system's characteristics of the development imply the fragmentation of resources. In these circumstances, it is not possible to implement comprehensive regional development programs. All of this means to the local government system that this sector can use central funds only some extent in accordance with the local interest. Further possibility to raise funds is the intensification of the tendering operation in connection with European Union. However, this opportunity has limited rationality because of the general difficulties of the local governments' management. To ensure the necessary proportion of the own fund for tender processes is almost an impossible task. Due to the lack of resources in the management own resources can really not be used by local governments. The majority of their own revenue is needed to maintain the institutional system and to solve the self-governmental tasks. The local taxes have typically development purposes but they will not be able to fit their role. The using of scarce resources has not been effective. Whilst individualized solutions tailored to local specific circumstances, capacities and needs are prerequisites for success in local economic development, the development goals and instruments of local authorities are quite homogenous across the board at national and even international level. From these functions excels the communication role, which contains the cohesive force and the communication with the authorities include in generally. However, significant differences can be observed on the basis of the size of the local governments. The small- and medium-sized municipalities have lower capacity in the development of local economy than the big cities. The paper aims to give some proposals for solve this situation. In the framework of local governments management a number of techniques could be applied, which would increase the effectiveness of Hungarian local economic development substantially.

## **Keywords**

Regional development, local economy, local government sector, development tools

## **1. Introduction – The Regional Aspects of Economic Development**

The process and practice of economic development is extremely complex. In fact, we can't verify a widely and general used conceptual definition for the concept of economic

development. According to the majority of the economic literature the development of the economy is a special kind of conscious intervention in the functioning of the economy, which is sometimes referred on the one hand to the target of securing sustainable development and on the other hand an increase in standard of living of the population.

The regional economic development materializes in different territorial scale. On this basis of this statement it could be tell apart different types of economic development, there are national, regional and local concepts of this idea. Any level also are examined, the intervention in the functioning of the economy assumes a number of intervention between the economic actors. Thus the economic development process can approach from different sides and some territorial level could stand for actors to achieve the targets.

In the member countries of the European Union there is no uniform practice for economic development. It is a common point, that this policy area has very important role in all European countries. At the same time there are some distinct instruments, because the applied methodology in the territorial politics is affected in each country fundamentally by the characteristics of the country.

In this paper the local level of the economic development will be examined. The aim of the study is to represent wherein could be stated that the techniques of the Hungarian territorial policy is fit compared with the European Union practice. The centre of this analysis is the perspective of local authorities and the local level.

### ***The situation of the regional economic development in Hungary***

From the perspective of local economic development the summary of regional level's situation is the basic point of the analysis.

Regional economic development is developing in two directions. One of these is the trend of gathering of financial instruments. Basically these instruments offer area independent solution for small and medium-sized enterprises according to the financial problems of these enterprises. The damages of the effectiveness could be well treated by these instruments (with other words this category is the market failures). The other trend is the spread of the indirect techniques (as such science parks, innovation centers) and the secondary instruments (clusters, sub regional development programs). It could be to notice that the decisions are decentralized and concepts adapt to the conditions of a region. Generally these instruments can treat the principles of fairness (these problems are the broader sense of market failures).

In Hungary it is characteristics that there is not practically a significant and craggy regional economic development tool, which itself could take effect in the direction of the settlement. Because of this it is indispensable the territorial focus of the regional development instruments. The territorial aspects should integrate in the development methods. The most effective programmes could be able to develop themselves if we learn from the faults and value the results of one or two decade-long processes. The funding system should be established so that can handle this.

Instrument system of the regional economic development works out on the basis of two main agents. One of these is the development of the economy, because the economy means the floor for instruments. The system of instruments needs to be fit for requirements. It can be well observed in the case of the developed market economies. The other agent is the slower development of the state, namely the state is one of the most important actors in the regional development process.

In Hungary, the adoption of all instruments is been delayed without exception or distorted. The reasons for this problem are the concepts of state failure and rent hunting. The state should avoid making discretionary decisions, and application of the tools that require these. A large number of instruments, which require discretionary decisions, should be entrusted reasonable for checked market, civil or local actors by the state.

So the local economic development works in this situation, which can predict the practically problems and tensions.

## **2. Characteristics of the Local Economic Development**

### ***2.1. Concept of the local economic development***

The concept of local economic development, as already mentioned in the introduction, can be not clearly identifiable. The definition of the place of the concept is very complex in the structure of development methods and thoughtful concepts also raise issues. In particular it can be stated that the concept of local economic development should separate from settlement development, territorial development, or rural development.

Of course some overlaps are possible in the cases of the mentioned concepts according to the characteristics. The settlement development involves such planning and implementation activities, which have the aim to influence the municipal processes. In fact, as a part of the regional development, it is its realization at the local level. [1] The territorial development means the conscious intervention of local governments and government in the spatial processes according to the development plans. [2] According to some researchers the rural regional development is one of the parts of the rural development, which the conscious intervention takes place in rural areas, which tend to have a low population density and agrarian activity is dominant. [3] The regional economic development focuses on the basis of the economic processes on the pivotal regions. [4]

Although there are some differences between the local and regional economic development, there are similarities in these politics, too. In the case of the local economic development we can determine what the focus of the intervention is. However this statement is not always effective by the regional economic development. [5]

It could be to verify the differences between the settlement- and local economic development in the characteristics of the legislation and the scope of actors. The potential focal area of local economic development should emphasize because the target of this is not only one settlement.

According to the former thoughts the concept of the local economic development can be defined as follows: it is a conscious intervention in the life of local economic and local processes, which can utilize both internal and external resources. Initiative of the process could be an external actor, for example the Central Government or foreign capital. But the most important thing is the involvement of local actors, who can be initiators of the development, instigators of the complainant or recipients of this process. [6]

In interpreting the concept also occurs in more than one question.

One of these is the interpretation of the local level. In the everyday sense it could be mean by this the settlement. According to the determination of the European Union the local level is on the one hand the settlement, and on the other hand the local groups of settlement. In the Lengyel's opinion the concept means the local area, which contains the towns and their attraction zone. [4] In the literature the concepts of the local and regional level is the same. The World Bank's documents in connection with the local economic development attach to the development of cities. Reese, American researcher in American cities examined in the case of their economic development practice, similar to the Bartik, in the 1990s. [7]

The embracement of awareness is not always unambiguous. It is a conscious intervention from the standpoint, because mostly written development strategy is grounded for the local economic development.

Furthermore many people think that the target of local economic development is to solve the imperfections of the economy, which are caused by market processes. However the main objective of the interventions is to create new mechanism in the local economy. [5]

## **2.2. Objectives of the local economic development**

The interpretation of the objectives of the local economic development also appears in various forms in the literature.

According to the interpretation of Faragó the primary goal of the local economic development is the improvement of unemployment rate. In generally the task of local economic development is to resolve the obstacles in the economy and it should handle the problems, which arise from the market failures. [2]

In pursuance of Mezei's thinking "the local economic development can achieve not only the economic growth, but also a qualitative change can be reached, such as improvement of employment rate or solve social problems". [6]

In 2005 the brochure of World Bank called "Local economic development" demonstrates the changes in the local economic development objective over time. The publication assigns assets of the implementation and the players in different time periods. 1970's were important milestone, since the former economic policy was not effective because of the oil crisis. The local ideas turned up in the territorial development's plans in the next decade. During this period have been realized clearly evident effects of the globalization process. In the 1980s, 1990s was no longer enough merely to ensure the line infrastructure, much more targeted infrastructure and more complex development forms of support was needed. By the goals has turned up the systematically supported sectors, territorial entities, entrepreneurship and investments and the networks of clusters. [8]

To sum it up it could be to find in the targets the intention of the local economy's amendment, which emphasizes the importance of territory.

## **2.3. Contributors to the local economic development**

Very wide range of actors play important role in local economic development. Grouping of actors is different in the literature. For example four feet are differentiated in local economic development by Lengyel. These feet are the following:

- Local government sector
- Business sector
- Institutions for knowledge transfer
- Development agencies

However the "four legs" system is not complete, since it is not one of the groups are, for example, the local residents, who are also play active role in the local acting. These groups, which can transform to civil organizations, do not perform in the opportunities of grouping.

In generally it could be to say that the first two "legs", which most of the cases, play the greatest role in the process. Worthy of note how important is the local actors, such as we could read in the conceptual definition. Because in some cases external actors are involved in the process of development, either pecuniary or by providing the intellectual capital of trust or the help of the participation of local actors is essential, and even the most initiative launched by them.

If the actors of the local economic development are examined in a wider sense, on the first place are those manipulators, how stands over the national level. For example this could be the European Union. Institutions located in this level, inspire the cooperations and issue documents in the form of recommendations.

On the top of national level stands the Central Government. Its role in the local economic development is obviously and exceptionally high in the accomplishment of the individual development goals. It could be attributable to the development of regulatory institutions such as the background or the availability of insurance. [9]

The next level is the regional level, which has different role in the development of local economy in European countries. Mostly the regulatory framework and the administrative system are the determining factor. [10]

Practical experience has shown that contributors play a determining role in this level, for example the regional government, local communities, associations, enterprises, knowledge institutions, civil society organizations and the general public. The role of local governments is essential moreover in some countries these organizations fill exclusive role in the process of local economic development. This statement can confirm with three factors: the dominant political stance, the regulatory environment and finally the municipal body. The policy stance gives significant effects on the purposes and methods of the implementation of local politics. Although the local governments are not required to be made directly to the tasks of economic development, the regulatory environment is still playing a determining role in the characteristics of the local government's obligations and actions. The local government organization could also affect the success of tasks to be performed during development programs, since their method of implementation will suit to the capabilities of the existing structure. However the realization of the latter concept becomes more difficult because new types of problems arise from the globalization process and local governments face with these factors. These problems are not treatable in the present organizational structure. As a result of this phenomenon appeared in a new approach to deal with the problems in the network. Characteristic of the new approach is that the role of the State will decrease and networks will use for solve different problems considering the nature of situation. [5]

Creation of different types of agencies has the aim to achieve economic development goals. In virtue of their operation these organizations can join to the Government sector with strong strands.

The local business organizations fill two types of roll in the local economic development. On the one hand they participate actively in this process and they are target group of the development. However this group has not a uniform nature, there are no solid instruments and assets for each company. The local economic development takes aim not to the whole of the companies, but the segment of this group. Determining characteristics of the companies is that today they take part in the market competition no longer separately, but also with each other in various forms of cooperation. Such cooperations, for example, are networks or clusters.

The knowledge-transfer institutions are belonging to the fourth group of actors. These institutions have an effect a very important influence on the development of the region's competitiveness. The main tasks of these organizations are creating new knowledge, stimulating and training of human resources.

### **3. Economic Development Practice by the Hungarian Local Governments**

Since the change of the regime Central Government allocate more are more resources for local governments in every year. This statement is valid for the regional and local level, too. At the territorial level are located the funds for territorial development plans. It should increase the amount of these funds, because the decentralized resources have the proportion from GDP about 0.2% and the optimal proportion would be 1.5-2% in the future. The regional level could inspire the local level and the other actors of the regional development for common development programmes and configuration of imperative partnerships.

Recognizable more and more operational problems are growing up at the local level, so the confusion of the municipal authorities, too. Reasons for this are complex and multiple, to originate in the Government's instruments as well as local articulated government system. [11]

The international practice clearly proves the relevance of local government economic development interventions, because the local authorities are actors of the local economic development initiatives around the world.

In Hungary after the change of regime and the globalization new challenges has emerged by local governments because of the large economic turnout. However, the domestic role of local governments in economic development and the measure of instruments' efficiency in local politics have not examined over the last 10-15 years by researchers.

According to international tendencies originator role was assumed from the years of nine teens in the local economic development by local governments. In parallel with this the expectations were thriven for Central Government's supports, mainly for financial aids. The reason of this duality should search in the background of characteristics of the domestic municipal financing system.

Negative parameters are the form of financing system of local governments and the inadequate measure of the own resources. However, solution to the problems could be to extend the local governments cooperation with each other, local business partners, or with regional actors.

Hungarian local governments have different opportunities for local economic development because of different factors. These characteristics are depending on for example the size and population of the given local government. Because of this different instruments are used by larger and smaller local governments. In generally local governments of cities are able to intervene in the functioning of the local economy in contempt of theirs financial crisis in accordance with strong capacity. For the smaller settlements the regional cooperation could be the expedient.

Opportunities from the background of legislation and capabilities are capitalized distinctly according to their size and management opportunities by Hungarian local governments. Various elements are emphatic in development programs of local governments and they use variant types of instruments for realizing development plans.

Since the change of regime it was a positive process on the municipal planning area in Hungary, still speaking that planning as a tool, helps to realize development programs by bigger cities. By smaller local governments there are some deficiencies in the planning in many respects. In the future adequate planning activity will necessary for obtaining EU funds, so they are seen as factors for competitiveness.

The lack of strategic planning has contribution to ensuring that the local governments orient to the priority of actual governmental support policy in the course of realization of development programs. Often important decision is made without deep planning process. These decisions could be for example selling of properties or infrastructure development and so on. [6]

Dependence of the local development strategies against the governmental and regional financial aid policy are explained by the form of financial structure and low own financial capacity.

Except for the bigger cities it has not yet developed the framework of the regular, formal relations with entrepreneurs and other partner organizations. In this sense, so we do not really speak about classic local economic development in Hungary. This activity does not base on the cooperation between local players and partnership.

There are a widely applied indirect economic development tool, it were the local industrial tax allowance and the tax exemption, which must change because of the adoption of the EU tax law. As a result of this provision the local decision makers must discontinue the possibility of attraction of innovative entrepreneurs, which former was an effective regional instrument.

The situation has not been changed since the early 1990s in Hungary in such regard that tasks of local economic development materialize in effective form in cities than small local governments. The majority of the cities and settlements are used at least one economic

development professionals, but in many cases, a separate economic development department supports the development activities.

The role of the Hungarian local governments in the financing of local economic development depends on some factors on the same time. Determinant factors are these:

- The regulatory background (the degree of decentralization and autonomy),
- The financial resources of local authorities, opportunities for loans,
- The structure of local government resources (bound or free-use),
- Background of the municipal property,
- The measure and allocation of resources from the state, the member states and regional institutions,
- The frequency of participation of local authorities in the community and private cooperation,
- The capacity for acquisition additional funds and the gaining further development supports,
- The local government's tender practices.

## Conclusions

One essential element of the local economic development is the participation of local governments. In Hungary the local governments fill active part in this area; however, the effective operation is hampered by the mechanisms of the development system. It needs for reform in many areas.

On the one hand, it should to clarify the functions of the local government in the local economic development process. While targets are unclear, none of the interventions may operate optimally. On the other hand, the financing conditions should also be ensured for the evolved tasks. Without the existence of financial funds may not be make successful economic development policies. All this presupposes the transformation of the financing structure.

In addition, it should be verified that local governments should have play two roles in the same time. These are the official and business service provider functions. The main challenge for the implementation of the two roles means the different approach. Typically, the role of the official service provider function means attending state tasks at the local level, which requires typical administrative attitude. In the case of a business service provider, in turn, the business approach will come in the front, and for the success of this concept are needed business instruments.

Today, in Hungary is the importance of the first function is stronger, but some of the larger local authorities recognized the importance of the business function. We can appreciate the reform ideas about, how can it improve the extent of these features.

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# Transportation Scheduling and Route Planning Framework for Modern ERP Systems

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Transportation scheduling and route planning are one of the most in depth researched areas of everyday logistics operations. Solutions about the challenges that arise during selection of the most optimal schedule and route are published in both Artificial Intelligence and in Operations Research literature. Strong problem solving techniques are proposed for clearly defined problems like the Traveling Salesman Problem (TSP), Vehicle Routing Problem (VRP) and Job Shop Scheduling Problem (JSSP). In the previous work, one of the main challenges for the researchers is to find the most optimal way to implement the imposed constraints or requirements and to take them in consideration while calculating the optimal transportation schedule and route. The constraints can be internal, such as vehicle capacity, loading personnel availability, loading dock capacity and availability; or external such as country or industry regulations, parking space at the delivery point or any specific customer requirement for the current order. These constraints and requirements are not general and vary for every country, industry, customer or order. In most modern companies these data is entered and kept in some software application, such as Enterprise Resource Planning (ERP) systems. These data is complex, very detailed and contains many parameters that are needed for calculation of the optimal time schedule and route, so its reusability is crucial. The main focus of this paper is to study how existing problem solving techniques can be integrated with ERP systems. In the first part we research the existing techniques and methodologies for solving the Transportation Scheduling and Routing problems and identify what data is needed as an input. In the second part, the data that exists within the ERP systems and that can be used for problem solving is identified. In the third section we propose a framework for deriving constraints from the data extracted from the ERP system.

## Keywords

ERP Process Improvement, Logistics Operations Enhancement, Transportation Scheduling, Route Planning

## 1. Introduction

Transportation costs represent significant portion of all costs related to logistics operations and of general costs for doing business. This means that the decisions associated with transportation scheduling and route planning that will enable most optimal usage of the resources is crucial.

Integration of common methodologies for Transportation Scheduling and Route Planning with ERP systems, gives option to monitor the performance of these problem solving techniques using real-life data, and measure their usability from business perspective. Later the performance results can be used to make optimisations both in the problem solving techniques and in the business processes if needed. In a Vehicle Routing Problem the standard optimization criterion is to minimize the total distance travelled by each vehicle. In

Transportation scheduling, a common criterion is the minimization of makespan: the time between the start of the first operation and the end of the last operation.

The main focus of this paper is to study how existing problem solving techniques can be integrated with ERP systems. In the first part we research the existing techniques and methodologies for solving the Transportation Scheduling and Routing problems and identify what data is needed as an input. In the second part, the data that exists within the ERP systems and that can be used for problem solving is identified. In the third section we propose a framework for deriving constraints from the data extracted from the ERP system.

## 2. Techniques for Routing and Scheduling

Transportation scheduling and route planning are one of the most in depth researched areas of everyday logistics operations. Solutions about the challenges that arise during selection of the most optimal schedule and route are published in both Artificial Intelligence and in Operations Research literature. Strong problem solving techniques are proposed for clearly defined problems like the Traveling Salesman Problem (TSP), Vehicle Routing Problem (VRP) and Job Shop Scheduling Problem (JSSP).

### 2.1 Travelling-Salesman Problem (TSP)

The Travelling-Salesman Problem (TSP) is widely studied in Operations Research and Theoretical Computer Science. There are many publications on the TSP, starting from 1930 when it was first formulated as mathematical problem by Menger, who tried to use mathematic rules to answer the questions that were solved by each postman in their everyday activities. The term Traveling-Salesman Problem was first used by Hassler [1].

The Traveling-Salesman Problem can be defined using a complete graph  $G$ , created with set of Nodes  $N$ , connected by set of Edges  $E$ , when each edge is associated with cost  $C_{ij}$  (Figure 1). The value of  $C_{ij}$  represents the cost incurred when traversing from node  $N_i$  to node  $N_j$ . With this information, a solution to the Traveling-Salesman Problem must return the cheapest Hamiltonian cycle of the Graph  $G$ . A Hamiltonian Cycle is a cycle that traverses the whole Graph and visits each node in a graph exactly once [2]. Using common TSP terminology this is referred as a tour.

The TSP has held the interests of computer scientists and mathematicians because, even after about half a decade of research, the problem has not been completely solved. The TSP falls in a distinguished category of hard problems and can be applied to solve many practical problems within our daily lives [3].

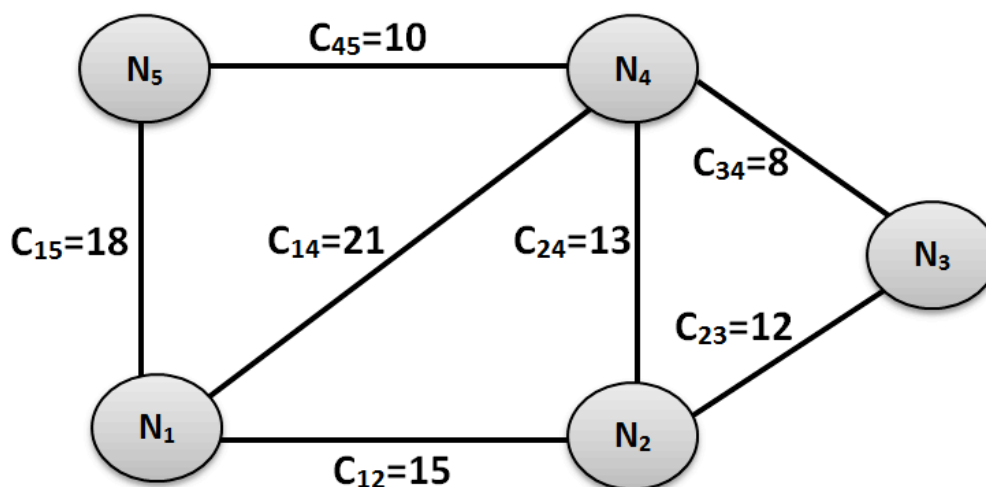


Figure 1 Weighted TSP Graph with five nodes (cities)

## 2.2 Vehicle Routing Problem (VRP)

The Vehicle Routing Problem was first introduced by Dantzig and Ramser in 1959 as part of their research paper Truck Dispatching problem [4]. They describe the problem as generalisation of the Traveling-Salesman Problem by introducing additional conditions such as vehicle capacity or mandatory return to the “terminal point” after  $n$  deliveries. These conditions are used to add complexity to the basic form of the Traveling-Salesman Problem, that is concerned with the determination of the shortest path between each of the nodes of given graph, in way that every node is passed exactly once (Figure 2).

There are several variations of the VRP depending of their specialization for specific implementation including:

- VRP with Time Windows

In the vehicle routing problems with time windows (VRPTW),  $m$  identical vehicles initially located at a central depot are scheduled to deliver given quantities of goods to  $n$  customers. Each customer has a demand for goods and each vehicle has a capacity. A vehicle can make only one tour starting at the depot, visiting a subset of customers and returning to the depot. Time windows define an interval for each customer within which the visit must be made. A solution is a set of tours for a subset of vehicles such that all customers are served only once and time window and capacity constraints are respected. The objective is to minimize distance travelled, and sometimes additionally to reduce the number of vehicles used [5].

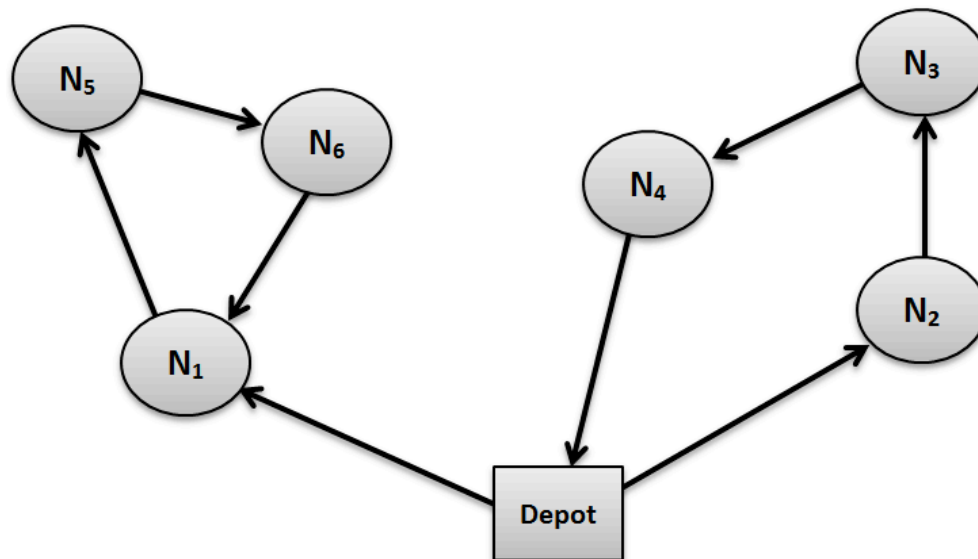
- VRP with Pickup and Delivery

In the General Pickup and Delivery Problem (GPDP) a set of routes has to be constructed in order to satisfy transportation requests. A fleet of vehicles is available to operate the routes. Each vehicle has a given capacity, a start location and an end location. Each transportation request specifies the size of the load to be transported, the locations where it is to be picked up (the origins) and the locations where it is to be delivered (the destinations). Each load has to be transported by one vehicle from its set of origins to its set of destinations without any additional loading at other locations.

The Pickup and Delivery and Dial-a-Ride are special cases of VRP with Pickup and delivery. In the Pickup and Delivery Problem (PDP) each transportation request specifies a single origin and a single destination and all vehicles depart from and return to a central depot. The Dial-a-Ride Problem (DARP) is a PDP in which the loads to be transported represent people. Therefore, we usually speak of clients or customers instead of transportation requests and all load sizes are equal to one. [6][7]

- Capacitated Vehicle Routing Problem

In this special case of the Vehicle Routing Problem, the capacity of the transportation medium (the vehicle) is taken in consideration [8] [9]. Example of CVRP would be a single depot (or distribution centre) that caters to the customer demands at a set of sales points (or demand centres) using vehicles with known limited capacities. The demand at each of these replenishment centres is assumed to be constant and known. Due to its limited capacity, the vehicles may need to make several trips from the depot for replenishment. The problem is to determine an optimal distribution plan that meets all the demands at minimum total cost.



**Figure 2** VRP Graph with five nodes (cities) and one Depot

### **2.3 Job Shop Scheduling Problem (JSSP)**

An  $n \times m$  Job-Shop Scheduling Problem (JSSP) consists of  $n$  jobs and  $m$  resources. Each job is a set of  $m$  completely ordered activities, where each activity has a duration for which it must execute and a resource which it must execute on. The total ordering defines a set of precedence constraints, meaning that no activity can begin execution until the activity that immediately precedes it in the complete ordering has finished with its execution. Each of the  $m$  activities in a single job that requires exclusive use of one of the  $m$  resources defined in the problem. No activities that require the same resource can overlap in their execution and once an activity is started it must be executed for its entire duration (i.e. pausing and activity partitioning is not allowed). The job shop scheduling decision problem is to decide if all activities can be scheduled within given date span and with predefined time window between activities, while respecting the resource and precedence constraints [5].

## **4. Constraints for Transportation Scheduling and Route Planning Calculation**

In the previous work, one of the main challenges for the researchers was to find the most optimal way to implement the imposed constraints or requirements and to take them in consideration while calculating the optimal transportation schedule and route. The constraints can be internal, such as vehicle capacity, loading personnel availability, loading dock capacity and availability; or external such as country or industry regulations, parking space at the delivery point or any specific customer requirement for the current order. These constraints and requirements are not general and vary for every country, industry, customer or order. In most modern companies these data is entered and kept in some software application, such as Enterprise Resource Planning (ERP) systems. These data is complex, very detailed and contains many parameters that are needed for calculation of the optimal time schedule and route, so its reusability is crucial.

#### **4.1 Time Constraints**

While not part of the basic JSSP definition, transition times and resource alternatives have been reported in the scheduling literature [12][14]. In the case of a transition time, there is a temporal constraint specifying a minimum time that must expire between pairs of activities can be executed on the same resource.

The information that is required as input data for this variant of the Job-Shop Scheduling Problem can be kept in the ERP system database as attributes of the fixed assets (vehicles, equipment etc.) For example this type of constraints can be applied when scheduling algorithm is planning the usage of the loading docks and equipment, to take in consideration the time needed for the loading cranes to return in position.

#### **4.2 Capacity constraint**

Probably most common constraints that must be taken in consideration during transportation scheduling and route planning are the capacity constraints. There are several types of capacity limitations and most common are:

- Vehicle capacity
- Loading dock capacity
- Warehouse capacity at the destination
- Parking space at the destination

All these constraints must be used as input parameters when transportation plan is generated, otherwise the risk that the plan will not be realised is very high. Without proper information about the vehicle capacity, the actual number of transportation mediums that will be needed to complete the delivery cannot be calculated. So there is no point in talking about transportation scheduling and route planning if the capacity of vehicles that can be used is known. The capacity of transportation mediums can be kept in the Fixed Asset register using standard features of any modern ERP system. Additional applications can be used to calculate the capacity of a vehicle for specific product/packing. These cargo loading applications enable maximum usage of the vehicle capacity, as for example pipes and boxes do not take the same space in the same trailer.

The capacity of the loading dock is another very important internal constraint. We cannot plan to dispatch 20 trucks in one day if the capacity of the dock is 10 trucks per day. The output capacity of the loading dock is influenced by the time constraints of the loading equipment so the integration with them is crucial. The information about the dock capacity can be predefined in a master table, or calculated from the historical data of delivered Purchase Orders.

Warehouse capacity and parking space/unloading dock at the destination seen as both internal and external constraints. If the delivery locations are part of the same enterprise, then the information about these constraints exists within the master tables and must be taken in consideration when Packing slips are created. If the delivery locations are external, then the information about the capacity of the receiving warehouse or the parking space/unloading dock can be entered as part of the Purchase Order and later copied in the Packing Slip.

#### **4.3 Driver restrictions**

Archetti and Savelsbergh [10] identify the driver restrictions as crucial constraint that must be taken in consideration during transportation planning and scheduling. Within their paper [10], they propose model how this real-live requirement can be used to add complexity to transportation planning and scheduling.

Governments impose restrictions on truck drivers to ensure their safety as well as the safety of other drivers. For example in the United States, this regulation is called Hours of Service (HOS) regulation [11] of the Federal Motor Carrier Safety Administration. It mandates that a driver cannot drive for more than 11 hours and cannot be on duty for more than 14 hours before a mandatory rest period of at least 10 hours (there are additional restrictions, but these two are the most relevant and most restrictive).

The number of Hours of Service (and all other additional restrictions) is different in every country. This means that the input data in the scheduling and routing algorithms cannot be fixed if the route goes thru several different countries. If the regulations in these countries are not consistent, then the results from the scheduling will not be correct.

Driver restrictions may not be very relevant information to the other processes that are part of the ERP system, but they are crucial for enterprise whose logistics operations cover several countries.

## 5. Conclusion and Future Work

As the results of all related research papers indicate, the imposed constraints have a significant impact on the feasibility and reliability of truckload transportation trips, especially when long distance trips that last several days have to be planned. Therefore, operation planners must be concerned by these regulations and limitations when they do their transportation scheduling and route planning. Appropriate techniques that solve the most common and some industry specific problems already exists and are well documented in the field of Artificial Intelligence, Operations Research. Also software applications that implement these problem solving techniques already have been developed, but most of them work as a stand-alone applications and are not integrated with existing information systems that are used within the enterprises. Additionally, for these application to give valuable transportation scheduling and route planning information they must be fed with big set of data. Usually this is the biggest setback against specialized Scheduling and Routing applications.

On the other side, most companies have implemented ERP system in some form. These systems contain huge database that includes valuable data that can be used for transportation scheduling and route planning calculations.

Our solution has tight integration with the ERP systems and uses data generated by business processes that are part of the ERP ecosystem. The main objective of the solution is to add value to those business processes with enhancement of their productivity and reliability, increasing the effective usage of vehicles, loading docks and personnel and warehouses, and decreasing the total cost of all logistic operations.

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# Science Parks and Technology Transfer

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Science parks are popular given their expected contribution to wealth and employment for a region. Even though many definitions of science parks refer to their role in developing technology transfer relations, hardly any empirical evidence exists on whether or not science parks support these relations. Further, the role of science parks has changed over time, and science parks are playing a specific role in times of open innovation in which firms have become more dependent on technology transfer. Studying a sample of on-park and off-park firms in Belgium, our analysis reveals that the proportion of high tech firms is significantly larger on-park than off-park. Our analyses show that the main drivers for location on-park are the possibilities to network and cluster with similar firms and the presence of a university or research centre, indicating that technology transfer possibilities are attractive drivers for on-park location.

## **Keywords**

Science parks; Technology transfer; Start-ups; High tech firms

## **1. Introduction**

Open innovation networks demand a higher involvement of external organisations in the firm's innovation process. It is important that firms develop permeable boundaries and allow knowledge to flow selectively inside and outside the organisation (Bennet and Bennet 2004). External entities can include clients, suppliers (von Hippel 1988; Tether 2002); competitors, consultants (Bessant and Rush 1995) and universities and public research centres (Tether 2002). Large companies that pioneered building successful open innovation models include organisations like Procter & Gamble, Nokia and Philips.

Open innovation practices result from an increasing complexity in innovation and deals with how innovation management can cope with this complexity. Open innovation occurs in an ever changing research environment (Chesbrough 2001): the increasing availability and mobility of knowledge workers; the applicability of research results of universities to enterprises; more widely distributed knowledge; erosion of oligopoly market positions; more deregulation and an increase in venture capital. The concept of open innovation highlights the need for innovative firms to look for R&D and commercialisation opportunities outside their boundaries. This is both the case for large, established firms, and smaller firms. So far, the vast majority of literature on open innovation has drawn on case studies focussing on large firms. Whereas part of the literature focuses on companies including Xerox (Chesbrough and Rosenbloom 2002; Chesbrough 2003a) and Intel (Chesbrough 2003a), these can hardly be seen as representative cases for open innovation. Both companies are located in Silicon Valley, the world's most famous science park and are often viewed as a role model for many others. However, despite the danger of generalising these cases, it may not be a coincidence that the classical examples of open innovation practices originated in a science park.

Science parks are known as facilitators in looking beyond the firm's boundaries (Saxenian 1994). Chesbrough acknowledges this: "Like Xerox PARC, Intel operates smack in the middle of Silicon Valley, with all the erosion factors that diffused technologies out of PARC." (Chesbrough 2003a: 113). Chesbrough named several of these erosion factors that are relevant when considering the role of science parks. Firms located on science parks are known to be surrounded by knowledge because of high labour mobility in the form of new university graduates and the presence of vast amounts of venture capital (Chesbrough 2003a). Spin-offs and start-ups extended the market of both Xerox and Intel. In sum, science parks are known to facilitate the external knowledge sourcing (inbound open innovation) on the one hand and the commercialisation of innovation with a large knowledge component or in science based and research intensive activities (outbound open innovation) on the other. Even though science parks have been attributed an important role for technology transfer, little evidence exists on the extent to which science parks play this role, which is especially the case when we look beyond the role models such as Silicon Valley.

Indeed, science parks have come a long way since the first one was created in the 1950s in the United States. Given the potential benefits of science parks and their perceived contribution to wealth and employment in their region (Gibb, 1985), science parks have received a lot of attention from academics and policy makers. Studies indicate that policy makers have, amongst other reasons, supported science parks acknowledging their capacity in facilitating technology transfer (Cabral 1998; Macdonald and Joseph 2001; Löfsten and Lindelöf 2002; Link and Scott 2003; Nursall 2003; Cassingena Harper and Georghiou 2005). The importance of science parks for transferring technology transfer has however been hardly empirically tested (Westhead and Batstone, 1998; 1999).

Further, science parks are important players in the innovation system. The innovation process and the role of the different players therein, has changed over time, and evolved from a closed innovation model to an open innovation model, documented by, amongst others, Chesbrough (2003a). Following McAdam et al. (2006), we start from the premise that science parks must be anchored in modern innovation theory in order to explain their contribution to technology transfer activities.

This paper aims at studying the performance of science parks in relation to their role in stimulating technology transfer. The main research question in this paper can, therefore, be framed as follows: since open innovation networks are important for firms to source technology, then to which extent do science parks facilitate the transfer of knowledge and technology?

In what follows, we first provide a framework for studying science parks in times of open innovation, hereby specifically focussing on their tech transfer mission. Second, we define the mission of science parks, elaborating on the technology transfer activities. Third, we elaborate on the data and method used, followed by a fourth part in which we analyse the extent to which science parks live up to their technology transfer mission, by studying differences in R&D intensity and location drivers between on-park and off-park firms. The paper ends with conclusions and implications. Given that science parks differ greatly across and within regions and are largely regional phenomena (Bugliarello 2004), we study science parks and their residents in Belgium.

## **2. Creating Open Innovation Networks: the Changed Role of Science Parks**

Open innovation stresses the 'abundance' of external knowledge outside firms that can potentially be converted into innovative products and services (Chesbrough 2003a; Chesbrough 2003b; Christensen et al. 2005). The innovation process itself is also distributed across a number of actors in the innovation system (Tether 2002; Acha and Cusmano 2005). Accessing external 'public' knowledge becomes a necessity for innovation (Lichtenthaler

2008) and technology transfer and knowledge diffusion have become instrumental preconditions in the 'era' of open innovation (Chesbrough 2003b). The creation of technology markets over the past decades greatly mobilised knowledge and technology (Arora et al. 2001) and heralded the coming of a variety of technology intermediaries (Howells 2006). Hence, open innovation practices by firms affect existing instruments, such as science parks, fostering R&D and innovation and stimulating technology transfer between universities and firms. Given that science parks are part of the innovation system, the role they play will be dependent on the way innovation is conceptualised. Afuah (1998) defines innovation as the use of knowledge in developing new products and processes for their profitable commercialisation on the market. In a knowledge-based economy, institutional agents pursue a joint strategy to enhance the generation (by science) and use (by industry) mediated by stable interactions and exchange (by government) (Cooke and Leydesdorff 2006). Science parks are considered an infrastructural policy instrument to transfer knowledge from science to industry (Löfsten and Lindelöf 2002; Cassingena Harper and Georghiou 2005; Tsai 2005).

The conceptualisation of the innovation process has evolved from a linear and closed model to the model of open innovation stressing the boundary spanning activities of firms (Chesbrough 2003a, 2003b). We illustrate this evolution and the inherent shift in roles played by science parks in these innovation models in Table 1.

**Table 1** The evolution of the discourses on innovation and the changing mission of science parks

Innovation model	Key features of innovation management	Science park impact
1 – Linear innovation - science and technology push	The origin of innovation lies in its in-house research and development. The next sequences are production and the market is a passive recipient	The scientific knowledge base of a region is important to implement science parks
2 – Linear innovation - market pull	Market demand exerts its effect on the marketing department of firms and thus on the in-house R&D department	Science parks are preferably located in urbanised areas to benefit from the local purchasing power
3 – Interactive innovation	External linkages become more important and complement in-house R&D efforts and the existence of non-linear feedbacks is acknowledged: push and pull factors work combined.	University departments become more important to innovation within enterprises (collaboration), proximity of science parks to universities prevail
4 – Open innovation	Networking and external knowledge sources are central (connect and develop), R&D outsourcing, the boundaries of the innovative firm gets blurred and the business model ensures the alignment of in-house R&D and external outsourcing and commercialising the R&D efforts other than through products (e.g. patents, licensing)	The process of technology transfer ensures that enterprises gain access to academic research results; and the university gets increasingly entrepreneurial (e.g. spin-offs). Proximity between innovative firms and universities remain important but also the management services offered at science parks start to play a key role

Source: Author analysis, based upon Massey et al. (1992), Kline and Rosenberg (1986), Cabral (1998) and Chesbrough (2003a).

The linearity of the innovation process relied on the discourse that any forthcoming economic growth is manageable and controllable and requires a long term planning horizon (Massey et al. 1992; Oakey 2005). The origin of innovation in this model lies in the in-house research and development within companies in an industry. This linear model has evolved into an interactive or non-linear feedback model, documented by Kline and Rosenberg (1986). In this

model, external linkages become more important and complement in-house R&D efforts. Often are these R&D efforts performed in close collaboration with academia and science parks are established closer to universities in order to enhance this collaboration (Cabral 1998; Feldman and Francis 2003; Egelin et al. 2004). However, since innovation networks grew even more complex, the innovation process has changed into an open innovation model, documented by Chesbrough (2003a). In this model, the boundaries of the firm are opening in order to access external R&D activities and knowledge. Networking and external knowledge sources are central to the model and imply an increased importance of the linkage between science and industry for R&D activities (Johnson and Johnston 2004). In this new model, science parks act as global hubs of science and technology zones, but well within a local and regional setting. As Simard and West (2006: 229) emphasise: "The first implication for Open Innovation is that location matters. In some industries and technological environments, forming ties with and establishing a physical presence in a region where important knowledge resides will be key".

Not only have the roles of science parks changed continuously. The first parks were primarily university owned. Later, as the concept of science parks matured, the parks were gradually reformed and their mission changed as well. Zhang (2005) posits that science parks are changing due to the shift from universities to governments as major promoters. The most recent change within the topic is the emergence of private owned science parks such as the High Tech Campus Eindhoven (HTCE) in the Netherlands initiated by Philips in the second part on the 1990s. Philips is a large multinational company that explicitly adheres to the model of open innovation. As such, the label of 'open innovation' has been explicitly adopted to define its strategy. Philips, as a firm, acts as the promoter trying to create and stimulate knowledge flows among science park residents. The science park objective is to generate opportunities for cooperation and joint ventures, creating valuable partnerships and turning ideas into business ventures.

Part of the success of open innovation practices depends on the availability of knowledge and technology transfer possibilities, which do not come to the firm automatically. Science parks are characterised by hosting R&D active firms. As Cohen and Levinthal (1990) emphasised, internal R&D activities help to create the absorptive capacity needed to incorporate external knowledge from outside the firm boundaries. Since open innovation points to the complementary role of internal and external R&D, firms located on science parks are expected to engage more in the practice of technology transfer than firms located off park.

It has to be acknowledged however that much of this technology transfer takes place in the form of formal and informal network relations. Since much of the knowledge is tacit in nature, the physical infrastructure and social environment matter for such firms. Network relations are not limited to other firms in the value chain, but also may be held with upstream organisations such as the universities or public research centres. This brings the issue of location choices in general, the possibilities to engage in networking activities, and the proximity to a knowledge centre in particular to the fore (Appold 2004; Egelin et al. 2004; Garnsey and Longhi 2004; Christensen and Drejer 2005).

Audretsch and Feldman (1996) showed that spatial concentration has a positive affect on spillover effects. The amount of information contacts benefits from spatial proximity between firms and, therefore, positively influences technology transfer. Jonsson (2002) looked at the importance of spatial proximity with respect to the type of knowledge and the collaborative arrangements of clusters and further investigated the existent untreated interdependencies occurring at clusters and science parks. The findings suggest that, even if local embedding is dominant, firms are at the same time connected to national and transnational networks. This supports the findings of Breschi and Malerba (1998) that informal means of knowledge transmission becomes more important the more knowledge is ever-changing, tacit, complex and a part of the system. This renders face-to-face contacts, personnel training and mobility of personnel becomes highly important.

Science parks, therefore, have to deal with knowledge flows and spillover effects. Spatially this implies that innovations are fostered by interaction with industry outside the science park boundaries (Feldmann et al. 2005). Thus science parks become urbanised catalysts for innovation (Annerstedt and Haselmeyer 2004; Tsai 2005). Its residents interact with all urban and regional activities and thus they contribute to clusters of a high tech nature: in short a knowledge-based economy (Mae-Phillips and Yeung 2003; Teirlinck and Spithoven 2008). Therefore, their role in enabling technology transfer has even become more important in times of open innovation. Our research therefore focuses on understanding the drivers for on-park location. More specifically, we aim at understanding to which extent these firms are constraint in their access to knowledge and technical means and therefore reside on science parks for technology transfer reasons.

### **3. Defining the Science Park's Technology Transfer Mission**

No uniform definition of what is meant by a 'science park' exists (Monck et al. 1988). Massey et al. (1992) define science parks as instruments that "bring together and interrelate particular ideologies and practices of scientific advance and industrial innovation; division of labour within society and their related social structures and the geography of social and economic development." (Massey et al. 1992: 2). Castells and Hall (1994) refer to science parks as 'technopoles' and see them as "planned developments originating from private and/or public investments". More recently the arguments on science parks are cast in the regional innovation systems approach (Cooke 2001; Zhu and Tann 2005). Science parks "can be considered to constitute techno-poles, i.e. hierarchically planned centres, for high-technology firms and research facilities in which agglomeration is induced." (Cooke 2001: 22).

More practical definitions are given by the body of science park associations. According to the International Association of Science Parks (IASP) a science park is "an organisation managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions. To enable these goals a science park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services together with high quality space and facilities" (IASP 2008). The IASP based this definition on experiences in 63 different countries, and is therefore fairly general in its definition.

The different definitions of science parks have two common denominators: science parks focus on hosting R&D active firms on the one hand, and are established in order to facilitate technology transfer between science (universities, public research organisations, collective research organisations) and industry on the other. In Chesbrough's open innovation model the consequences on location is explicitly recognised by stating that "geographic location has also been shown to result in knowledge spillovers between firms and from university research in many industries, especially high-tech." (Chesbrough 2006: 9). Technology transfer and knowledge sharing are facilitated because of the presence of a critical mass of knowledge resources found in innovative R&D active firms, universities and research centres (Malecki 1979; Jaffe et al. 1993; Feldman 1994).

### **4. Data Collection and Research Methodology**

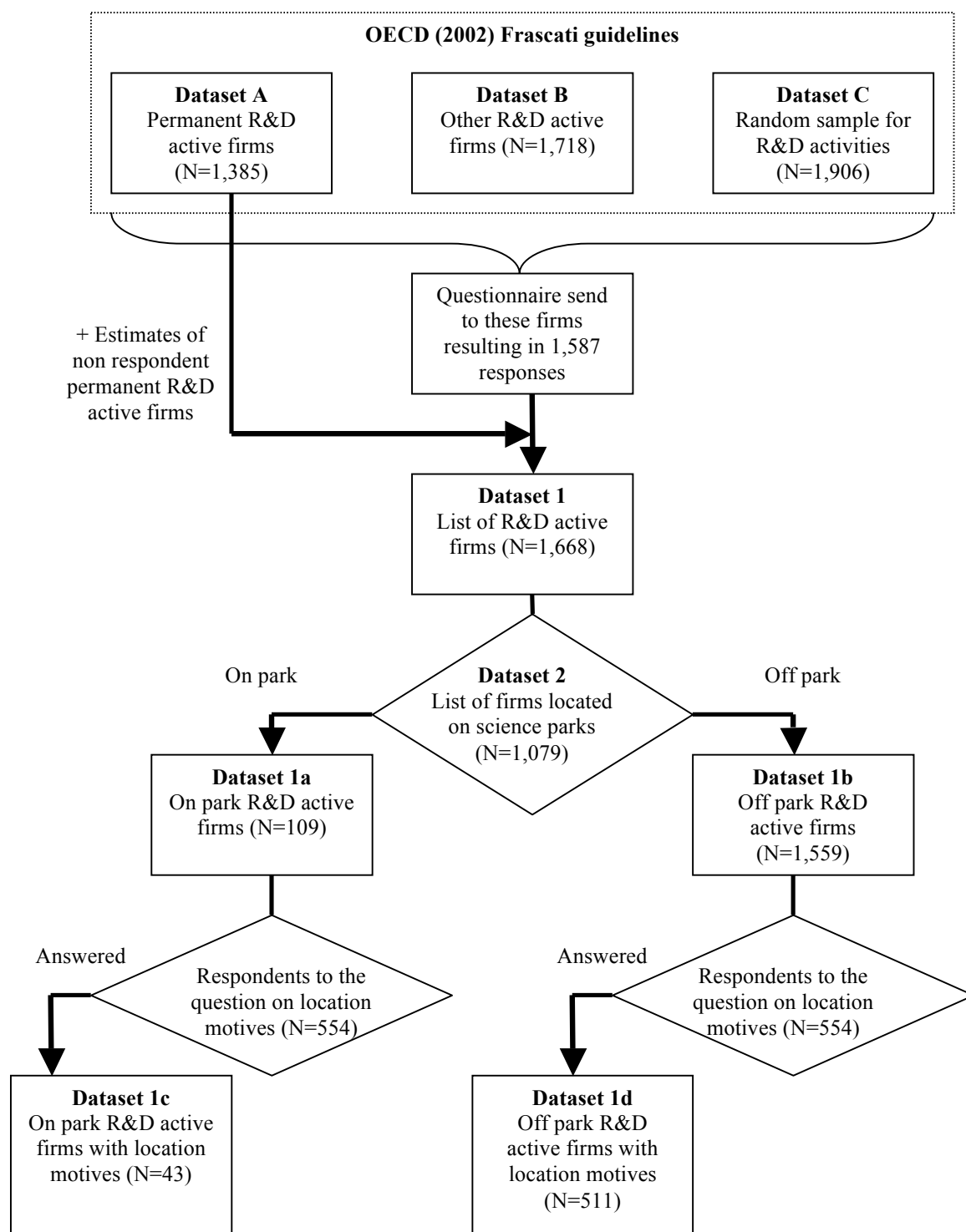
In order to understand the science park's role in technology transfer, data was collected on science parks in Belgium. Belgium is a small, export-intensive economy, located in Europe

and considered to be a high tech region (Cantwell & Iammarino 2001). Today 14 science parks are operational, but six others are in start-up phase or envisaged in the near future.

In Belgium no readily available data on science parks exist. Therefore, in order to study our research question we had to combine several data sources. The main database stems from the OECD 2004 R&D Survey for monitoring R&D activities. In line with the OECD (2002) guidelines in the Frascati-manual the R&D data in this survey were gathered following three steps. First, a list of all firms known having permanent R&D activities from past surveys is compiled. In the survey of 2004, this list contained 1,385 firms that have permanent R&D activities and at least one full time equivalent working in an R&D capacity. A second list is compiled using the following criteria: the same firms as before with less than 1 FTE in R&D; firms performing R&D occasionally; firms of the first list that did not respond to the previous questionnaire; firms that performed R&D according to the Community Innovation Survey; firms that declared to perform R&D according to a survey of the national statistical bureau on business practices of firms; firms receiving subsidies and public contracts for their R&D activities; firms eligible for fiscal incentives to employ additional personnel to perform R&D; spin offs from universities (only the French community). This list counted, in 2004, 1,718 firms. Third, in addition to the previous two sources, a random sample of firms is drawn from the remaining population of firms using the BELfirst database containing all firms that have deposited their balance sheets (accessed on February 2004). Non-profit organisations, retail businesses and government organisations were excluded. This resulted in an additional population of 20,690 firms of which 1,906 were drawn randomly.

These three steps, in line with the OECD methodology on R&D data, resulted in 3,983 firms which received a postal questionnaire. The total response ratio was 41%, or 1,587 firms. The responses were supplemented with estimates using information from the past for the first list of permanent R&D firms, yielding a dataset of 1,668 R&D active firms (dataset 1).

A second source to study science park residents is a database on science park firms (dataset 2). This dataset was constructed during visits of all science parks in Belgium in the course of 2006 and contains 1,079 firms on science parks. The confrontation of dataset 2 containing science park residents and the R&D active firms according to the R&D survey (dataset 1), allowed to identify 109 (6.5%) on-park R&D active firms and 1,559 (93.5%) off-park R&D active firms. Further, in the 2004 edition of the R&D survey information on the motives for location of R&D activities was collected. Only a part of the firms, however, responded to the question on location criteria. The 554 responses on this item are divided between 511 firms located off-park (92.2%) and 43 on-park (7.8%), and will be used for answering our second research question. The sample proportion test revealed no significant differences ( $p=0.293$ ). Figure 1 summarises the construction of the dataset used in this research.



**Figure 1** Overview of datasets used in the analyses

In what follows, we study the differences between the R&D active firms located on-park and those located off-park, and analyse the drivers of their location preference. Table A1 in the appendix defines the variables used. Table A2 describes their statistical characteristics. Table 2 provides an insight into the descriptive statistics used, both in the total sample and the sample that also responded to the location question.

**Table 2** Statistical descriptions of the control variables

Variable	Obs.	Mean	Std. deviation	Min	Max	Difference between answered and unanswered (p-value)
<b>Question on the location answered by R&amp;D active firms</b>						
Science park	554	0.078	0.268	0	1	
P_RI	554	0.262	0.440	0	1	
P_SI	554	0.162	0.369	0	1	
P_SS	554	0.242	0.429	0	1	
P_SB	554	0.164	0.371	0	1	
P_II	554	0.170	0.376	0	1	
S_SMALL	554	0.507	0.500	0	1	
S_MEDIUM	554	0.383	0.486	0	1	
S_LARGE	554	0.110	0.313	0	1	
AGE	552	21.676	19.301	1	121	
LRDINT03	554	12.634	2.214	-6.9	19.8	
LRDEXT03	554	1.153	9.267	-6.9	20.0	
GP	554	0.585	0.493	0	1	
CONT	554	0.318	0.466	0	1	
<b>Question on the location not answered by R&amp;D active firms</b>						
Science park	1114	0.059	0.236	0	1	0.018 (p=0.153)
P_RI	1114	0.275	0.447	0	1	-0.013 (p=0.472)
P_SI	1114	0.204	0.403	0	1	-0.041 (p=0.043) **
P_SS	1114	0.249	0.432	0	1	-0.007 (p=0.762)
P_SB	1114	0.089	0.285	0	1	0.075 (p=0.000) ***
P_II	1114	0.184	0.388	0	1	-0.014 (p=0.472)
S_SMALL	1114	0.553	0.497	0	1	-0.046 (p=0.078) *
S_MEDIUM	1114	0.381	0.486	0	1	0.002 (p=0.935)
S_LARGE	1114	0.066	0.249	0	1	0.044 (p=0.002) **
AGE	1113	23.769	19.880	0	150	-2.093 (p=0.041) **
LRDINT03	1114	11.909	3.026	-6.9	18.1	0.725 (p=0.000) ***
LRDEXT03	1114	1.032	9.025	-6.9	18.3	0.121 (p=0.798)
GP	1114	0.703	0.457	0	1	-0.118 (p=0.000) ***
CONT	1114	0.260	0.439	0	1	0.057 (p=0.014) **

Note: The differences were tested using two sample proportion tests in the case of binary variables, and using t-tests in the case of continuous variables.

The most important variable is that on the location on or off a science park. In the subsample of firms that have responded on the question of location there are 7.8% located on science parks versus 5.9% in the case they did not answer. But, as can be seen in Table 2, no statistically significant difference is noticeable: respondents on and off science parks are equally represented over the two groups. For several other control variables there also was no difference between the two groups: external R&D activities (LRDEXT03); medium sized firms (S\_MEDIUM); and several sector dummies (P\_RI, P\_SS, P\_II). The firms that have answered the questions on location are, proportionally, large (S\_LARGE) Belgian (CONT) science based (P\_SB) firms having more internal R&D (LRDINT03). On the other hand, smaller (S\_SMALL) and older (AGE) firms belonging to a group (GP) or active in scale intensive (P\_SI) industries have proportionally not answered the questions on location



motives. We will take these elements into account when discussing our findings. But since the key variable on science parks is equally present in both groups (responding and non-responding to the question on location motives) we may proceed with the analysis.

## 5. Results

### 5.1 Main characteristics of firms on science parks

First we look into the age of the firms. Here, we use a t-test with unequal variances with respect to age ( $n=1665$ , due to 3 missing values). Based on the sample of R&D active firms, the firms off-park ( $n=1,558$ ) are, on average, 23.6 years old (median 17 years); and on-park ( $n=107$ ) are 14.6 years old (median 13 years). These differences proved statistically highly significant, using a t-test for unequal variances in the case of the average and a Mann-Whitney test in the case of the median ( $p=0.000$ ). Compared to previous research both on- and off-park firms seem to be older (see for instance Westhead and Storey (1994) who found that, in a sample of UK firms, on-park firms were on average 9.6 years old, compared to 12.4 years for off-park firms). This may be explained by the relatively low levels of entrepreneurial activity and especially high expectation entrepreneurial activity in Belgium (GEM, 2009). However, given the clear distinction in age between on- and off- park firms we believe this finding does not affect our results or the generalizability of the results. Second, we expect that the technological intensity will be higher for on-park firms than for off-park firms. We first build upon the OECD classification using technological intensity (Tidd et al. 2005; Kristensen 1999). Then, we build upon Pavitt (1984)'s classification based on technological trajectories. Five industrial sectors are identified: resource intensive (e.g. textiles), scale intensive (e.g. chemicals), specialised suppliers (e.g. electrical machines), information intensive (e.g. telecom) and science-based (e.g. pharmaceuticals). By analysing the number of firms per class and the R&D expenditure of on and off-park firms, we gain more insight into the nature of on and off-park residents with respect to R&D. Table 3 provides an overview of the analyses.

**Table 3** Technological activities on and off science parks – in column percentages

Industry	Number of R&D active firms (n=1668)		Two sample proportion test	R&D expenditures (n=1668)		Two sample proportion test
Technological intensity (OECD classification)	On-park (in %) (n <sub>1</sub> =109)	Off-park (in %) (n <sub>2</sub> =1559)		On-park (in %) (n <sub>1</sub> =109)	Off-park (in %) (n <sub>2</sub> =1559)	
Manufacturing high tech	29.4	30.8		21.0	61.9	***
Manufacturing low tech	5.5	38.4	***	6.4	14.9	**
Services high tech	59.6	23.9	***	71.5	21.0	***
Services low tech	5.5	7.0		1.1	2.1	
Technological trajectory (Pavitt classification)	On-park (in %) (n <sub>1</sub> =109)	Off-park (in %) (n <sub>2</sub> =1559)		On-park (in %) (n <sub>1</sub> =109)	Off-park (in %) (n <sub>2</sub> =1559)	
Information intensive	38.5	16.5	***	32.9	7.2	***
Resource intensive	3.7	28.7	***	0.3	10.9	***
Science based	26.6	10.3	***	44.3	40.9	

Scale intensive	11.9	19.5	*	18.1	18.9	
Specialised supplier	19.3	25.0		4.4	22.1	***

Note: Symbols \*\*\*, \*\*, \* denote significance at the 1%, 5% and 10% level.

Source: Authors calculations (based on OECD R&D Survey 2004)

Firms in science parks tend to engage to a large extent in R&D. Off-park firms spent in total 2,788 million euro on R&D in 2003, compared to 283 million euro for on-park firms (Table 3). This means that 9.2% of total business R&D expenditures by permanent R&D investors is carried out on science parks, which makes them an important element of science policy. Using the OECD classification, our data confirms that science parks are 'high tech' phenomena as can be read from the data on the number of firm establishments in the upper left half of Table 3: 89% (29.4+59.6%) of the firms on science parks is categorised as active in high tech industries; whereas this is the case for 54.7% of the off-park firms. Furthermore, 59.6% of the science park firms are active in high tech services. This high percentage may be explained by the fact that production activities are not always allowed on science parks. Similarly, low tech manufacturing firms account for only 5.5% of all on-park establishments, whereas this is the case for 38.3% off-park. In summary, using a two sample proportion test, we found significant differences between the proportions of firms engaging in manufacturing low tech and high tech services, with off-park firms engaging significantly more in low tech manufacturing, and significantly less in high tech services. When extending the analyses to R&D expenditures instead of firm establishments (see Table 3), similar results are found.

Using Pavitt's classification, focussing on the technological trajectories of these firms, in the lower part of Table 4, the information intensive and science based firms are significantly more present on science parks than off-park. Science based firms are representing the sector with the highest R&D expenditure, both for off-park and on-park firms. Science based firms on-park however have a significantly higher share of total R&D expenditure (44.3%) compared to off-park firms in the same industry (40.9%). Similar findings were found for information intensive sectors. Both findings indicate that linkages of science parks with universities may attract this type of R&D intensive activities. Opposite findings arise for resource intensive and specialised supplier sectors with proportions of R&D expenditure of off-park firms being significantly above those of on-park firms. Again the activities associated with a moderate knowledge base are far less represented on-park than off-park. Moreover these resource and scale intensive firms may have other location drivers, such as the presence of natural resources and the space to reach their scale.

In sum, we find that firms on science parks are relatively younger and more high tech oriented than off-park firms, irrespective of whether they operate in manufacturing or services. These firms are especially found in activities in which a substantial knowledge element is required: information intensive and science based. Both activities might benefit from being located near a university and, consequently, from technology transfer.

## **5.2. The role of science parks for technology transfer**

In order to understand the importance of science parks for technology transfer, we first asked the residents of the science parks to indicate what the main drivers for establishing their R&D activities on science parks were. Based on existing literature we identified ten potential drivers for location (Appold 2004; Christensen and Drejer 2005) and grouped them into three categories: those related to technology transfer; those related to public involvement; and other reasons (see Table 4). As open innovation practices draw primarily on the use of external information sources and on forging organisational ties, the presence of both public (universities and research centres) and private (companies) organisations on science parks is considered to be conducive to the openness of innovation. Given that the OECD R&D survey also yields information on off-park companies, we compare the drivers for on-park established companies to the drivers for off-park established companies when choosing their

location. Firms indicate the importance of each driver on a 1 (not important) to 3 (very important) scale.

**Table 4** Reasons for locating R&D activities: comparing on-park and off-park establishments

Reasons for locating activities	Firms on a science park (n <sub>1</sub> =43)		Firms not on a science park (n <sub>2</sub> =511)		Difference in average score	Mann-Whitney test on-park versus off-park
	Average score (1-3)	Standard-deviation	Average score (1-3)	Standard-deviation		
<u>Technology transfer</u>						
* Availability of highly skilled personnel (G_PERS)	2.163	0.110	2.004	0.036	0.159	
* Presence of a university or research centre (G_UNI)	2.163	0.110	1.847	0.040	0.316	**
* Presence of a cluster of companies or networking (G_CLUST)	2.000	0.137	1.536	0.037	0.464	***
<u>Public policy</u>						
* Presence of physical infrastructure (G_INFRA)	1.837	0.133	1.916	0.038	-0.079	
* Local rules and regulations (G_REGLOC)	1.767	0.128	1.474	0.035	0.294	***
* Possibilities of enjoying subsidies (G_SUBS)	2.186	0.126	1.834	0.039	0.352	***
<u>Other reasons</u>						
* Presence of production services (G_PROD)	1.907	0.140	2.067	0.031	-0.160	
* Presence of clients and/or suppliers (G_CLISUP)	1.465	0.117	1.710	0.038	-0.245	*
* Financial attractive location conditions (G_FINAN)	1.814	0.130	1.558	0.037	0.256	**
* Historical reasons (G_HIST)	2.000	0.129	1.988	0.035	0.012	

Source: OECD R&D survey 2004, own calculations.

Notes: Symbols \*\*\*, \*\*, \* denote significance at the 1%, 5% and 10% levels. Scores ranged between 1=not important and 3= very important

The analysis provides an indication of significant differences in location drivers between on and off-park firms. First, the analysis shows that the proximity of a university or research centre is considered of significant higher importance for on-park firms than for those located off-park. Another factor in science park missions, is less explicit or traceable, and focuses on

the potential benefits of spillovers or externalities coupled to the presence or co-location of firms. The analysis shows that the cluster effect and the possibilities for networking differ significantly with on-park firms on-park appreciating this aspect more than off-park firms. The availability of highly skilled personnel is ranked the second most important location driver, but even though the average score for on-park firms is higher than that of off-park firms, this difference is not significant.

The average scores on these items further show that the possibilities of benefiting from grants or subsidies are an important incentive for firms to locate on science parks. This may point to the fact that many of the science park residents are new technology based firms and resource dependent (Clarysse et al. 2007) and may have to rely on external sources for accessing financial and technical resources. Table 4 also demonstrated that financial attractive local conditions are searched for by R&D active firms.

**Table 5** Probit analysis on drivers of science park location for R&D active firms

	<b>Dependent variable: Located on science park? (no/yes)</b>			
	<b>Model (i) – base model full sample</b>	<b>Model (ii) – base model reduced sample</b>	<b>Model (iii) – important location factors</b>	<b>Model (iv) – Not important location factors</b>
Constant	-4.085 (0.934)***	-6.897 (1.110)***	-6.411 (1.109)***	-6.271 (1.107)***
P_II	1.132 (0.223)***	1.286 (0.433)***	1.199 (0.424)***	1.039 (0.466)**
P_SI	0.608 (0.223)***	0.773 (0.446)*	1.012 (0.420)**	0.898 (0.475)*
P_SB	1.167 (0.245)***	0.889 (0.463)*	0.934 (0.450)**	0.710 (0.498)
P_SS	0.722 (0.219)***	0.716 (0.434)*	0.828 (0.402)**	0.676 (0.453)
S_SMALL	0.778 (0.336)**	1.434 (0.472)***	1.313 (0.461)***	1.360 (0.486)***
S_MEDIUM	0.482 (0.300)	0.954 (0.426)**	0.910 (0.418)**	0.958 (0.440)**
AGE	-0.010 (0.004)**	-0.012 (0.008)	-0.010 (0.008)	-0.012 (0.008)
LRDINT03	0.093 (0.062)	0.288 (0.066)***	0.246 (0.066)***	0.272 (0.067)***
LRDEXT03	0.004 (0.006)	0.012 (0.011)	0.006 (0.011)	0.007 (0.011)
GP	0.281 (0.134)**	0.112 (0.239)	0.217 (0.255)	0.172 (0.263)
CONT	-0.074 (0.136)	-0.647 (0.256)**	-0.901 (0.268)***	-0.939 (0.277)***
G_PERS			-0.028 (0.257)	0.070 (0.296)
G_UNI			0.522 (0.245)**	-0.635 (0.261)**
G_PROD			-0.284 (0.207)	0.388 (0.219)*
G_CLISUP			-0.417	0.277

G_INFRA			(0.212)** -0.434 (0.229)*	(0.218) 0.600 (0.228)***
G_REGLOC			0.433 (0.236)*	-0.588 (0.244)**
G_SUBS			0.176 (0.225)	-0.282 (0.260)
G_CLUST			0.429 (0.216)**	-0.485 (0.227)**
G_FINAN			0.059 (0.233)	0.023 (0.251)
G_HIST			-0.233 (0.201)	0.168 (0.226)
No. obs.	1655	552	552	552
Wald chi <sup>2</sup>	97.45***	62.25***	93.11***	84.38***
MacFadden R <sup>2</sup>	0.1422	0.2124	0.3059	0.3249

Notes: The robust standard errors are between brackets. Symbols \*\*\*, \*\*, \* denote significance at the 1%, 5% and 10% levels.

More remarkable, in Table 4, are the low scores of the physical infrastructure such as terrains and transport facilities. This last driver is, be it moderately, higher for on-park than for off-park firms. Belgium, as a whole, is characterised as an urban field where qualitative industrial sites are scarce, and so the presence of physical infrastructure could have been expected to receive a much higher score. This may point to the fact that the screening procedures by science park management, which comprise the universities, are quite effective in choosing R&D intensive firms willing to integrate in a (localised) network of R&D related activities. The item which scored lowest is the presence of vertical network agents: clients and/or suppliers. A reason for this might be that the R&D active firms on-park work on technological development before building complementary assets or commercialising products.

In order to complement the analysis above, we carried out probit regression analyses (Table 5). The binary dependent variable measures whether or not a respondent is located on or off a science park.

Models (i) and (ii) are base models containing all the control variables. We use two models to stress the bias caused by some variables. Model (i) uses the information in the full sample. It shows that firms active in all industries are more located on science parks than firms active in resource intensive industries. Further, small firms are more often located on science parks than large firms. As seen earlier, these firms are also younger than those off park firms. Finally, on park firms more often belong to a group. Model (ii) zooms in on the firms that have answered the question on location motives. The probit regression of this reduced sample has a higher explanatory power since the Pseudo R<sup>2</sup> is much larger. In this sample the small and medium sized firms are more located on science parks than large firms. The impact of firms having internal R&D becomes positive, pointing to their higher propensity to answer the question on location. The impact of group membership disappears and is replaced by the fact that Belgian firms become significant: obviously independent domestic firms are more inclined to have an opinion on the location motives of R&D activities.

Model (iii) and Model (iv) take the drivers of location into account. The answers could be categorised by the respondent according to high (score of 3); low (2) and no (1) importance. Average scores are not admissible due to the problems of equidistance in ordered scales. Therefore we enter the different choice possibilities in the models. This has the advantage that we can investigate the characteristics of firms that attach some (high or low) or no

importance to certain location factors. Model (iii) looks at firms rating the drivers to be located on a science park as important. They belong to industries that are especially information intensive and, to a lesser extent, the other industries in relation to firms active in the resource intensive industry.

In comparison to large firms, the firms on science parks are small, and to a lesser extent, medium sized. They perform internal R&D activities and are mainly domestic firms. As for the main location drivers, we find that the presence of a university is an important factor in the location decision of firms. In the light of open innovation, firms need to source knowledge that supplements their internal R&D efforts. The importance of universities might, at least partially, be explained by the fact that universities are also in the admission committee or in the science park management. It might also point to the fact that the presence of universities is beneficial to gaining access to tacit knowledge. Also the cluster and networking possibilities affect the on-park location decision. The clustering with other firms is an indication that the tacit knowledge also stems from the interactions with the private sector. Again, this is in contrast with the importance attached to the presence of potential clients and suppliers, which we relate to the positioning of many on-park firms in the early stages of the product development process.. Further, we find confirmation for the fact that firms do not primarily locate on science parks because of a need for infrastructure which we elaborated on above.

Model (iv), finally, zooms in on the firms attaching no importance to location factors, and should mirror the earlier findings to a large extent. Except for some industry dummies, the other control variables do not differ from the previous model. The probability of being on a science park, for firms that do not attach importance to location drivers, shows negative significant estimates for the presence of universities and the presence of clusters of similar firms and/or networking possibilities. This is corroborated by our findings in Table 4 where the average scores on and off-park were discussed, and where the presence of universities was highly rated. The fact that local policy measures are also important (because of the negative affect of no importance) demonstrates that science parks are localised phenomena. As before, the availability of infrastructure (e.g. terrains, transport facilities) is considered to be of no importance.

In sum, the technology transfer drivers for locating on a science park – the presence of university or research centre and the presence of a cluster of similar companies and networking possibilities – are significantly important factors in terms of average scores and compared to off-park firms. These practices also figure prominently in the literature on open innovation.

## **6. Conclusions, Implications and Limitations**

This research set off to investigate whether science parks live up to their role in facilitating technology transfer. This role is a necessary precondition in an open innovation context. First, we find that science parks are indeed populated by high tech or knowledge intensive activities in terms of number of firms and in terms of R&D expenditure. Because the matching of the databases indicated that not all firms on science parks are R&D active, there might be a problem in the effectiveness of the management of the science park.

By looking at the technological trajectory the information intensive or science based activities are the most representative activities for on-park activities. This is what science policy in general, and science park management in particular, set out to achieve. Also, on-park firms are significantly younger than off-park firms (14.6 versus 23.6 years on average).

More importantly, however, our research sheds light on the technology transfer role of science parks. We found that the presence of a university or a research centre is an important location driver for on-park firms. The R&D intensive firms that we identified as main residents of science parks are not residing on-park because of lack of infrastructure off-park

or coincidence. On the contrary, their location on-park seems to be inspired by potential collaboration with other potential partners on-park. In the first place, these partners are universities and research centres. We can thus conclude that industry-science relationships are important elements of the science park's attraction, corresponding to their mission of technology transfer. The attractiveness of science park location is further supplemented by the presence of other companies. This reflects the need for collaboration for R&D intensive companies in times of open innovation. Other aspects, such as availability of subsidies and financially attractive location conditions linked to science park location, are appreciated by firms who are typically constraint in their resources. The significance of the difference of appreciation by science park firms of local rules and regulations underscores the relative local autonomy in offering a 'constructed advantage' (Cooke and Leydesdorff 2006). The presence of vertical networks shows that off-park firms attach more importance to these networks, even though the effect is marginally significant. The presence of production activities is rated indifferent by on- and off-park firms. This is a remarkable finding, because the production facilities are in most cases not allowed at science parks. The presence of highly skilled personnel and physical infrastructure indicate that their supply is equally spread across Belgium. Furthermore, science parks are believed to play an important role in innovation systems since 9.2% of all R&D expenditures is found on these parks. Therefore they are vital in regional innovation policy aiming to make the region a 'hotspot' for knowledge intensive activities producing high value added and employment for knowledge workers.

This study has a number of implications. First, for policy makers, this research shows that science parks are instrumental in R&D activities and are an environment in which firms are actively relying on academic research. As such, they can be facilitators in building industry-science relationships. As the Barcelona target of spending 3% on R&D of total GDP demonstrates, this input measure for innovation is an important one for policy. Also, the need for commercialising research results is an important topic for policy. A lack of commercialising – referred to as the innovation paradox (Knockaert et al., 2010) – occurs when fundamental research has to be translated to firms in order to take advantage of the research findings. Science parks are environments in which industry-science relationships are actively stimulated and that can be helpful in narrowing the innovation paradox. Second, this research has implications for both on- and off-park firms, which can learn from the characteristics and location drivers of companies. For instance, a small firm, looking for a technological collaboration with firms of similar sizes may benefit from residing on a science park, since science park residents tend to be relatively young, and hence small, and indicate that they reside on the park because of the presence of a cluster of similar companies. They are, therefore, firms that are open and even actively looking for collaborations.

As science parks were identified as multidimensional phenomena, it can be expected that our contribution shows a number of limitations that lead to directions for further research. First, we did not investigate the mission of science parks in contributing to regional economic development by either regenerating depressed regions or building high tech hotspots of already knowledge based regions. This research calls for other macroeconomic indicators at regional level; whereas our contribution concentrated primarily on the microeconomic level.

Another limitation is that regional authorities in Belgium turned towards science parks as an active ingredient in their policy mix. The difficulty with science parks is that – because of its physical and spatial nature – they have to align the goals set by science policy, regional policy and spatial planning authorities, necessitating a horizontal policy view on science parks. A corollary of this is that many actors are involved, and their role has not been addressed in this contribution leaving science park management issues in the dark. Bass (1998) points to the potential danger that too many lead agencies in the management of science parks might imply too much fragmentation and stakeholders might develop opposed motives hindering successful development. This relates to the problem of multi-governance

in the management of science parks, an issue also not addressed in this contribution (see also Phan et al. 2005).

Finally, this research assessed the location drivers of residents, but does not allow assessing the effectiveness of science parks, and the extent to which science parks live up to the expectations of their residents. We have identified 1,079 firms on science parks, and future research aims at scrutinising the residents' opinions on these science parks: the physical environment; the accessibility; the quality of management; the services offered; the possibilities to network with either local firms, MNEs, universities, the knowledge required for their operations and other critical success factors. Further research may assess the extent to which on-park firms benefited from tech transfer opportunities within science parks.

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## Appendices

**Table A1** Description of the variables

<b>Variable</b>	<b>Definition</b>
Science park location (SP)	SP = 1 if the firm is located on a science park
Industry dummy – resource intensive (P_RI)	P_RI = 1 if the firm is classified in the ‘resource intensive’ industries (mining, food, beverages and tobacco, textiles, non-metallic minerals, ferrous metals, non-ferrous metals, fabricated metal products, wood and furniture, recycling, construction)
Industry dummy – scale intensive (P_SI)	P_SI = 1 if the firm is classified in the ‘scale intensive’ industries (paper and printing, chemicals, rubber and plastics, motor vehicles, other transport equipment)
Industry dummy - specialised supplier (P_SS)	P_SS = 1 if the firm is classified in the ‘specialised supplier’ industries (non-electrical machinery, electronics and communication, electrical machinery)
Industry dummy - science based (P_SB)	P_SB = 1 if the firm is classified in the ‘science based’ industries (pharmaceuticals, computers and office machinery, scientific instruments)
Industry dummy - information intensive (P_II)	P_II = 1 if the firm is classified in the ‘information intensive’ industries (financial intermediation, telecommunication, transport services, business services, computer and related service activities, research and development, technical engineering)
Size dummy – small firms (S_SMALL)	S_SMALL = 1 if the firm is classified as a small firm based on the number of employees (less than 50)
Size dummy – medium firms (S_MEDIUM)	S_MEDIUM = 1 if the firm is classified as a medium firm based on the number of employees (50-499)
Size dummy – large firms (S_LARGE)	S_LARGE = 1 if the firm is classified as a large firm based on the number of employees (more than 500)
Age (AGE)	Date of creation of the firm
Log of internal R&D (LRDINT03)	Natural log of the internal R&D expenditures in the year 2003
Log of external R&D (LRDEXT03)	Natural log of the external R&D expenditures in the year 2003
Group membership (GP)	GP = 1 if the firm is member of a group
Localisation of firm control (CONT)	CONT = 0 if the firm is for more than 50% controlled by Belgian shareholders; CONT = 1 if these shareholders are foreign
Qualified personnel (G_PERS)	G_PERS = 1 if the firm uses this criterion for R&D activities
Presence universities and research centres (G_UNI)	G_UNI = 1 if the firm uses this criterion for R&D activities
Vicinity of production activities (G_PROD)	G_PROD = 1 if the firm uses this criterion for R&D activities
Presence of clients and/or suppliers (G_CLISUP)	G_CLISUP = 1 if the firm uses this criterion for R&D activities
Presence of infrastructure (G_INFRA)	G_INFRA = 1 if the firm uses this criterion for R&D activities
Local policy measures (G_REGLOC)	G_REGLOC = 1 if the firm uses this criterion for R&D activities
Possibilities of subsidies (G_SUBS)	G_SUBS = 1 if the firm uses this criterion for R&D activities
Presence of cluster of similar firms and /or networking possibilities (G_CLUST)	G_CLUST = 1 if the firm uses this criterion for R&D activities

Financial attractive location G\_FINAN = 1 if the firm uses this criterion for R&D activities conditions (G\_FINAN)  
 Historical reasons (G\_HIST) G\_HIST = 1 if the firm uses this criterion for R&D activities

**Table A2** Statistical descriptions of the variables

Variable	Observations	Mean	Std. deviation	Min	Max
Sciencepark	1668	0.065	0.247	0	1
P_RI	1668	0.179	0.384	0	1
P_SI	1668	0.270	0.444	0	1
P_SS	1668	0.190	0.392	0	1
P_SB	1668	0.114	0.318	0	1
P_II	1668	0.246	0.431	0	1
S_SMALL	1668	0.538	0.499	0	1
S_MEDIUM	1668	0.381	0.486	0	1
S_LARGE	1668	0.081	0.273	0	1
AGE	1665	23.075	19.709	0	150
LRDINT03	1668	12.150	2.803	-6.9	19.8
LRDEXT03	1668	1.072	9.104	-6.9	20
GP	1668	0.664	0.473	0	1
CONT	1668	0.279	0.449	0	1
G_PERS	554	2.016	0.812	1	3
G_UNI	554	1.872	0.890	1	3
G_PROD	554	2.054	0.730	1	3
G_CLISUP	554	1.691	0.844	1	3
G_INFRA	554	1.910	0.852	1	3
G_REGLOC	554	1.496	0.796	1	3
G_SUBS	554	1.861	0.888	1	3
G_CLUST	554	1.572	0.844	1	3
G_FINAN	554	1.578	0.841	1	3
G_HIST	554	1.989	0.795	1	3

# Simulation of Differential Robotic Platform Movement

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**This paper presents an overview of possible new concept for the simulation of the differential robotic platform movement, which provides an excellent experimental basis to study computer science and robotics. Simulation of the movement taking place in real time and track (except for the dynamics of the platform) and the real effects produced by the surface (wood, glass, grass, sand...etc.) as well as different types of wheel (plastic, rubber Etc.). Simulation program can connect to the PLC (control robo platform in real lab environment) and follow the distinction of simulation and real parameters. The proposed solutions are based on many years of work and research that are conducted at the Faculty of Information Technology, the University Singidunum and the University Apeiron. The final work presented here was supported by the Serbian Ministry of Education and Science (project III44006).**

## **Keywords**

Virtual robo lab, e-robotlab, robotic platform

## **1. Introduction**

New Web technologies, created real conditions for the realization of virtual robotic laboratory. This was contributed to the relatively rapid development of Internet infrastructure that enabled Web technologies to create space and e-learning becomes a way of comparative education worldwide. The result is - more and more universities in the world with e-learning as an offer in its academic programs.

At the end of the nineties we have already implemented a virtual laboratory that allowed students on-line exercises (student access to Web server via the Internet). The exercises were designed to enable students to work with stationary robot [1]. Following the work in the virtual classroom (Virtual Robo Lab.) we decided to develop a dynamic exercise robotic platform. University courses such as computer science and robotics in their programs have anticipated laboratory exercises. Practical exercises are of great importance in the education of students of these subjects. But in many cases, educational laboratories do not have proper equipment for economic reasons. Virtual Robo Lab. offers many advantages, especially when specific equipment is necessary and expensive. In educational environments, there is another problem. By increasing the number of students we are coming to serious problems in providing adequate space and laboratory time.

By analyzing these aspects, we identified potential problems.

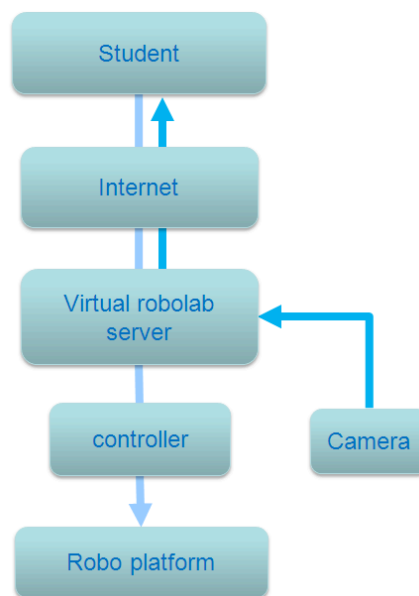
1. From the viewpoint of the editors exercise (college professor)

- equipment for a particular type of exercises can be expensive or unavailable for some reason,
- use of university resources, reserving classrooms or equipped cabinet,
- space - room for laboratory equipment must be dedicated.

2. From the perspective of students,

- must attend and participate in exercises usually in groups,
- arrival at the scheduled date for the exercise.

Robo Virtual Laboratory (abbreviated VRL), many of the above problems solved with minimum initial investments. The investments were mainly in equipment for the exercise. Resources used in the computer server farms that already exists. In Figure 1.1 shows the arhitektura VRL system.



**Figure 1** The basic system architecture of VRL

Access to Virtual robo lab is a shared time position (time sharing). Student access to VRL Web server, login and choose a term that is free. Depending on the type of practice, defined the time that the student has available. Exercises can be repeated several times.

## 2. Project VRL

Name that we took for this project is EXPERIMENTAL VIRTUAL ROBO LABORATORY. The concept of the project is divided into several parts:

- building an application (virtual robotic laboratory interface),
- Internet Web server configuration,
- setting realistic robotic platform environment,
- testing in the online mode,
- monitoring exercise by the assistant and professor.

The choice of the differential robotic platform that we already had from previous projects [2,3], it is much easier to design the working environment is the first in a series of

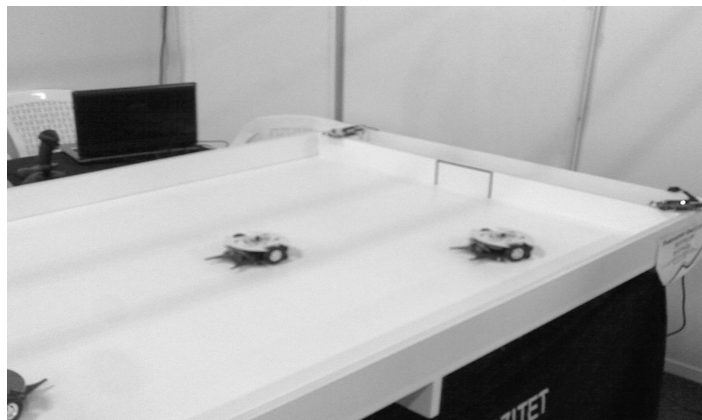
implementation. Making an application interface that would support all the requirements of dynamic robotic platform has two components:

- dynamic simulation of all robotic platforms functions,
- visual monitoring and controlling a robotic platform in real time.

## **2.1 Laboratory equipment**

The necessary laboratory equipment that we use include:

- Differential robotic platform,
- PLC for control of the robot,
- High-resolution CCD camera,
- computer is connected to a LAN,
- specially designed training polygon for the exercise.



**Figure 2** A polygon that we use for VRL

## **3. VRL Application**

Base system is a software application (Virtual Robo Laboratory, VRL), made with rudimentalnim interface, which students can easily follow. Figure 3.1 shows the main interface environment.

### ***Visual interface on-line control of movement***

The designed interface allows you to track all the dynamic action robotic platform. Video segment of interface supports wide-angle CCD camera resolution higher than 4 Mega pixels. We anticipate the use of two CCD cameras. Further development of VRL applications we predict 3D system. VRL video window is empirically defined as optimal, although there is a possibility that is adjusted according to customer requirements.

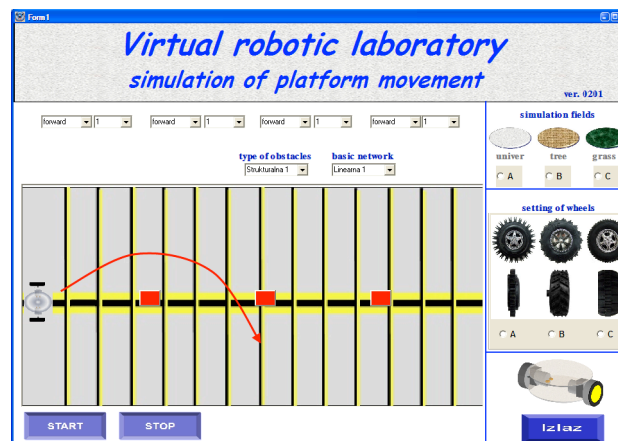
Since there is always a need for certain positions robotic platform to document capture, analysis and correction, later, students can use the save function that records the freeze mode and saves the images (in BMP format) on the user's computer. The interface and command set for robotic motion control platform.



**Figure 3** Application Interface Virtual Robo Laboratory

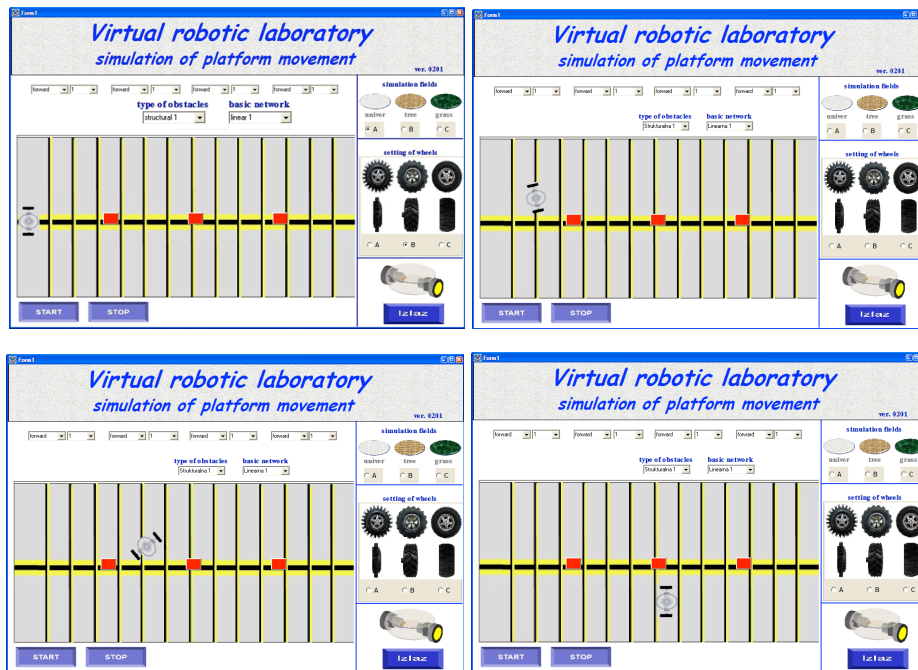
### ***Interface simulation of the movement***

Creating an application that would simulate the movement of the programmable robo educational platform was a major challenge for our team. In addition to defining a set of simulation it is necessary to process and output functions in the form of graphical reports. The challenge was even greater when we decided to gradually introduce the kinematic elements such as details of the geometry of wheel settings, selection of the structure of the wheels and the choice of the structure of the terrain on which the mobile robotic platform is moving. Figure 3.2 shows the layout of the simulation system interface VRL where we use the prediction of movement of robotic platforms.



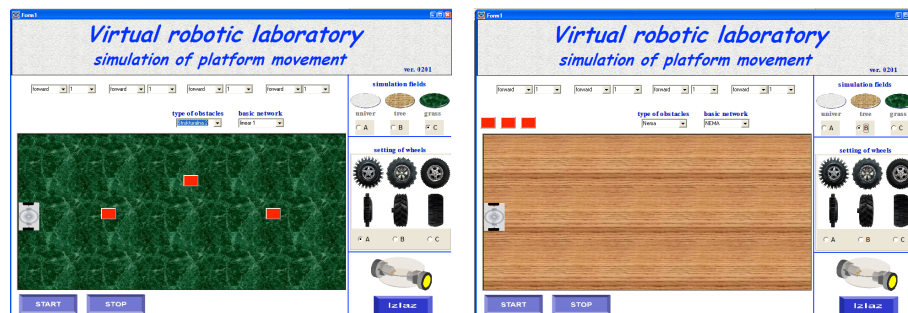
**Figure 4** Prediction of Robo movement





**Figure 5** Simulation of Robo movement

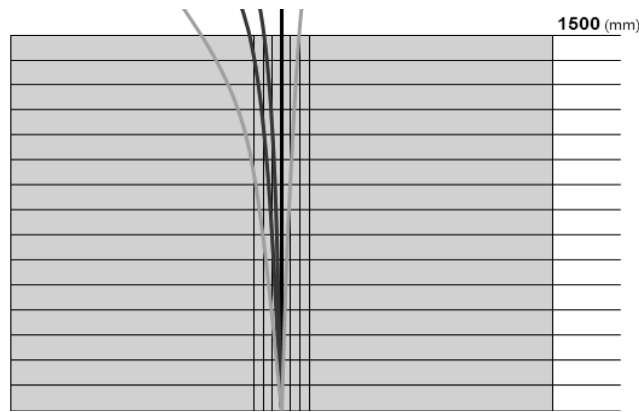
It is also possible to use a variety of surfaces such as glass, timber and grass etc. Figure 3.3 shows the layout of the simulation system interface VRL where we use the grass and wood.



**Figure 6** The layout of grass and wood

### ***Graphical representation of a simulation of movement***

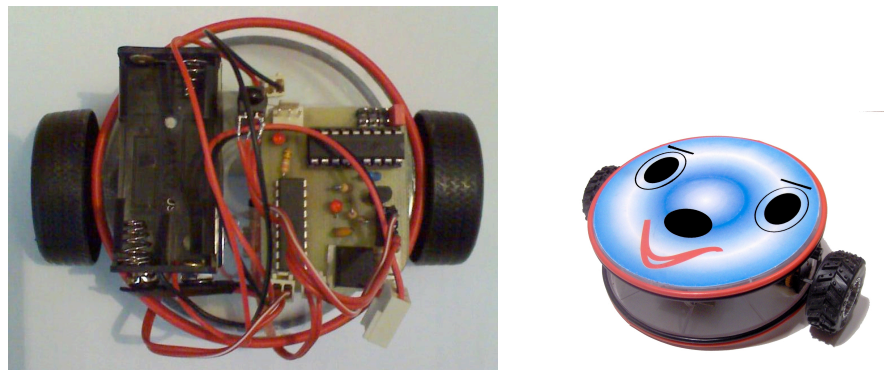
Upon completion of the simulation it is possible to get a motion graph. At this stage of development the project is only a review of linear motion. Modules for other views (include time base) will be included in the next stage of the project VRL system.



**Figure 7** Graphical representation of linear motion simulation Robo Virtual Laboratory

## 4. Robo Platform

Robotic platform used in this project is a modern programmable robo platform (teaching tool) which meets the requirements of modern academic programs in their curriculum with information technology, electronics, programming and robotics. We developed two types of robotic platforms, depending on the needs of the exercises themselves can be used individually or in pairs (groups). Our robotic platform equipped with five IR sensor (three front and two rear) [4], which can detect obstacles and depending on the definition of output parameters it is possible to make a prediction of the movement of the robot [5].

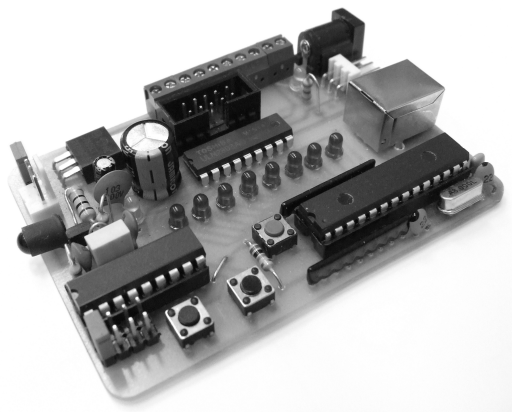


**Figure 8** Robo platform which we use (on the left is an experimental model that can be equipped with a wireless camera)

## 5. Robo Controller (PLC)

Projected PLC finds its application in teaching robotics, digital electronics, computer science and technical education. It is designed for experiments and modular systems. Because of its purposes, PLC and PM module RoHS recommendations are subject [6], the European Agency for the electronics. Special attention is focused on finishing.

By connecting external sensors PLC is becoming a powerful tool in teaching each cabinet. To work with PLC-prepared with existing applications, exercises and instructions that are located on the installation CD drive that is part of the set at the controller, which includes USB cable and battery terminals.



**Figure 9** Prototype 1-2, IR controller version of the V03

## 5. Conclusion

In today's technologically dynamic world, Virtual Robo Laboratory, definitely aims that to assume the primacy of classical university labs [7]. Reasons for this are many but let us mention just a phrase to be used for e-learning "learn when you can". That provides great opportunities for students. Another reason that VRL will set the primary place in the curricula and the possibility of applying a wide range of teaching modules in the field of technical and information sciences. Subjects such as mechatronics, electronics, computers and information technology technical education in their curricula are planned exercise.

Whether you want to solve tasks robo-platform design or implement movement of robots by default settings, discuss the topic with your students with practical examples of sensors, or want to develop a new simulation program in some of the programming language, the proposed Virtual Robo Laboratory is the first step and ideal starting point for contemporary experimental virtual classes.

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# Current Themes, Challenges and Research in Social Entrepreneurship

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Today we face many problems: global warming, poverty, increasing economic inequality, hunger, terrorism, etc. Finding solutions and ways to solve these problems has proved to be very difficult. Thus, in all these critical issues and debates, there is more and more talk for social entrepreneurship segment as it proves to be an effective solution for many types of social problems mentioned above. The social entrepreneurship involves highly innovative approaches to solving social problems in opportunistic, consistent and responsible manner. Innovative approaches are usually performed by non profit or nongovernmental organizations, but they can also be applied to profit oriented organizations or government agencies. One of the sources of revolutionary potential in a society and a holder of sustainable socio-economic change is exactly-the social entrepreneurship. Social enterprises develop opportunities for markets where other businesses cannot. They provide examples of new ways of working that can be practiced throughout the economy. A key factor is the role social enterprises play in strengthening individuals and communities, fostering the development of work habits and increase in employment diversification. The social entrepreneur catches large ventures with deep social significance. The social entrepreneurship covers market participants with different motives that are not limited to seeking profits. Instead, the focus being placed solely on financial income, these organizations show strong social functions-they tend to focus on issues based on principles of solidarity and active citizenship. In Macedonia social entrepreneurship is in its very beginnings. The reality in Macedonia is that the theme social entrepreneurship despite some declaratory action by specific entities is still insufficiently developed and largely unproven in practice. It is not yet well understood the essence of social entrepreneurship, and that this kind of entrepreneurship in the world represents a solid basis for developing conditions that would create sustainable socio-economic changes. However, thanks to personal examples of a small number of business entrepreneurs there is some progress in this direction. In this respect the problem is that in R. Macedonia is not sufficiently understood the essence of social entrepreneurship and how it helps in developing a society, what is its importance and what can be achieved. It is needed raising awareness among citizens, doing research, finding ways to encourage the government to foster the social entrepreneurship, as well as waking up of civil and business sector and realizing the benefits of this type of entrepreneurship. The focus of this paper will be on the current challenges of the social entrepreneurship, with a specific focus to the development of social entrepreneurship in R. Macedonia.

## **Keywords**

Business, Social entrepreneurship, Social change, Socio economic model, Social enterprise

## 1. Introduction

“The most powerful source in the world is the big idea, but only if it is in the hands of a good entrepreneur. This can move the world”. (Bill Drayton-social entrepreneur)

The social entrepreneurship paradigm is not new, but has come to the forefront as people grow increasingly unhappy with focusing solely on money and profit. Although social entrepreneurs differ in their focus and in how they describe their motivation, the common thread is a desire to combine business principles and models with a social objective. These individuals want to make a difference in the world, and recognize that often the best way to accomplish their goals is through a business enterprise. They may establish a for-profit company that funnels its profits toward worthy causes, or found a not-for-profit organization that is made successful and sustainable through a sound business model. The social entrepreneurship paradigm is often described as following a "triple bottom line" rather than striving solely for financial success, social entrepreneurs focus on achieving success in economic, ecological and social arenas. The social entrepreneurship addresses the social problems and needs that are not determined by markets or governments; it is motivated primarily by social assistance and generally works together and not against market forces. [1] Considering the fact of raising the role of the social entrepreneurship this paper will firstly describe the concept of social entrepreneurship, the research and challenges in this area, as well as the basis of the social entrepreneurship for creation of sustainable socio-economic changes. In the second part the focus will be put on the social entrepreneurship in R. Macedonia, the current trends, challenges, the problem of the low level of awareness for the benefits of the social entrepreneurship, operationalization of this problem and future recommendations for improving the situation.

## 2. The Concept Of Social Entrepreneurship, Trends, Research And Challenges

### 2.1 Defining the Social Entrepreneurship

“Social entrepreneurs often seem to be possessed by their ideas, committing their lives to changing the direction of their field. They are both visionaries and ultimate realists, concerned with the practical implementation of their vision above all else. Social entrepreneurs are change agents for the social sector. They are mission-driven, determined to achieve results and committed to maintaining accountability to the communities they serve. Social entrepreneurs effect systemic transformation by tackling not only the problem at hand, but also the roots of that problem. What's more, social entrepreneurs are usually more effective in addressing root causes than are supranational NGOs because they are better integrated into the societies they serve, and know the specific needs of their beneficiaries.”[2] Social entrepreneurs want to do more than just make money and have a successful business. They strive to make a difference in their communities and in the world, by using a business model to meet a social need.

The social entrepreneurship can be recognized even in the XVIII and XIX century in Britain, where the famous industrialist Robert Owen pointed out the alarming need for improving the welfare of employees by improving their performance, knowledge and enrichment of life. Social entrepreneurship is slowly becoming part of many research projects. Social entrepreneurs generally do not receive the same media coverage as certain business entrepreneurs, though, inevitably, there are exceptions to this.

Social entrepreneurs play the role of change agents in the social sector through:

- Adopting a mission to create and maintain social value (not just private value);
- Recognition of new opportunities in terms of that mission;

- Engaging in a process of continuous innovation, adaptation, and learning;
- Increased accountability for results arising

The key idea is that social entrepreneurship involves highly innovative approaches to solving social problems in opportunistic, consistent and responsible manner. Innovative approaches are usually performed by nonprofit or nongovernmental organizations, but they can also be applied to profit or government agencies.

Social entrepreneurs are the subject of admiration and support of many supporters of social change, including many who were formerly business entrepreneurs (for example, Jeff Skoll of eBay, Stieve Case of AOL, Bill Gates of Microsoft). These ex-business entrepreneurs and many others, offer financial support in the form of awards and grants to social entrepreneurs.[3]

The definition of social entrepreneurship has proved to be a difficult task. Among various definitions arising during the past two decades, two things remain common: 1) the basic desire to create social value and 2) activity which is characterized by change and create something new. The authors Tapsell and Woods (2010) offer a working definition of social entrepreneurship, "the creation and running of the possibilities for transformation, social change through innovative activities that take place in or around the economic and social communities in the historical and cultural context. Social enterprises can be perceived as hybrid organizations that have both economic and non-economic goals.[4]

The social entrepreneurship differs from entrepreneurship in terms of mission. Social entrepreneurs are people who create and manage innovative entrepreneurial organizations or ventures whose primary mission is social change.[5]

## **2.2 Social Entrepreneur And Social Enterprise**

The term "social entrepreneur" is particularly used in American foundations and organizations as Ashoka in the mid-1990s. These individuals are identified to support the different ways individuals, launching new activities devoted to the social mission, and behave like real entrepreneurs in terms of dynamics, personal commitment and innovative practices. Such social entrepreneur brings new ways of responding to social problems. In Europe, the emphasis is often placed in the collective nature of social enterprise and its associated form or cooperative.

Corporate Social Responsibility (hereafter CSR), as promoted by the European Commission, is a concept where companies integrate social care and concern for environmental protection in their business activities. In the European Union (hereafter EU), social entrepreneurship is seen as part of the business sector's contribution to sustainable development and the Union's strategy for growth and employment. In the EU, CSR is embedded in social policy and employment policy for development of small and medium sized enterprises, policy environment, consumer protection, the rules and procedures for procurement and foreign policy. Accession of R. Macedonia to the EU implies the need for acceptance of its norms and practices, including the recognition and promotion of CSR and its contribution to social cohesion and the creation of sustainable competitiveness and development.

The concept of "social enterprise", first appeared in Europe (for several years before it appeared in the U.S.), particularly in Italy. Social enterprises are organizations that provide products or services directly related to their explicit aim to benefit the community. They rely on the collective dynamics involving various types of stakeholders in their governing bodies, have high value on their autonomy and they bear the economic risks associated with their activities "[6]

### **2.3 Trends, Research and Challenges**

Trends from the preceding two decades show that social entrepreneurs have moved from their traditional philanthropic and charitable moorings to find more effective and sustainable solutions to social problems using the tools from the world of business. Much of the recent social entrepreneurship initiatives have emerged from third-world countries where poverty and poor quality of life make such interventions expedient. Throughout history, social entrepreneurs have either filled the spaces left void by the state or worked more closely with public organizations at both the national and local level for common good. They have successfully brought enormous synergies and benefits by unifying business principles with social ventures.[7]

Just as business entrepreneurs, social entrepreneurs act as change agents for society by inventing new methods and creating solutions for social betterment. With the population explosion, technological advancements, and complexities of living, the social entrepreneurship faces many challenges including:

- Social needs are becoming more diverse and demands are steadily increasing
- Nonprofit organizations - both genuine and less genuine - crop up and compete for government funds and philanthropic support
- Traditional forms of funding are becoming scarce and obsolete
- Commercial enterprises vie with non-profit organizations to promote social causes aimed at corporate image-building
- Government funding agencies, sponsors, and donors are becoming increasingly more socially conscious and demand greater accountability from social entrepreneurs

Confronted by this changing environment, an increasing number of social entrepreneurs are reinventing themselves, striving to combine the passion of a social mission with an entrepreneurial discipline.[8] It is important to look at creative funding solutions. Social enterprises are getting more resourceful in the way that they are going after funding, and some of the most successful enterprises are those that are utilizing a combination of different sources of capital. The responsibility for creating widespread social change is not something that falls squarely on the shoulders of social entrepreneurs anymore. Entrepreneurship is just one avenue by which change can be achieved. We have entered a time of democratization in which everyone can be involved in advancing social change.[9]

For social enterprises to develop entrepreneurial, a shift in paradigm to encourage social enterprises to accept and embrace business risk might help. There is also need of extensive training programs in business management especially strategy to enable social entrepreneurs to survive most of the challenges of the market place. Apart from the business skills, such trainings would equip them with confidence to venture deeper into riskier markets. There is also a need to design focused and shorter management courses aimed at practicing social enterprise leaders.

In addition, it is urgent need of continued drive to promote local support organizations to foster and assist emerging social entrepreneurial activities and also to encourage social organizations to be part of such support groups and organizations and expansion of such support bodies nationwide. There should be a drive to strengthen structures outside the government to support social enterprises to function independent of the state.

When we are talking about the research in the field of social entrepreneurship, the concept of social entrepreneurship means different things to different people and researchers. One group of researchers refers to the social entrepreneurs as profit initiatives in search of alternative financing strategies, or management schemes to create social value. A second group of researchers refers to understanding how socially responsible business practices are involved in commercial intersectoral partnerships. A third group sees social entrepreneurship as a means of addressing social problems and a catalyst of social transformation.[10]

Probably one of the most controversial issues is whether social entrepreneurship is an independent field of research. Many studies on social entrepreneurship have adopted concepts and terminology used in the established entrepreneurship literature. Does this imply that social entrepreneurship is a sub-category of entrepreneurship? Social entrepreneurship differs from other forms of entrepreneurship in that it gives higher priority to social value creation—by catalyzing social change and/or catering to social needs—than to value capture. It has enormous potential to inform and enhance the field of entrepreneurship, as it provides an excellent opportunity to challenge and rethink central concepts and assumptions. Assessing social performance and impact is one of the greatest challenges for practitioners and researchers in social entrepreneurship.

### ***2.3.1 The Social Entrepreneurship As A Model For Socio-Economic Changes***

Among the numerous examples of social entrepreneurship, which are the main model for socio-economic change, stands out this example- "banker to the poor man" - Nobel laureate Muhammad Yunus - founder of the already world-famous Grameen Bank. This Bank launched a micro credits to the poorest women in Bangladesh without any collateral required and has grown into an organization with over 24, 000 employees and annual revenues amounting to 6 billion U.S. dollars.

The social entrepreneurship identifies resources where people see problems. Social entrepreneur starts with the assumption that "the people are able to be the change they want to see." [11] The emphasis is certainly put on the model created by the social entrepreneurship as a possible way to achieve sustainability, with emphasis on the need for strengthened efforts to better educate officials, donors and the general public for this type of activity. [12] Instead of the focus being placed solely on financial income, these organizations show strong social functions, tend to focus on social issues based on principles of solidarity and active citizenship- model for sustainable socio-economic change in any society. In local communities, social enterprises provide unique goods and services that include a child care and elderly care, affordable housing loans and loans for small businesses that are intended for marginalized groups. [13] In order to create and support sustainable social and economic change, social entrepreneurs are primarily motivated by ethical imperative.

The rise of the entrepreneurship in Cleantech [14] is a perfect example. It is driven by many people working in the environment who see business as a powerful engine to achieve their environmental objectives.

## **3. Social Entrepreneurship in R. Macedonia**

### ***3.1 Development Trends and Challenges***

In recent years, R. Macedonia was faced with great changes mostly common to all countries in development especially those that have decided to leave the socialism and centralized governance and to make the commitment towards the democracy. After succession of Yugoslavia and Macedonian independency in 1991, we have accepted the challenge to pioneer our history and to start building community in which people's voice can be heard, respected and taken into account in decision making processes.

The social entrepreneurship is necessary to develop and encourage the development of civil society in R. Macedonia. From year to year it grows and includes more smart and creative people. In Macedonia social entrepreneurship is in its beginnings. There isn't a favorable framework for implementation of the concept of the social entrepreneurship. There is no legal structure for development of social entrepreneurship. Social entrepreneurship is important in developing countries, where there are high levels of poverty and unemployment. It engages



numerous workforces, while helping the disadvantaged categories of citizens. The biggest problem for these organizations is the initial funding. While in European countries, governments provide small grants for start ups; in R. Macedonia support for the social entrepreneurship is not even provided in the government program. In EU there are banks specialized in lending to social enterprises at very favorable terms. [15]

The reality in Macedonia is that the social entrepreneurship and despite some declaratory action by specific entities is still insufficiently developed and largely unproven in practice. There are some positive examples like the web page Mladinfo.com, CSO that runs commercial activities, "Izbor" Strumica, the Slovenian Telekom company ONE, "Social Entrepreneurship Competition 2010" American Chamber of Commerce Macedonia, etc. But it is not yet well understood the essence of social entrepreneurship, and that this kind of entrepreneurship in the world represents a solid basis for developing conditions that would create sustainable socio-economic changes. However, thanks mainly some personal examples of a small number of business entrepreneurs, there is some progress in this direction and that is commendable.

In R. Macedonia fighters for social change are often non-governmental organizations. They focus on solving problems with small or medium-weight. The problem is that in R. Macedonia is not sufficiently understood the essence of social entrepreneurship and how it helps in the development of a society, what is its importance and what can be achieved. It is needed raising awareness among citizens, making research, finding ways to encourage the government to support the social entrepreneurship, as well as civil and business sector to wake up and realize the benefits of this type of entrepreneurship. Setting up enabling legal framework that will stimulate the philanthropic activities of companies and individuals is one of the key priorities. The Law on donations and sponsorships in public activities, adopted by the Parliament in April 2006 makes a clear distinction between the donations and sponsorships and respectively predicts different tax deductions for companies donating for public purposes. Although it went into the force on 1 January 2007, large number of companies has stated that they are not introduced with the benefits of the law. Also, many companies have demonstrated fear to use the law being afraid of attracting additional attention of the governmental institutions such as the Public Revenue office. The general conclusions are that the Law is beneficial, but needs additional revision and that there is a great need for further promotion and education on the Law for donations and sponsorships.[16]

### 3.2 Operationalization Of The Problem

**Table 1** Operationalization of the problem-Low level of development of social entrepreneurship in R. Macedonia

Input	Process	Output
Insufficient research for the social entrepreneurship	Making research	Development of social entrepreneurship
Insufficient information provided to the private sector	Organization of trainings	Development of social entrepreneurship
The private sector is not interested for support to the solutions for the social problems in the country	The government should motivate the private and nongovernmental sector	Development of social entrepreneurship
Small number of experts in this field	Training and education	Development of social entrepreneurship
Insufficient awareness for the benefits from the development of the social entrepreneurship as a solid base for creation of	Creation of favorable climate for development of the social entrepreneurship through showing positive examples,	Development of social entrepreneurship

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sustainable changes	socio-economic	organizations of seminars, conferences, workshops, panel discussions, media cover
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### **3.3 Recommendations for Future Actions**

It is crucial to understand that social entrepreneurship is the solution of many social problems and create a model for sustainable social and economic change. It is raising awareness among citizens that this kind of entrepreneurship successfully connects civil and private sector and helps to resolve many social problems in the society and cannot be solved otherwise. In this context, it is crucial to highlight the role of the media, because they represent an important tool that can create a broad understanding of the concept of social entrepreneurship through programs and activities that raise awareness.

Then, the teaching concept of social entrepreneurship as a subject in universities could be of great importance in the institutionalization of the concept and building awareness among the young generation, and on this way a new generation of social entrepreneurs in the future will be prepared. By incorporating these concepts into teaching curriculum and extracurricular activities, awareness can be increased and a new generation of new social entrepreneurs can be built.

The role of the private sector is as important as a key source of innovative initiatives undertaken by businessmen from different areas to serve their communities, especially in companies that split off part of its profits for the implementation of changes in the community. The private sector may also be involved in creating opportunities for marginalized groups in society through targeted initiatives that come out to meet new needs and capacities, thus helping in the transformation of the recipients. Furthermore, vital role here plays the public and civil sector.

The social entrepreneurship can be seen as bottom-up model of socio economic development that aims to overcome government and market failures.

There is a need for broader discussion and explanation of the terms social enterprising and self-financing activity. Social entrepreneurship is lacking information for commercial activities and the social enterprise concept. More focused approach to promotion should be offered for increasing the awareness to the governmental bodies, public servants about the benefits from this model. The networking for sharing experiences and information should be strengthened, but also to use the collective understanding to "spread the word". The capacities of the governmental institutions for increasing the cooperation with civil society should be strengthened, as well as to work on additional legal changes and policies that will support the growth of the social enterprises in Macedonia.

It would be good to have more funding opportunities for starting social enterprise. In this regard the role of banking sector is important in improving the portfolio of services that will be offered to social enterprises, lobby between the donors to increase their support for development initiatives as social entrepreneurship, or work with governmental officials to create public fund for seed money for starting a social enterprise and additional funds for operating and growing the business.[17]

In an environment as Macedonia, where the model of social enterprise has not been much treated and explored and there are some initial forms, a lot of challenges must be met by joint cooperation of all stakeholders and transfer of best practices from other countries.[18]Creating a consistent framework for social enterprise development could support full exploitation of the social, economic and employment generation roles of this concept.

To conclude- it is necessary to implement various measures:

- Raising the stakeholder awareness on importance and potential of social enterprises: develop a learning structure that will provide relevant expertise and support to the managers of the social enterprise; educate the interested individuals and upgrade the skills of current social entrepreneurs (operating both in a business or civil sector) about running a business with a social mission; to promote the image of social enterprises in the public;
- Improvements of the legal work: to develop an official definition of social enterprise that will be used nationwide; to open a broader discussion and provide recommendations about the legal context of social enterprise
- Developing more favorable fiscal framework
- Creating supportive structures-to set governmental structure that will support and coordinate the work of the social enterprise: to encourage pilot projects on social entrepreneurship; to run a data base with information about social entrepreneurship; strengthening the SMEs support structures; strengthening the public funding; provide information on a regular basis about opportunities for initiating a social enterprise; support the market positioning; establishing a system for measuring the social impact; to motivate the donor community

## 4. Conclusions

I'll finish with encouraging words of David Bornstein:" Of course, not every one wants to be a social entrepreneur, just as everyone doesn't want to start own business. But today almost everyone has the opportunity to participate in this new sector. Just because you grow so fast and in such different directions, the possibilities are wide open to people with different interests and for those who have different skills. For anyone who enjoys to change the existing situation - these are good times. This is the right moment. "

This is social entrepreneurship, entrepreneurship in the future, a model that offers a solution to the growing problems that occur in every society and which represents the basis for changing those societies with the creation of sustainable socio-economic changes.

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# Entrepreneurship Changes with Special Empathizes on ICT in Kosovo

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It's well known that Information and Communication Technology (ICT) development has very important impact on entrepreneurship development. Companies today are forced to function under constant changes which are driven mostly by ICT. Every day innovation and new equipment contributing to a better working life are introduced. This paper focus is in analyzing and measuring the use of ICT activities by Kosovo enterprises. In transition economy especially in Kosovo, the ICT activity should be analyzed by taken into consideration; the level of education of entrepreneurs, the age, the traditional approach of entrepreneur in Kosovo. The survey will include 125 entrepreneurs within 7 regions in Kosovo.

## **Keywords**

Entrepreneurship, ICT, innovation, Kosovo

## **1. Introduction**

As in real world, quite often companies are contradicted, with objectives and ideologies, the technology is used to reinforce or improve organizations objectives and principles of the association that constructed and arranged it. Such information technology is driving force behind collecting useful information, principles, and objectives of that association by internalizing and developing further leading ideals of company in the organization.

## **2. Importance of ICT**

The information system is focused on structural goal and no one else fails to accept the degree, to which the information technology role is of importance to modify transformation in organization, nevertheless, dominant approach today is that different organizational form can be attained through information technology. [1]

Information technology and structure in organization is centrally element for sorting the procedures and positioning them. [1]

There is a pressure connecting the knowledgeable, act of human being actors and the traditional values, structural force of institutionalized practices. In everyday life, expression is essential to shape human communications, thus, communication between people is characterized by indefinite, and this indefinites is a feature of "process of theories of social phenomena, which implies that human action in organizations is never totally predictable" [1] and it is not accidental (because it is never completely unrestrained).

According to Jackson & Carter [2], the evolution of computers system is becoming as: "regime of truth", by now the Information Technology age is very important source of knowledge. The new generation is grown up with computers and especially with operation system. The same is in Kosovo, including old people.

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, in this case from mechanics system to digital system. Then people can without difficulty try out the innovation and changes, what makes them adopt it more easily soon after on. [3]

Due to the ongoing process, more or less all human resources of the organization nowadays have to deal with the new condition, such as ; new information technology . By this means, they have to be trained how to make use of new issues (standardize administrative procedures) and adopt, and use the new form of working. In addition, staff in the organization may see the development positively, but a number of workers are afraid of the upcoming transform and as a result, they bring out resistance towards the new conditions.

As in real world, quite often companies are contradicted, with objectives and ideologies, the technology is used to reinforce or improve organizations objectives and principles of the association that constructed and arranged it. Such information technology is driving force behind collecting useful information, principles, and objectives of that association by internalizing and developing further leading ideals of company in the organization and that portrays the behavior of employees in an organization. The information system is focused on structural goal and no one else fails to accept the degree, to which the information technology role is of importance to modify transformation in organization, nevertheless, dominant approach today is that different organizational form can be attained through information technology [1].

At the same time as organizations, frequently have contradictory goals and ideologies, the technology will be predisposed to reproduce those goals and ideologies of the alliance that built and deployed it. Such information technology motivations embody the collective thoughts, ideals, and goals of that alliance by internalizing and reinforcing the leading principles and culture of the association in the organization and this is behavior of organization.

As regard to the information technology, "indeterminacy" implies that information technology is not utilized as is planned by developers, IT does not establish behavior, but is suitable for people that work in organizations. People practices regarding the development and usage of Information Technology will "therefore result in both intended and unintended case, and depend on anticipated and unanticipated circumstances." [1].

### **3. The Importance of Using Education and Communication**

According to Schlesinger (1997) in order to cope with the changes an essential thing is education, by education is mean preparing people before changes happen, exchanging ideas and discussion are important processes to help people adopt with the changes, an education and communication plan can remove obstacles such as resistance, in cases when the resistance is based on incoherent information. This way for managers is needed help to implement; therefore, good relationship among people working in an organization is of crucial importance even though it takes time and efforts.

### **4. The Importance of Employee's Participations and Involvement**

According to Kotter & Schlesinger [4] in cases when certain plans are about to be implemented, initiators engage people likely to resist so that they could help implementing changes and become part of this change. It is important that initiators of these kind of plans to listen those who participate and take their advices

Kotter & Schlesinger [4] reveals that some managers have "strong feelings" about participants, then they pointed out that these feelings, does not matter if they are positive or negative, they might cause problems. Sometimes initiators might neglect and be tired of doing hard work, therefore, participation and involvement of others people is good, studies

reveal that participation increases commitment, which is of a great importance to succeed, at the same time involving other takes time consequently there might not be success if it's not managed carefully.

## **5. Facilitation and Supports**

Being supportive is a good way to deal with people that might resist, according to Kotter & Schlesinger [4] this procedure consist of training, giving employees time to consult and as well being supportive, listening their feelings etc .

Facilitate and support, as a tools are useful in cases when changes might cause stress and therefore, it will result with resistance. In some cases managers ignore these kind of things, as well facilitation and support as a tools to solve problems of this nature. Nevertheless, this process might take long time and at the same time fail, Kotter & Schlesinger [4] agree that "time is money" therefore this procedure is not very practical.

## **6. Ways of Learning in Organization**

Therefore, the difficulty below manifestation is still in the intellect that ability levels of human resources and ability necessities of everyday jobs is preset, and here are no extra employees to be hired or everyday jobs subcontracted equivalent to optimally locating a fresh member of staff in the ability space, or optimal training and re training, of present human resources [5].

According to [6] comparing today's workers level of knowledge comparing with ten years ago is much higher and that is called "aura" for achieving the success. Nowadays managers are more obligated to wing for possibilities of incising the capable of trainings and workshops for all the staff and for themselves as well.

Just to establish conflict between worldwide economic benefit and local following welfare, organizations have to know how to be more approachable to the wants of the communities in the way of which they function still as they are going to international level. In addition, communities have to decide how best to attach or join cosmopolitans and local issues is well, and how to make a public civilization as culture to draw and keep the employees in companies [6].

## **7. The Patching Strategy**

As successfully strategy according to Campbell [7] observation or hindsight is very well mentioned, but repeatedly moves on to the effectively to new issue and changes can happen. There is a common advantage of patching strategy, known as migration to new process and progress by following the feedback and performing them. In today's market the building of new thing by patching is core concept of big companies such as Microsoft.

Approach of success in dynamic organization by patching is Chiles & Hench [8] mention neo-Darwinians process of profile in organization, evolution of changes. One of four elements for based knowledge economy is information infrastructure based on ICT, according to World Bank final report, the conference held in Paris 2002 [9].

According to Samoilenko, S. & Weistroffer, R. [10] ICT is key element to attract domestic and foreign investors especially for transition countries sac as Kosovo. Kosovo have just 5 years as independent country and back from war 13 years. UK as other states (including Macedonia) have shown interest and considerable for ICT as high potential economic impact. Mcquaid, R [11].

## 8. The Process of Information Technology as Social Model

In 21<sup>st</sup> century, workplace has little similarity with the workplace about hundred years ago. Most changes that have been taken place in workplaces are results of technological innovations and new ways of using it. First, the new technology enables a faster transmission of messages via for example reports and comparing different reports, different periods. The new technology allows people in different geographically positions to still be able to communicate with each other. The information technology provides different ways for communication and decision-making that can look different in comparison with conventional ways of working. The way of adapting to new organizational technologies tells something about the organizational environment. Digitalized organization can get people to work in different places in the same time together but can “*create social isolation*.” [12]. As Robbins [12] points out, the use of Information Technology sometimes is seen as a *disruptive* in social relations.

## 9. Empirical Findings

As it mention above age of people using ICT is crucial element, for this paper respondents are divided in two groups as they are shown in table number 1. People born before 1970 are more neglect to adopt with new procedures by using ICT, then people born in or after 1970.

**Table 1** Age of respondents

<b>Response Option</b>	<b>%</b>
Born before 1970	34.4
Born in 1970 or after	65.6
Total	125

Education of entrepreneurs is investigated because adoption to new technologies and caching innovation are more suitable for educated people.

**Table 2** Education of respondents (entrepreneurs)

<b>Response Option</b>	<b>%</b>
None diploma	2.48
Primary school	16.8
Secondary (high) school	41.6
Bachelor level	28.56
Master level or higher	10.56
Total respondents	120

The important question for analyzing is: Are you / is your company saving money with using ICT, if yes, how much per year? None of respondents was able to qualify how much they are saving but all of them responded positively. This is like regime of truth for ICT to entrepreneurs in Kosovo.

## 10. For ICT the Demography is an Element of High Priority

According to statistical office, Kosovo has a population of 1.733.872 (without 40 000 - 50 000 Serbs who live in northern part of Kosovo and did not participate in census). Kosovo average population age is slightly below 28 years.



VAT rates on ICT products in Kosovo is 16% (as in most of products). Tariffs on ITC equipment is 10%, and both of them goes 27.6%. [15]

VAT rate on ICT products in Albania is 20% (as in most of products). Tariffs on ITC equipment is 0% [12]. Average age population in Albania is 35+.[13]

Average population age in Macedonia was just slightly above 37 years in 2010 (37.2 overall, 36.4 for males and 38.1 for females) and has been gradually increasing - around 0.3 years per annum [14]

VAT rate on ICT products in Macedonia is 5% (the preferential rate - regular rate is 18%). Tariffs on ICT equipment is 0%.

Average population age in Montenegro is 37 years. [17] VAT rate 7-30% in general, for most of product in ICT is 7% [18]. Tariffs on ICT equipment is 0%. [19]

## 11. Limitation

Number of active businesses in Kosovo in total are 60,696 [16], in this paper just 125 company in 7 regions in Kosovo are investigated.

**Table 3** Number of active business registered [16]

<b>Category</b>	<b>Total per Category</b>
Individual	49,843
Joint venture with limited.	1,550.0
Joint venture	176
Cooperative	42
LLC	5,209
Public company with limit.	12
Public enterprise	70
Social enterprise	187
Other	1,524
Limited partnership	9
Foreign companies	336
NGO	1,708
Farmers cooperative	23
Liaison office	7
Total	60,696

## 12. Conclusion

According to theoretical approach and through empirical findings conclusion comes up with recommendations:

Kosovo is with youngest population in region and with high potential for developing entrepreneurial activities in lots of spheres especially in ICT sphere.

As it have seen Kosovo has 27.6% in total taxes to pay for ICT, while other countries have less than, Kosovo.

The recommendation for this paper comes to reduce the taxes for ICT in Kosovo because ICT is in highly needed in social society.

People born in or after 1970 are in need to for more trainings and more time to adopt to new systems.

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# Preconditions for Implementation of Mass Customization Strategy in SME's

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**Mass customization presents a new paradigm and trend in the global market enabling the efficient production of many product variants with smaller quantities by each variant with efficiency and cost close to the mass production. Companies who embraced this strategy in sales and production added a new value to their business. This has proven as a good strategy for some small and medium enterprises (SME's) as well as for the big multinational companies. Never the less, implementation of mass customization strategy still presents a challenge for the company. Although a number of companies proved that implementation of mass customization is possible, there is still a question of combination of factors that lead to success of one and failing of another company in MC market. Further more there is a question of the size of the company implementing mass customization strategy. It is not the same if we are studying a case of multinational company or SME. The paper will deal with a challenge SME must cope with if they have chosen to implement mass customization strategy. Success factors of SME's in the field of mass customization will be analyzed and emphasized.**

## **Keywords**

Mass Customization, Production Programme, Configurators, Manufacturing

## **1. Introduction**

Mass customization is a relatively new production paradigm based on the production of customized products with mass production efficiency [1]. Emerged in late 20th century the paradigm is today more actual than ever. It is enough to go online and find the range of manufactured goods that can be customized on one way or another.

Mass customizers can customize products quickly for individual customers or for niche markets, in some cases responding to customer orders at greater speeds than mass producer can. Using the same principles, mass customizers can Build-to-Order both customized products and standard products without forecasts, inventory, or purchasing delays. [2]

The work in this paper is based on the assumption that the mass customizer companies are derived from the ranks of craft producers belonging to SME's as well as large mass production companies. Approaches for creating mass customizers from these different starting points are not the same. The papers and the available literature has mainly devoted it's attention to how to create a mass customization manufacturer from mass-production company.

Multinational companies, as Dell Computers have succeeded in adopting mass customization strategy. But this is the company with "unlimited" resources in workforce, technology and capital, from the standpoint of small company.

From this point of view Dell Computers and big car manufacturers are simply light years away. The questions emerging from this issue are:

- Are mass customizers mainly coming from the ranks of mass production companies?
- What is the path taken by the mass producer to become a mass customizer?
- What is the path taken by craft producer to become a mass customizer?
- What is the difference between a mass customizer and a craft customizer?
- When is the SME company ready to undertake the mission of becoming the mass customizer?

## 2. SME's in Europe

In order to analyze SME's from the angle of mass customization we must determine the scope of these companies and what do we mean when we say small or medium company. There are different approaches to defining what are small and what medium enterprises are. Almost every country in Europe has its own definition. However there are recommendations from the European Commission used to determine the size of the company. By these recommendations [3] there is also a subcategory of small companies called micro enterprises consisting of 10 or less employees – Table 1.

Enterprises qualify as micro, small and medium-sized enterprises (SMEs) if they fulfill the criteria laid down in the Recommendation which are summarized in the table below. In addition to the staff headcount ceiling, an enterprise qualifies as an SME if it meets either the turnover ceiling or the balance sheet ceiling, but not necessarily both.

**Table 1** Classification of micro, small and medium enterprises as given in recommendations of EU Commission [3]

Enterprise category	Headcount	Turnover	or	Balance sheet total
medium-sized	< 250	≤ € 50 million		≤ € 43 million
small	< 50	≤ € 10 million		≤ € 10 million
micro	< 10	≤ € 2 million		≤ € 2 million

However this is not the only criteria relevant to the company's classification, let alone the one being enough to show us the road which we are to follow in order to embrace mass customization strategy in our company. The branch of the industry, the type of products manufactured, the characteristics and qualifications of the work force, material flows, the level of the automation in company, the level of informatics integration, using of push or pull principle in the production etc. are factors relevant to "moving towards mass customization" approach. The implications of these factors will be discussed further in the paper.

## 3. Mass Customization against Craft Customization

Mass customization is bringing together effectiveness of mass production and individualization of craft production into one paradigm – Fig. 1.



**Figure 1** The development of emerging market of mass customization [4]

Evolution of production companies since the beginning of production can be summarized in only a few resulting paradigms in whole human history [5]:

- Craft production – peak in late 19<sup>th</sup> century
- Mass production – peak in middle of 20<sup>th</sup> century (around 1955.)
- Mass customization – active paradigm from 80's
- Global production – with Personalization and Regionalized production as sub categories

We can also argue that personalized production is nothing more than further development of mass customization and going all the way with fulfilling customer desires and needs offering more and more involvement of customer in the design process.

The development of paradigms would not be possible without the development of manufacturing and technology systems capable of producing the demanded products. In that sense we can say there are dedicated manufacturing lines, flexible manufacturing systems, reconfigurable manufacturing systems and general purpose machine tools. Every one of these manufacturing systems can be found adequate for one or other manufacturing paradigms, more suitable for one then for another.

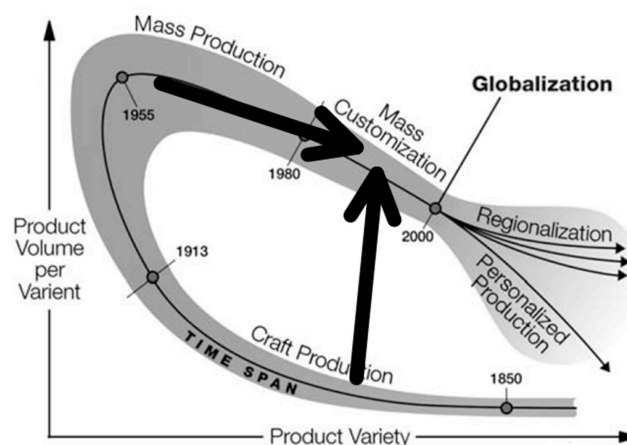
However, in the terms of customization we can distinguish craft customization from mass customization, although the difference may not be always so evident at first glance.

The only difference between craft production and craft customization is the awareness of craft customizer in meeting the customer needs and many times the existence of configurator tool in one of the possible forms. The level of technology systems is the same as in craft production - general purpose machine tools. Also company dealing with customizing is in most cases the company eager to become a mass customizer and implement the economy of scale increasing it's production output.

#### 4. Becoming a Mass Customizer

The development of mass customization markets has its roots in the beginning of mass production in the first half of the 20<sup>th</sup> century. The development of paradigm has taken the markets from craft production, trough mass production all the way to mass customization and globalized production of the future markets [5].

Today there are two ways of mass customization company to emerge – Fig. 2. The first is to come from the ranks of mass producers implementing mass customization paradigm, and the other is coming form the ranks of craft producers or craft customizers.



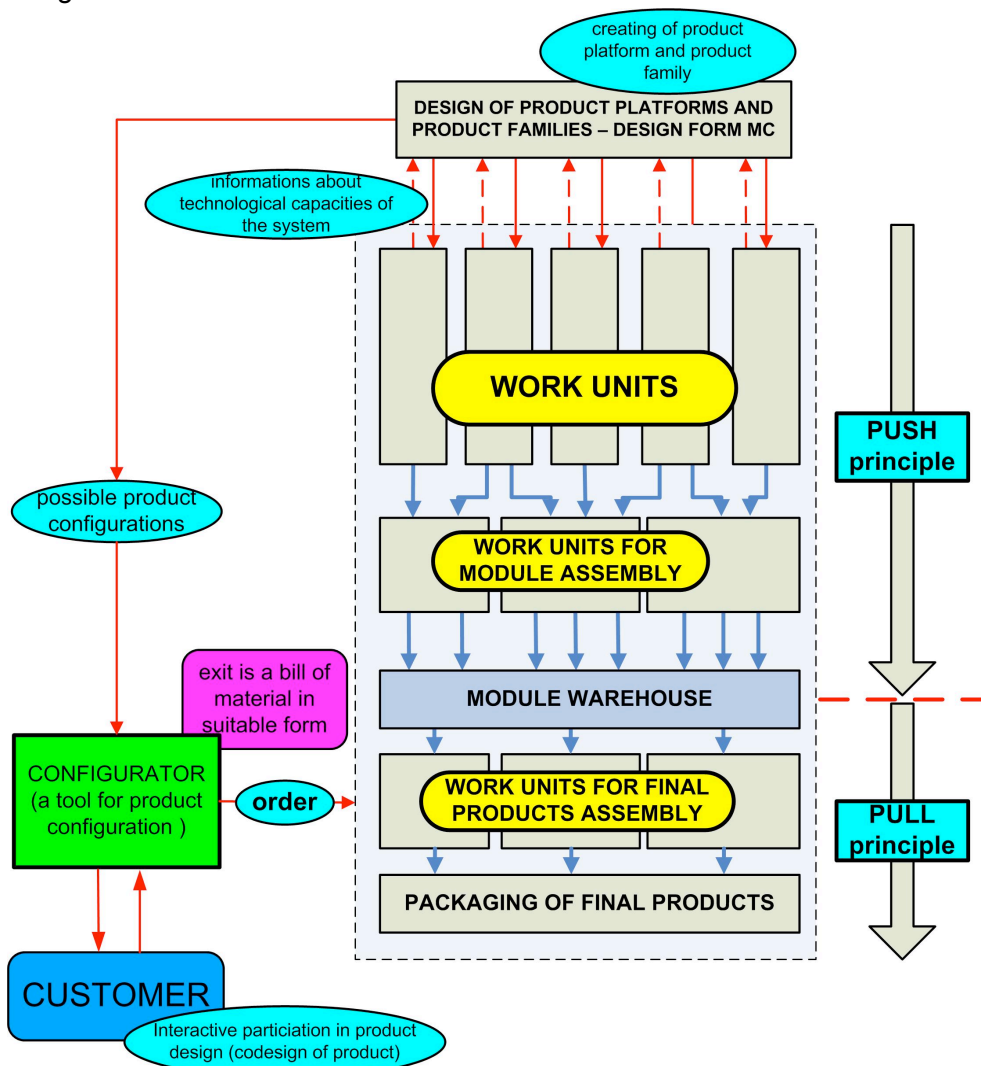
**Figure 2** Development of production systems trough time [5] and ways for mass customizer to emerge

Mass producer will not expect the same results as the craft producer or craft customizer when implementing mass customization strategy. Their starting points and expectations will be completely different.

#### 4.1 Implementation Strategy for Mass Producing Company

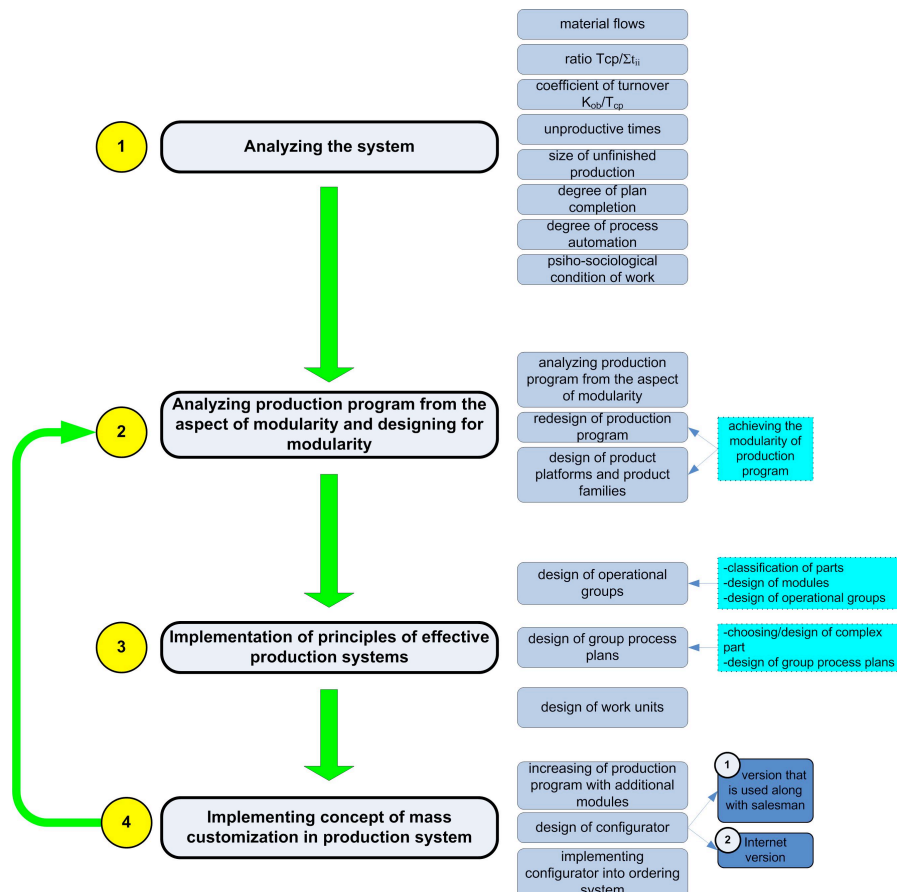
Mass producer is accustomed to economy of scale. He can produce a large quantities of products in a relatively short time. On the other hand he lacks the variety level of a craft producer, craft customizer and mass customizer.

In establishing mass customized production mass producer will be headed for the model similar to the one shown on the Fig. 3. The model is based on PUSH-PULL principle of production and assumes the use of product configurator as a tool. The one shown is based on work cells (work units) and product platforms and product families as the basis for the product design.



**Figure 3** Model of production system built on basis of work cells oriented on mass customization market [6]

According to the model on Fig. 3 the implementation of the mass customization strategy into the mass producing system could be as shown in Fig. 4. The steps given would take mass producing company into the mass customizing market.



**Figure 4** Model for implementing mass customization into production system [7]

On the other hand these steps would not be suitable for a smaller company. So there is a need to develop a methodology for implementation of MC strategy into the SME companies.

#### 4.2 Implementation Strategy for Craft Customizer

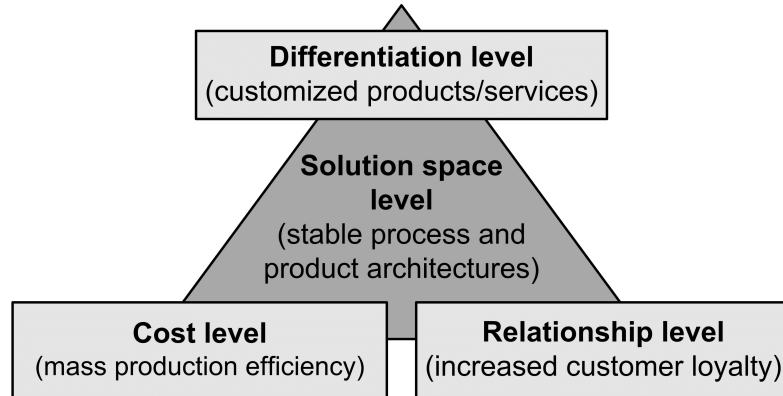
The question is: Is the mass producer equal to large company? Is mass producer always coming from the ranks of large companies or it can be a small and medium enterprise?

The branch of the industry, the type of products manufactured, the characteristics and qualifications of the work force, material flows, the level of the automation in company, the level of informatics integration, using of push or pull principle in the production – these are all characteristics of the company that should be taken into account.

What do SME's need to do if they want to become mass customizers? Some of the next steps could be taken:

- Development of product configurator that can be:
- sales configurator
- back end configurator - which is used with the mediation of an expert
- Increased automation – in the phases where it is purposeful
- Dealing with solution space (Fig. 5)– defining the production programme that can be successfully produced with existing production equipment
- Increase in production volume - introducing new technologies in manufacturing and organization of production
- Replacing particular technology systems with CNC systems
- Introduction of IT systems for the successful management of data - PDM or PLM

- Developing of product platform and product families

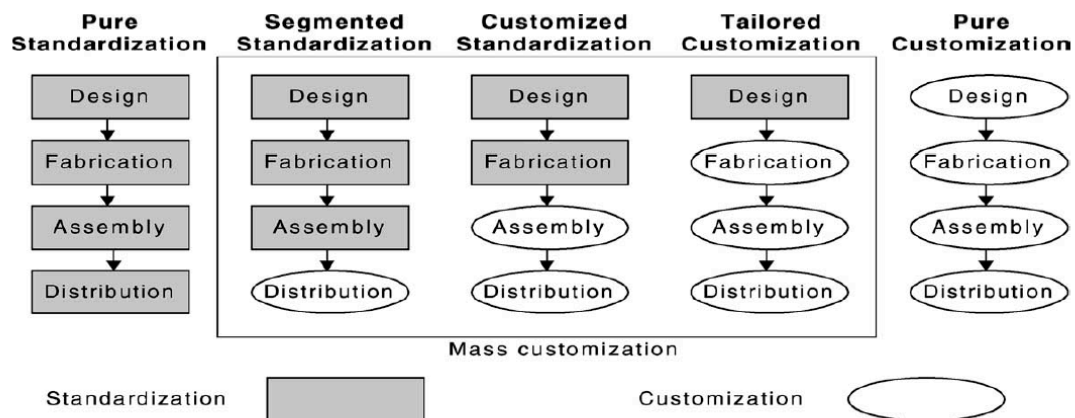


**Figure 5** The four levels of mass customization [8]

Either way the steps should be synchronized with current position of the company. In that sense the step of precisely defining the starting point of the company becomes crucial.

The size and the lack of power is often seen as a main disadvantage of SMEs who are trying to offer mass customized products to customers.

The company dealing with craft customization can permit her self to have maybe not so well defined solution space since the quantities of products are smaller than the ones in mass production and can be dealt with in mainly hand craft production. The mass customizer is not in that position. Mass customizer must be careful with solution space since it will affect the production process if it is not well solved. The mass customizer simply does not have the luxury of wrong determining the solution space. It could prove to be a fatal mistake if made. So the mass customizer must get his full attention on determining of customer order decoupling point (CODP) – Fig. 6.



**Figure 6** Division of products into groups based on the point of customization [9]

So what is the potential of SME's to implement the MC production. To answer this question we must be clear on these dilemmas:

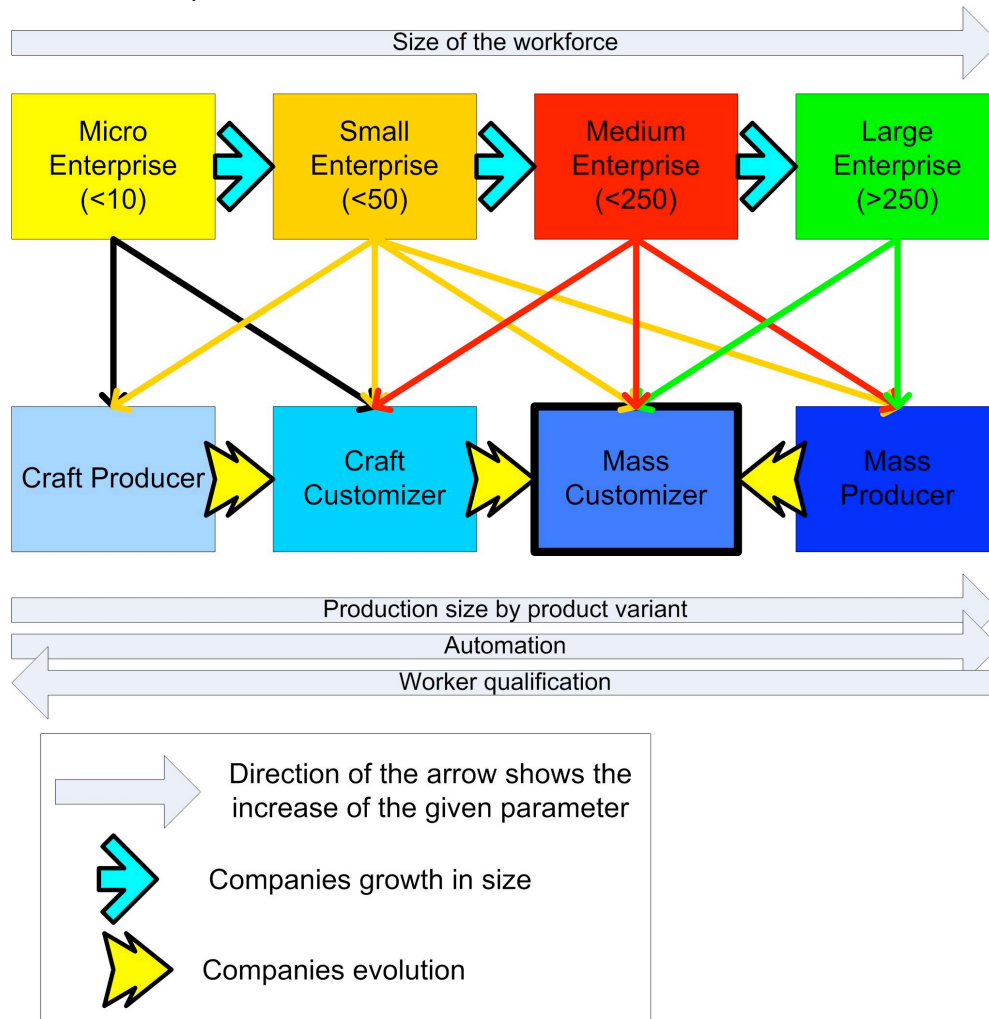
- Is the firm size crucial for implementation?
- How does the product portfolio affect the ability to transfer to mass customization?
- Is there a potential for implementation of the product platform and product families?
- How hard is introducing an information system that will support the configuration of the product?
- Can production system be easily translated to PUSH-PUL principle?
- Is the PDM systems needed to engage in this type of production? ...



Questions of this type can go on and on. But in some point of time the enterprise must be able to answer to the ones relevant for their road to implementation.

The truth is that many of small companies who started their business in customization failed [10], but the failing may be the consequence of the market not being ready for the customized products of the kind the company offers.

The Fig. 7 shows the size of the production systems in relevance to the type of the production being done. Every size of the enterprise is able to undertake at least two types of production. Which of them will depend of the enterprise target market and technological factors relevant to the production?



**Figure 7** Size of the enterprises and the type of the production

## 5. Conclusions and Future Research

In the conclusion of the paper we can say that:

- SME companies can fit into the MC paradigm,
- SME companies will use different tools to become a MC manufacturer than large firms,
- SME's and large companies do not play on the same competitive advantages in the MC strategy,
- It is possible to identify sets of tools to create an mass customization manufacturer from SME company,

- It is possible to identify (create) a model strategy for the adoption of MC by SME enterprises,
- Sets of tools SME companies use to achieve the position of MC vary depending on the specific size of company and industries in which the company is.

The future research will be based upon:

- Determining all the criteria for classification of SME's and LE upon the parameters relevant for mass customization production,
- Determining the basic parameters who will give us the road of implementing the mass customization in SME's depending of their starting point,
- Conducting empirical studies in this field of research,
- Determining the model for implementation of mass customization strategy in small and medium enterprise.

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# **Comparative Analysis of the Innovation Capacities in the WBC with Emphasis on Joint Cooperation Needs in the Field of Innovation**

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**The paper presents the comparative analysis of the innovation systems of the Western Balkan Countries (WBC) with a special stress on the needs for better regional innovation and science-industry cooperation in order to support the design of the innovation strategy of the region. The final aim is to encourage a new growth paradigm in WBC based on knowledge and innovation.**

## **Keywords**

Innovation capacities, Innovation systems, Comparison, Cooperation, Western Balkan Countries

## **1. Introduction**

The last enlargement of the EU by two new members Bulgaria and Romania shifted the focus of the European Union from Southeast Europe towards the Western Balkan Countries (WBC) as the area where future integration is expected. WBCs which include Albania, Croatia, Kosovo UN Res.1244, Serbia, FYR Macedonia, Bosnia and Herzegovina, and Montenegro are European Union (EU) neighbouring countries and potentially important partners for EU in trade, investments, exchange of experts, etc. At the same time much of the Balkans lags behind the rest of the EU in technology and innovation development (Sanfey, 2011)<sup>1</sup> and WBC will need many decades to catch up with the EU average. That certainly calls, after two decades of transition to market economy, for application of the new growth models based on innovation and research. One of the possibility to foster innovation in the Balkan region is to initiate the common innovation strategy and to foster the concept of the regional innovation system (RIS)<sup>2</sup>.

In order to provide a background analysis for a common innovation strategy the analysis of the innovation capacities of the WBC with a special stress on the need for regional innovation cooperation as well as for science-industry cooperation is carried out within the WBC-INCO.NET project. The project is financed by the European Commission within FP7 and includes 26 partners from 16 countries. The project is coordinated by the Centre for Social Innovation, Vienna, Austria.

## **2. The Comparative analysis of NISs in the WBC**

### **2.1 Methodology**

In order to carry out the comparative analysis of the innovation capacities and joint cooperation needs of the WBC in the area of innovation several methodological and analytical approaches have been employed, as follows: desk research, survey of innovation

needs based on two on-line questionnaire targeted at entrepreneurs and researchers, analysis of the innovation infrastructure carried out by national experts and mapping of the innovation infrastructure. Since the response rate on the on-line questionnaires was rather low (79 researchers and 20 entrepreneurs) the results based on this survey are more indicative than conclusive. Yet, this is a first attempt of this kind of research in WBC. The surveys on innovation needs were performed from April to May 2011.

## ***2.2 The comparative analysis of the national innovation systems***

This comparative analysis of the national innovation systems (NIS) includes the examination of four components:

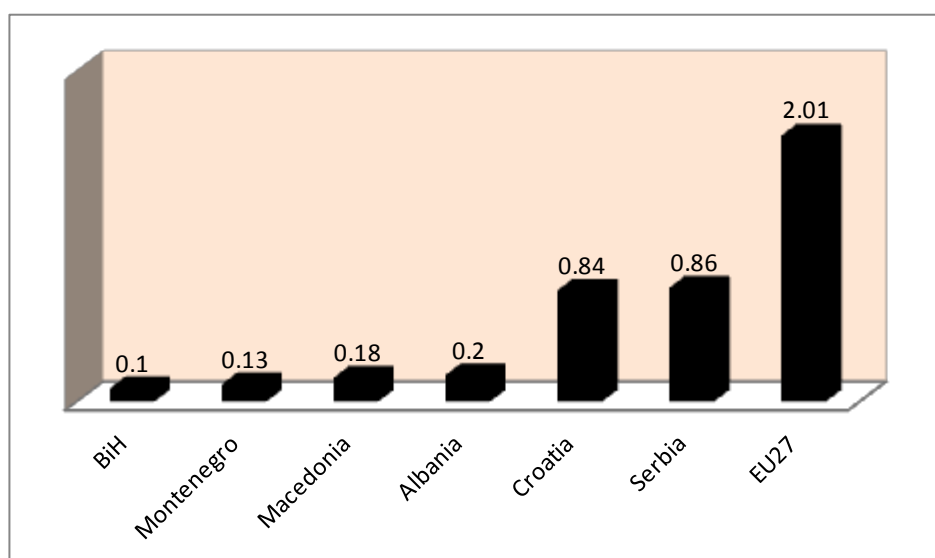
- Governance of innovation and research systems;
- Research capacities;
- Innovation system and policy programmes for non-research driven innovation including institutional set up for fostering entrepreneurship;
- Innovation system and policy programmes for research-driven innovation and intermediary institutions including the development of specialized innovation sub-systems.

The analyses revealed that the governance of innovation and research in the WBC are highly centralised “top-down” systems coordinated by the line ministries, primarily ministries of science and education and ministries of economy. This governance model is typical for less developed countries and technological followers that suffer a lack of market forces that drive technological development by “invisible hand” of business interests. There is a strong “division of labour” within these two leading ministries that points to the gap of knowledge producers and knowledge users.

All the WBCs, except Kosovo UN Res.1244, have the strategic documents related to research policies in place. The main difficulties with the strategic documents in many WBC countries are related to the:

- large number of strategic documents in different areas with a low-level of implementation;
- “Europeanization” of innovation and research policies far away from the local problems and circumstances, i.e. strategic documents presents only a copy the European schemes and approaches while lacking down-to-earth analysis of national capacities.

Comparative analysis of the research capacities revealed that research systems of WBC significantly differ. For example, research system in Kosovo UN Res.1244, are in the phase of infancy (e.g. the Government of Kosovo UN Res.1244, has devoted €1m for research for public institutions in 2010 for the first time) while Croatia is faced with various reforms of rather mature and inert higher education and research sectors towards greater efficiency and business needs. The most developed research and higher education systems are established in Croatia and Serbia which developed rather complex institutional set up for research and education as well as strategic policy documents and supporting programme. Although their gross domestic expenditures for research and development as a percentage of GDP (GERD) (Figure 1) are the highest among WBC, it is still significantly lower than in the European Union.



**Figure 1** WBC by GERD in 2009 or closest

The institutional set-up for non-research based innovation including the policy programmes for entrepreneurship is the most advanced part of the innovation systems of WBC. This is mainly due to the European Charter for Small Enterprises which was adopted by the WBC in 2003. The comprehensive monitoring process of the implementation of the Charter made the WBC to have in place, as of 2010, the basic legal and regulatory frameworks necessary for entrepreneurship and business development. Some countries like Croatia developed very complex entrepreneurship supporting infrastructures (more than 200 facilities). According to the Mapping of the WBC Innovation infrastructures<sup>3</sup> the most spread innovation facilities are business incubators and business clusters, followed by innovation and technology centres.

The innovation capacities for research-driven innovation that involve supporting programmes for science-industry cooperation and for commercialisation of research results are the least developed part of the NISs in WBC. Only Croatia developed specialised institutions (Business Innovation Agency – BICRO; Croatian Institute for Technology - HIT) and programmes (e.g. Proof of Concept, Knowledge-based companies, Technology projects, etc.) for innovation development. Serbia carries out individual programmes like the very successful “Competition for the Best Technological Innovation in Serbia” at the University of Novi Sad. The innovation instruments in other countries are mainly reduced to establishing of the intermediary institutions like innovation/technology centres (all WBC) and technology/science parks (recorded in all WBC except Albania and Montenegro). Unfortunately, there is a lack of evidence about the achievements of these institutions.

A few countries, e.g. Croatia and Montenegro launched fiscal (tax) incentives for fostering research in companies. Programme for development of venture capital is initiated only in Croatia. Technology foresight exercise is not applied in any country.

The comparative analysis of the main components of NIS (Table 1) distinguishes tentatively three groups of countries in terms of performance of innovation systems. Croatia and Serbia belong to first group which develops a complex innovation systems, yet not fully functional in all parts. Their role and activities will be crucial for the development of regional cooperation within the WB region. Bosnia and Herzegovina (B&H), FYR Macedonia and Montenegro form the second group of countries which are lagging behind the leading countries. They are rather familiar with the development of some component of NIS (e.g. research systems) but they are beginners (or moderate) in other components especially those related to science-industry cooperation. The third group of countries are small and geographically isolated

economies (Albania and Kosovo UN Res.1244) whose innovation systems are in the beginning phase (Albania) or infancy (Kosovo UN Res.1244).

**Table 1** Tentative categorization of WBC by the maturity of innovation infrastructure and programmes

		Research system	Entrepreneurship and SMES	Research innovations based	
		Programmes	Institutions	Programmes	Institutions
Croatia	Complex	Complex	Complex	Complex	Complex
Serbia	Complex	Complex	Complex	Moderate	Moderate
FYR Macedonia	Familiar	Moderate	Familiar	Beginner	Moderate
B&H	Moderate	Familiar	Familiar	Beginner	Moderate
Montenegro	Familiar	Beginner	Moderate	Beginner	Beginner
Albania	Beginner	Beginner	Beginner	Beginner	Beginner
Kosovo UN Res.1244	Infancy	Infancy	Infancy	Infancy	Infancy

Due to the different level of development of NISs in WBC the different measures or specific policy mix should be put in place. For example, in Kosovo UN Res.1244 and Albania important measures should be directed towards setting up the research system while in Serbia and Croatia the reforms of research and higher education systems are needed in terms of achieving both scientific excellence (international recognition) and involvement of research/education sectors in local and national economy. However, WBC shares many common problems in research sector such as low participation in the European Framework Programmes<sup>4</sup>, lack of quality assurance system in research and development and higher education, low mobility of researchers, obsolete scientific equipment, etc.

### 3. The Analysis of Joint Cooperation Needs for Better Innovation and Science-Industry Cooperation

This analysis is based on on-line questionnaires targeted at entrepreneurs and researchers. The latter were asked about their opinion for two periods: the present and the future in 2030. Among other results, the analysis revealed that the two most important actions for fostering science-industry cooperation, for both researchers and entrepreneurs, are (Table 2):

- More funding for collaborative research between universities and businesses;
- More funding for knowledge/technology transfer activities and expert consultations.

**Table 2** The most important factors for science-industry cooperation

	<b>Companies</b>	<b>Researchers - Today</b>	<b>Researchers in 2030</b>
<b>More funding for collaborative research between universities and businesses</b>	1	1	2
<b>More funding for knowledge/technology transfer and expert consultations</b>	2	2	1
<b>Greater understanding by researchers of the needs of business companies and industry</b>	3	6	8
<b>Development of local partnership/inclusion of universities in clusters or business associations</b>	4	9	9
<b>Greater understanding by researchers of intellectual property rights (IPR) and its implications</b>	5	6	10
<b>Easy access to professional technology transfer officers (or similar staff)</b>	7	11	6
<b>Establishing of university incubators or science parks</b>	8	10	9
<b>Financial incentives for university staff which cooperate with companies</b>	9	8	11
<b>Better mobility (exchange) of researchers between universities and industry</b>	10	5	5
<b>Organization of specialized training courses by universities for the needs of industrial sectors and companies</b>	11	4	4
<b>Creation of specialised large-scale programmes for cooperation of companies and research institutions (e.g. technology platforms)</b>	12	7	7
<b>Introduction of regular business/technical advising services at universities for the needs of businesses</b>	13	3	3

It is important to notice that entrepreneurs, unlike researchers, think that the biggest obstacle to science-industry cooperation is the lack of understanding of researches of the needs of businesses. It points to the communication barriers between entrepreneurs and scientists, lack of understanding of each other needs. It demands establishing of different forms of dialog and communication channels among these two spheres.

When comparing the answers given by companies and those given by researchers on the most important actions for improving regional innovation cooperation, they seem to differ substantially (Table 3). The three actions least important for companies are among the four most important for researchers. They include:

- Common programmes for mobility of personnel in the region between universities and business to establish cooperation between science and industry;
- Consistent legal framework aimed at facilitating foreign direct investments in the WB region;
- Progressive liberalisation and mutual opening of the service market within the WB region.

By contrast, companies prefer funding and financial support for improving regional innovation cooperation. The establishing of the regional venture capital fund which is perceived by the companies as the most critical factor for improving regional innovation activities is next to the least important factors for researchers. The similar is with the “Creation of regional financing programme for innovation” which is ranked second by the companies and four (sixth in the future) by researchers. However, both the parties recognized the need for large infrastructural programmes as the driver of regional innovation cooperation (ranked 3rd).

**Table 3** Importance of regional innovation actions for improving regional innovation cooperation

	Companies	Researchers - today	Researchers in 2030
Establishing regional venture capital fund	1	6	11
Creating a regional financing programme for innovation	2	4	6
Developing regional initiatives for large infrastructural projects	3	8	3
Common large scale technology programmes	4	12	9
Joint regional approach towards international funding institutions (WB, EU)	5	10	7
Harmonisation and opening of the government's procurements markets	6	5	5
Strengthening regional innovation clusters in selected sectors	7	11	12
Common apprentice (trainee) programmes of young experts	8	7	10
Common educational programmes for technical skills, innovation management,	9	9	8
Common programmes for mobility of personnel in the region between	10	3	1
Consistent legal framework aimed at facilitating foreign direct investments in the	10	1	2
Opening and liberalisation of the service market within the WB region	12	2	4

## 4. Conclusions

The analyses reveal that WBC differs significantly in overall development and related innovation capacities (e.g. there is almost a six-fold difference in per-capita income between the richest and poorest country in the region) as well as in performance of the national innovation systems (NIS) and governance abilities to advance innovation competences.

Despite the differences, WBC share many similarities that provide a platform for mutual cooperation and possible development of the regional innovation system. One of the most substantial similarities is a nature of their competitive advantages which refers to non-research based innovation and technology efforts that include absorption of foreign technologies and mastery of production capability. Science and research is a residual of their



present economic models and not a vital element of development. It calls for policy measures and instruments for strengthening innovation capacities at national and regional level and productive use of research and education.

Due to the different level of development of NIS in WBC the different measures and policy mix should be put in place. For example, in Kosovo UN Res.1244 important measures should be directed towards setting up the research system while in Serbia and Croatia the reforms of research system are needed in order to achieve scientific excellence and involvement of research sector in national economy.

The survey-based studies on regional innovation needs reveals that entrepreneurs and researchers recognised two factors as the most important for fostering science-industry cooperation:

- More funding for collaborative research between universities and businesses;
- More funding for knowledge/technology transfer activities and expert consultations.

In addition, two factors are recognised as the most important for fostering regional cooperation:

- Removing the state and local administrative burdens and procedures for regional cooperation;
- Improvement of expert assistance and cooperation with universities which include enhancement of the overall quality of science-industry cooperation in the region and strengthening the interest of both companies and universities for mutual cooperation.

The concrete joint actions to be taken for better regional innovation cooperation perceived by entrepreneurs include:

- Establishing of the regional venture capital fund;
- Regional financing programme for innovation.

In contrast, researchers perceived the following joint action:

- Mobility of personnel among sectors;
- Legal framework for fostering direct foreign investments (FDI);
- Opening and liberalisation of service market (probably for R&D services).

Despite the above differences, both parties recognised the lack of infrastructural projects for fostering regional innovation cooperation. It calls for identifying and creating infrastructural projects that are sufficiently large and capital intensive to involve several if not all countries in the region like ICT, transportations, energy resources, clean technologies, etc.

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# **The Knowledge Economy: Some implications for the Republic of Bulgaria**

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The paper will review the innovation ecosystem and identify the main drivers and barriers of the knowledge economy. Using UNESCO Science Report 2010 and the World Bank's World Development Indicators (WDI) 2011, the paper will present various Science, Technology and Innovation (STI) Indicators for selected countries, including the Republic of Bulgaria. Sources of financing Research and Development (R&D) will be highlighted, including the role of public and private sectors. The paper will highlight the importance of creating business enabling environment, including transparent regulations as well as entrepreneurship and venture capital to commercialize proven technology. "Ease of Doing Business" Indicators for selected countries, including the Republic of Bulgaria, using the World Bank/IFC Doing Business 2012 Report will be reviewed. The paper will emphasize that given the right enabling environment; STI will enable countries to embark on knowledge based-development leading to higher economic growth path. The paper will make some recommendations and suggestions for the consideration of policymakers in the Republic of Bulgaria (Bulgaria).

## **Keywords**

Commercialization, Ease of Doing Business, Innovation Ecosystem, Knowledge-based Development, Science, Technology and Innovation (STI) Indicators

## **1. Introduction**

Many countries are experiencing knowledge-based development and achieving high rates of economic growth by building up their national Science, Technology and Innovation (STI) capacity and implementing STI strategies. In Korea the government has established in 2008 a Ministry for Knowledge Economy and other countries have articulated explicit knowledge-based development strategies. The emergence of Information Communication Technology (ICT), Biotechnology, Nanotechnology and High-Technology provide great opportunities for small and large countries to attain knowledge-based economies. The Republic of Bulgaria (Bulgaria) has a current National Innovation Strategy to support knowledge-based development and compete in the 21<sup>st</sup> Century.

## **2. The Innovation Ecosystem**

There are many definitions of innovation. Innovation is commonly described as "Creating value by doing things differently; or doing something in a novel way", simply it is a good idea put to work<sup>62</sup>. The National Science Foundation (NSF) relates innovation to the conversion of ideas to useful products and services. "Moving from an idea or discovery to a product, process or service on the market involves different contributors and requires resources from

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<sup>62</sup> Terry Culter – Venturous Australia, 2008

various sources”<sup>63</sup>. Academic researchers, private sector scientists and researchers, entrepreneurs, investors, policymakers and other constituents have a role to play in the innovation ecosystem. “The introduction of new or significantly improved products (goods or services) processes, organizational methods, and marketing methods in internal business practices or marketplace”.

The innovation ecosystem requires a holistic approach, which brings together entrepreneurs, policymakers, research institutions and provides access to appropriate infrastructure and financial services to commercialize new ideas and technologies leading to economic growth and knowledge-based development. Innovation is an economic act. To create new product, service or process is only beneficial if there is adequate demand. Researchers and entrepreneurs operate according to different culture and institutional logics; the innovation ecosystem brings them together in clusters, networks and regions resulting in innovation-based economy.

While funding Research and Development (R&D) is a significant contributor to technological innovation, it is not the only factor that affects the success of the innovation ecosystem. Some have pointed out that many innovative companies do not engage in any R&D and they create value through both technological and non-technological changes<sup>64</sup>. Knowledge-based intangibles such as Information, Communication, Technology (ICT), skills and competencies, computerized information, software, data bases, engineering designs and new products for financial & banking sectors and system solutions are important components of the innovation ecosystem. The work Foundation<sup>65</sup> coined the term “manu-services” to describe a broad group of activities that involve manufactured goods with services. A great deal of innovation involves “manu-services”.

Financing R&D, building state-of-the-art science park, and giving industry a tax break are not sufficient to innovate. Connecting scientist and entrepreneurs and creating networks are essential for innovation. The importance of having strong R&D institutions, an industrial base, a pool of skills and competences, a strong physical and cyber infrastructure, and a business-friendly regulatory framework are essential for the innovation ecosystem. Innovation requires removing barriers between organizations and individuals as well as increasing collaboration across disciplines and sectors. It also requires a culture which supports taking risks, tolerate failures and celebrate success<sup>66</sup>. Some have argued that “the experience of failure is more valuable, because it teaches the champions when best to cut their losses. Thus even failed enterprises bring valuable lessons and experience into the culture of the ecosystem”<sup>67</sup>.

2.5 Innovation ecosystems are based on successful examples of agglomeration whether in geographic, economic, industrial or entrepreneurial terms. For example, successful regions (Silicon Valley, Bangalore), successful ICT platforms (iphone, Android) or new industries (Cloud Computing). These are good models for creating robust networks and fostering an environment that facilitates interaction among individuals from different disciplines and sectors.

### 3. Main Drivers and Barriers of Knowledge Economy

The main drivers for knowledge-based economy include investments in: (i) Education, at all levels, (ii) R&D, including capacity building and collaborative research, (iii) Entrepreneurship, (iv) Venture capital, (v) Science parks and business incubators, and (vi) Commercialization of proven technology. These investments will not yield the desired results unless there exists:

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<sup>63</sup> National Science Foundation – *Science and Engineering Indicators*, 2010

<sup>64</sup> OECD – *The OECD Innovation Strategy: Getting a Head Start on Tomorrow*, 2010

<sup>65</sup> Andrew Sissons, *More than Making things – A new future for manufacturing in a service economy*: A Knowledge Economy programme report, the Work Foundation, March 2011

<sup>66</sup> The New York Academy of Science, *How to Build an Innovation Ecosystem*, April 2011

<sup>67</sup> Deborah J. Jackson, *What is an Innovation Ecosystem?* National Science Foundation, 2010

(a) An overall macroeconomic framework with continues structural reform, (b) Business friendly environment including transparent regulations to encourage private sector development, and (c) Minimum administrative barriers to facilitate the ease of doing business. These are important factors to encourage private sector investments including Foreign Direct Investments (FDI), resulting in technology transfers, spillover effects and leading to knowledge-based development.

A Rand Corporation Study<sup>68</sup> identified the drivers and barriers that countries face to acquire and commercialize new technologies. A country's science and technology capacity is only one of several factors that enable a country to implement and commercialize a technology application. The drivers facilitate innovation and the barriers hinder innovation. The study indicates that "Drivers and barriers involve the same dimensions: a dimension that is a driver in one context may be a barrier in another. For example, financing, when available, would be a driver, but financing, when lacking, is a barrier". The study identified the major drivers and barriers that countries may face including: (i) Cost and financing, (ii) Laws and policies, (iii) Social values, public opinion and politics, (iv) Infrastructure, (v) Use of resources and environmental health, (vi) R&D investment, (vii) Education and Literacy, (viii) Population and demographics, and (ix) Governance.

Many challenges are facing Bulgaria and other countries to minimize the barriers and boost the drivers to knowledge-based economy. Some of these challenges will be examined in the following sections.

## 4. Key STI Indicators

Various indicators are used to monitor and measure STI. These indicators include: (i) Research and Development (R&D) Expenditures as Percentage of GDP, (ii) Number of Researchers in R&D per Million People, (iii) R&D Expenditures per Researcher, (iv) High-Technology Exports as Percentage of Manufactured Exports, (v) Number of Scientific and Technical Journal Articles, and (vi) Number of Patents Applications filed by Residents and Non-residents. This section reviews some of these indicators for selected countries, with special focus on Bulgaria.

**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 Scientific &amp; Engineering Journal Articles</b>	<b>Number of Patents filed by Residents</b>
Israel	4.86*	NA	15	6,623	1,387
Sweden	3.75	5,239	14	9,914	2,549
Finland	3.46	7,382*	11	4,989	1,806
Korea, Rep.	3.21	4,627	29	18,467	127,316
USA	2.82	4,663	21	209,695*	224,912
Austria	2.66	3,774	11	4,825	2,263
Singapore	2.52	6,088	50*	3,792	750
Slovenia	1.66	3,490	5	1,280	373
China	1.44	1,071	28	56,806	229,096*

<sup>68</sup>Rand Corporation, National Security Research Division - "The Global Technology Revolution 2020", 2006.

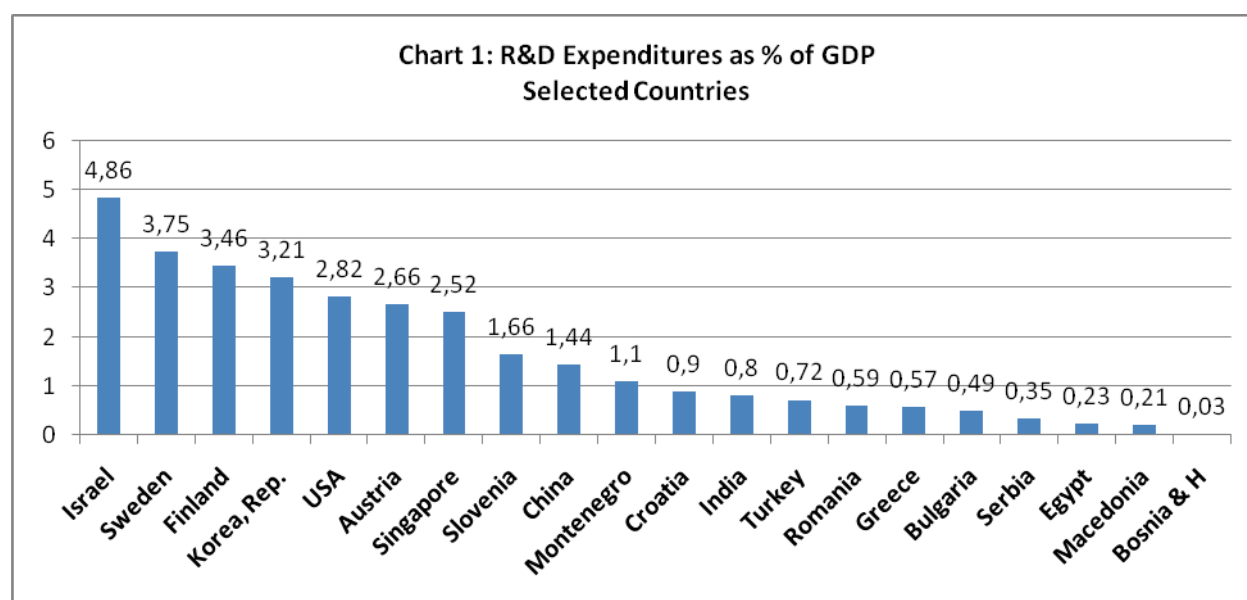
Montenegro	1.10	NA	NA	15	NA
Croatia		1,384	9	1,102	250
India	0.80	137	7	18,194	5,314
Turkey	0.72	724	2	8,638	2,555
Romania	0.59	908	11	1,252	1,054
Greece	0.57	1,873	11	4,980	698
Bulgaria	0.49	1,499	8	801	242
Serbia	0.35	1,196	NA	1,057	319
Egypt	0.23	617	1	1,934	490
Macedonia	0.21	521	3	58	34
Bosnia & H	0.03	197	3	54	59

Source: World Bank – World Development Indicators (WDI) 2011. All data are for 2009 or 2008. If data is not available for these years; the most recent data from previous years are used. High-Technology Exports data is for 2010, except for Korea & Macedonia which is for 2009.

\*Highest score for each indicator.

In addition to the above indicators, 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 and number of smart phones and tablets per 1000 people, etc.

R&D Expenditures as Percentage of GDP: Chart 1 shows these percentages for selected countries. The World average was 2.07% in 2007, the European Union (1.75%) in 2008, the Euro area (1.68%) in the same year and OECD countries (2.29%) in 2008<sup>69</sup>. This is compared with a modest ratio in 2008 for Bulgaria (0.49%) compared with Slovenia (1.66), Croatia (0.90), Turkey (0.72), Romania (0.59) and Macedonia (0.21%).



**Figure 1** R&D Expenditure as % of GDP Selected countries

<sup>69</sup> World Bank – World Development Indicators (WDI) 2011

Source: World Bank – World Development Indicators (WDI) 2011

All data are for 2009 or 2008. If data is not available for these years; the most recent data from previous years are used.

R&D expenditures as % of GDP indicator include 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 R&D expenditures include very large amounts (about 85% – 90%) for salaries of researchers and technicians; which leave little funds for purchasing scientific research equipments, materials for conducting research and capacity building, training and networking (conferences, seminars and workshops) for researchers and scientists.

Researchers in R&D 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.

High-Technology Exports as % of Manufactured Exports: The World average was 18% in 2010, while East Asia & Pacific was the highest region in the World recording 29% in the same year and the Arab World was the lowest where only 1% of manufactured exports were high-technology products in 2010. The European Union and the Euro area recorded 15% each in 2010 and OECD Countries (16%).<sup>70</sup> Bulgaria manufactured exports only included 8%, in 2010, as high technology exports, compared with Greece (11%), Romania (11%), Croatia (9%) and Macedonia (3%) in 2009. The higher the ratio of high-technology exports to manufacturing exports the more likely a country is moving toward a diversified and knowledge based-economy.

Scientific and Engineering Journal Articles: While the number of published articles is important, what is more important is how many of these articles/papers are patented and eventually commercialized. Commercialization of research outputs is the “acid test” for moving a country towards a knowledge-based economy.

Number of Patents Filed by Residents: Scientists and researchers should be encouraged to register patents, but it is more important to commercialize patents and proven technologies. Countries should create the enabling environment for researchers and inventors to commercialize their patents and innovative ideas. Building up the STI capacities and management capabilities of entrepreneurs through training, incubators, science and technology parks, availability of finance, including venture capital, and a friendly and transparent business environment as well as reducing the cost of doing business are necessary and essential elements of commercialization.

## 5. Trends of R&D Expenditures in Selected Countries

This section presents and analyzes trends of R&D expenditures as percentage of GDP for selected countries. Table 2 shows R&D Expenditures as % of GDP for selected countries, including Bulgaria, from 2000 to 2008.

**Table 2** Trends of R&D Expenditures as % of GDP in Selected Countries\* 2000 – 2008

Percent of GDP

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Israel	4.32	4.6	4.59	4.32	4.26	4.37	4.42	4.76	4.86
Sweden	3.61	4.17	-	3.85	3.62	3.60	3.74	3.61	3.75
Finland	3.35	3.3	3.36	3.43	3.45	3.48	3.45	3.47	3.46
Korea, Rep.	2.3	2.47	2.4	2.49	2.28	2.79	2.01	3.21	

<sup>70</sup> World Bank – World Development Indicators (WDI) 2011

USA	2.75	2.76	2.66	2.66	2.58	2.61	2.65	2.72	2.82
Austria	1.94	2.07	2.14	2.26	2.26	2.44	2.46	2.54	2.66
Singapore	1.88	2.11	2.15	2.11	2.19	2.28	2.27	2.52	
Slovenia	1.39	1.50	1.47	1.27	1.40	1.44	1.56	1.45	1.66
China	0.9	0.95	1.07	1.13	1.23	1.34	1.42	1.44	
Montenegro				0.8	1.02	0.92	1.42	1.1	
Croatia	1.07	0.93	0.96	0.97	1.05	0.87	0.76	0.81	0.9
India	0.77	0.75	0.74	0.73	0.77	0.8	0.8	0.8	
Turkey	0.48	0.54	0.53	0.48	0.52	0.59			0.72
Greece	0.6	0.58		0.57	0.55	0.58	0.57	0.57	
Bulgaria	0.52	0.47	0.49	0.50	0.50	0.49	0.48	0.48	0.49
Serbia	0.93	0.34	0.69	0.54	0.31	0.42	0.47	0.35	
Romania	0.37	0.39	0.38	0.39	0.39	0.41	0.45	0.53	0.59
Macedonia	0.44	0.32	0.26	0.23	0.25	0.25	0.21		
Egypt	0.19			0.27	0.25	0.26	0.23		
Bosnia & H				0.02	0.02	0.03	0.02	0.03	

Source: UNESCO Science Report 2010

It should be noted that Korea's R&D expenditures as % of GDP have increased by 0.91% of GDP between 2000 (2.3%) and 2007 (3.21%)<sup>71</sup>. Singapore R&D expenditures as % of GDP have increased from 1.88% in 2000 to 2.52% in 2007, an increase of 0.64% during this period. China<sup>72</sup>'s R&D expenditures as % of GDP have increased from 0.9% in 2000 to 1.44% in 2007, an increase of 0.54% over this period. However, Bulgaria's R&D expenditures as % of GDP have declined by 0.03% of GDP between 2000 (0.52%) and 2008 (0.49%).

The USA R&D expenditures as % of GDP declined from 2.75% in 2000 to 2.58% in 2004 and finally recovered to 2.82% in 2008. This perhaps explains why Singapore, Korea and China's high-technology exports as % of total manufactured export were 50%, 29% and 28% respectively, compared with only 23% for the USA (Table 1). The Obama administration is planning to increase R&D expenditures as % of GDP to about 3.0%<sup>73</sup>. In 2009, the second stimulus package included significant investments in STI, including renewable energy. 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 development.

## 6. Trends of R&D Expenditures in Bulgaria

As indicated in section II investment in R&D is a significant contributor to the innovation ecosystem, but it is not the only factor which affects innovation-based economy. Table 3 shows Bulgaria GDP in Bulgarian Leva (лв) in current prices (nominal) and constant prices, base year is 2000, (real terms), as well as R&D expenditures in current and constant лв, for the period 2000 to 2008, as well as R&D expenditures as percentage of GDP during this period.

<sup>71</sup> Korea is planning to raise its R&D expenditures as % of GDP to about 5% by 2012 compared with 3.21% in 2007. To emphasize the importance of STI, Korea has established in 2008 a Ministry of Knowledge Economy.

<sup>72</sup> China is planning to raise R&D expenditures as % of GDP from 1.44% in 2007 to 2.5% by 2020.

<sup>73</sup> National Science Foundation (NSF) – Science and Engineering Indicators 2010.

**Table 3** Bulgaria – R&D Expenditures and GDP\* (Million)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
GDP <sup>лв</sup> Cont Prices	27,399	28,536	29,863	31.507	33,633	35,772	38,101	40,558	43,068
GDP <sup>лв</sup> Curr Prices	27,399	30,299	33,189	35,812	39.824	45,484	51,783	60,185	69,295
R&D as % GDP (%)	0.52	0.47	0.49	0.50	0.50	0.49	0.48	0.48	0.49
R&D Exp, лв Cons Pric	142.47	134.12	146.33	157.53	168.16	175.28	182.88	194.67	211.03
R&D Exp лв Curr Pric	142.47	142.41	162.63	179.06	199.12	222.87	248.56	288.89	339.55

Source: IMF - World Economic Outlook Dataset

Base Year: 2000

\* GDP and R&D Expenditures data are in лв Millions.

Bulgaria, R&D expenditures as % of GDP have declined from 0.52% in 2000 to 0.49% in 2008, a decline of 0.03% (Table 3). It should be noted, however, that despite this decline R&D expenditures in real terms (constant prices) have increased from лв 142.47 million in 2000 to лв 211.03 million in 2008, an increase of about 48% over 9 years or about 5% annually.

It should be noted, however, that Bulgaria's R&D expenditures in 2008 (0.49% of GDP) is much lower than the target set by the European Council of 3% of GDP in 2010<sup>74</sup>. Bulgaria has made some attempts to increase this ratio. "The country's innovation strategy envisaged R&D spending reaching 1.15% of GDP by 2013 (out of line with the current level slightly above 0.5% of GDP)<sup>75</sup>. It is important for Bulgaria to move faster towards meeting the EU target of 3%.

## 7. Business Enabling Environment

As indicated in Section II business friendly environment and transparent regulations are necessary drivers for commercialization of technologies, leading to innovation-based development. It is important for policymakers to know where their economy stands in the aggregate ranking on ease of doing business. It is also useful to know how a country ranks compared with other countries and compared with regional average. Table 4 shows the ranking of Bulgaria and selected group of countries and the number of reforms countries implemented in in the World Bank/IFC "Doing Business Report 2012", (DB2012)<sup>76</sup>.

**Table 4** Ranking of Selected Countries for Ease of Doing Business

For DB2012 and DB2011 Surveys

	DB2012 183 Countries	DB2011 183 Countries	Change in Rank	DB2012 Reforms
Macedonia	22	34	+12	4
Austria	32	28	-4	1
Slovenia	37	37	No change	3
Montenegro	56	56	No change	3

<sup>74</sup> UNESCO – Science Report, 2010. (This target includes two-thirds (2% of GDP) from the private sector)

<sup>75</sup> Innovation Europe, EU Vol2-1, July 2010.

<sup>76</sup> World Bank/IFC - *Doing Business 2012, Doing Business in a more transparent World*



Bulgaria	59	57	-2	2
Turkey	71	73	-2	2
Romania	72	65	-7	2
Croatia	80	79	-1	1
Serbia	92	88	-4	2
Greece	100	101	+1	2

Source: World Bank/IFC: Doing Business 2012

Singapore ranked first among 183 countries in terms of ease of doing business in DB2011 and DB2012 in the World Bank/IFC Doing Business Scurvies. The average rank for Easter Europe & Central Asia was 77 in the DB2012 survey. Macedonia's rank has substantially improved from 34 in DB2011 to 22 in DB2012; this may be due to the fact that Macedonia has implemented the highest number of reforms (4) among the above countries. Although Bulgaria has implemented 2 reforms in DB2012 (Bulgaria made trading across borders faster by introducing online submission of customs declaration forms, and amended its commerce act to extend further rights to secured creditors and increase the transparency of insolvency proceedings), Bulgaria's rank has declined from 57 in 2011 to 59 in 2012, out of 183 countries who participated in the Doing Business 2012 Survey. It is important for Bulgaria to improve its ranking in order to be able to compete with other countries in the region and internationally to increase private sector investments, including attracting FDI, to meet the challenges of the 21st Century.

**Table 5** Bulgaria – Summary of Doing Business 2012 and 2011 Data

Topic Rankings	DB 2012 Rank	DB 2012 Rank	Change in Rank
Starting a Business	49	43	-6
Dealing with Construction Permits	128	125	-3
Getting Electricity	133	134	+1
Registering Property	66	63	-3
Getting Credit	8	8	No Change
Protecting Investors	46	44	-2
Paying Taxes	69	72	+3
Trading Across Borders	91	97	+6
Enforcing Contracts	87	90	+3
Resolving Insolvency	90	88	-2

Source: World Bank/IFC: Doing Business 2012

Bulgaria topic ranking in the main categories of Doing Business 2012 and 2011 data is shown in Table 5.

## 8. Conclusions and Recommendations

Bulgaria's current Innovation Strategy has outlined the way forward to embark on innovation-based development. It is timely, however, to revisit the current Innovation Strategy and make some mid-course adjustments to reflect the current realities and the changing global economy. Based on the analyses made in this paper, the following conclusions and recommendations emerge for the consideration of Bulgarian policymakers:

- **Setting Targets for R&D Expenditures:** The previous analysis shows that Bulgaria only invested 0.48% in 2008 of its GDP on R&D. In fact, since 2000 this ratio has remained

around 0.50 % with slight variation from year to year. This is very low ratio by international standards. The World average was 2.07% in 2007, the European Union (1.75%) in 2008, the Euro area (1.68%) in the same year and OECD countries (2.29%) in 2008<sup>77</sup>. The European Council, in 2002, set a target of 3% for R&D expenditures as percentage of GDP, for EU countries, by 2010 and that two-thirds of this share (2% of GDP) comes from the private sector<sup>78</sup>. Bulgaria has made attempts to increase its investments in R&D, but for various reasons including the financial crises of 2008, these increases did not materialize. It is recommended, therefore, that Bulgaria sets a realistic target of 1.0% of GDP for investments in R&D by the year 2020 and a target of 3% by 2030, to meet the goal of the EU.

- **Increasing Private Sector Funding for R&D:** As indicated above, the European Council set a target of two-thirds (2% of GDP) of total R&D expenditures (3% of GDP) to be performed by the private sector<sup>79</sup>. Bulgaria private sector invests only about 33% (about 0.16% of GDP) of Bulgaria's total R&D investments (averaging about 0.50 % of GDP annually between 2000 and 2008). This is very low in comparison of other EU and OECD countries, where the private sector invests about 67% of total R&D expenditures. It is recommended, therefore, that the private sector increase its investment in R&D and attempt to meet the target set by the European Council, through investing in R&D in their own companies and establishments, contracting out more R&D work to local, regional and international research institutions.
- **Increase interaction and dialogue between private sector and Research Institutions:** It is important to intensify the dialogue between the private sector and research institutions, in order to get the research institutions to carry out research in priority areas for the private sector and the country. Increasing interaction between "Faculty to Factory" and "Industry to University" is essential. Innovation and Research Vouchers may be one of the means to improve such interaction. It is recommended, therefore, that concerted efforts be made by all parties to increase and intensify this interaction and enhance dialogue.
- **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 Bulgaria. It is recommended that Bulgaria increases collaborative research at the regional and international levels and intensifies its collaboration with Strategic Alliances and reputable research institutions.
- **Increasing High-Technology Exports:** Bulgaria's high technology exports represented only 8% of its manufactured exports, in 2010. This is very low compared with Singapore which registered the highest ratio of 50% in 2010, followed by Korea (29%) in 2009, China (28%) in 2010, and USA (21%) in 2010. The World average was 18% in 2010. East Asia & Pacific was the highest region in the World recording 29% in 2010 while the Arab World was the lowest where only 1% of manufactured exports were high-technology products in the same year. The European Union and the Euro area recorded 15% each in 2010 and OECD Countries (16%)<sup>80</sup>. The potential impact of increasing investments in STI and increasing high-technology exports will enable Bulgaria to move faster towards a knowledge-based and diversified economy. It is recommended, therefore, that Bulgaria makes a concerted effort to increase its high-technology products and exports.
- **Venture Capital and Commercialization:** Financing of early phase development and expansion phase requires earmarking resources for venture capital and commercialization. Little data is available for expenditures on venture capital and

<sup>77</sup> World Bank – World Development Indicators (WDI) 2011.

<sup>78</sup> UNESCO - Science Report, 2010.

<sup>79</sup> UNESCO – Science Report, 2010.

<sup>80</sup> World Bank – World Development Indicators (WDI) 2011

commercialization in Bulgaria. It is also recommended that Bulgaria makes concerted efforts to increase spending on venture capital and commercialization of proven technologies and innovative ideas.

- **Make it Easier to Do Business:** To compete with other countries in the region and attract FDI, it is essential for Bulgaria to make it easier and faster for the local and foreign investors to start a business, get construction permits, get electricity, etc. It is recommended, therefore, that Bulgaria consider introducing additional reforms to make it easier to do business and to improve its ranking in the Doing Business surveys.
- **Establish a Ministry for Innovation and Knowledge Economy:** In order to ensure proper coordination among the various actors in the innovation ecosystem, some has suggested the establishment of a Ministry or an Agency reporting directly to the Prime Minister. It is recommended, therefore, that a Ministry for Innovation and Knowledge Economy be established to (a) articulate and update national policies for STI, (b) ensure effective coordination among various parties, (c) be an advocate for STI, and (d) make the innovation ecosystem more efficient.
- **Comprehensive and Timely Data:** Lack of recent and comprehensive STI data hampers the analysis for recent years. More comprehensive and timely data on STI is needed. It is recommended, therefore, that a concerted effort be made to collect data about venture capital, entrepreneurship centers and commercialization, in addition to the traditional data about R&D.

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# SMEs, Patent Data and New Tool for Business Intelligence

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Patents are ways to protect Intellectual Property (IP) but also excellent sources of information. Patent documents are multidimensional and provide technical and legal, business related and public policy relevant information. In order to make decisions about usage and management of patents it is important to understand the strengths, weaknesses, opportunities and threats related to the managed patent assets. Among the other things information contained in the patent can help in: understanding the current patent position of the company in the market; monitoring competitors; forecasting technological development; improving the company's decision-making process: where/when to invest; and developing effective defensive tactics. However, it seems that this function is not completely understood by SMEs. In the first part, this paper presents the structure of patent document, motivation to patent and explains different information contained by patents as well as importance and possibilities for using them for a full spectrum of actions, but mostly in core areas of business intelligence. We show once more why SMEs should use more actively patent information for different purposes. In the second part, paper describes PSALM, a recently developed tool for business intelligence. The tool is based on MySQL database and web robot, both supported by routines developed in Java and PHP. The PSALM assembles patent data from publicly available data bases, it collects and analyses bibliographic parameters of patents but also does text mining. High-dimensional data contained in the patent documents are transformed into much lower dimensionality space (2D or 3D), clustered and visualized. The PSALM functionality and usability is demonstrated on MPEG-2 essential patents' portfolio.

## Keywords

Business intelligence, SME, patent data, tool, competitors monitoring, forecasting, decision-making process

## 1. Introduction

With the emergence of a knowledge economy, importance of knowledge as a driving force of innovation and economic growth worldwide has significantly increased. In the dynamic arena where creativity, knowledge and the production of novel ideas have the central place, traditional manufacturing moves to lower cost economies and new technologies become the most important wheel in global economic trade. In such an economy, intellectual property (IP) rights are becoming one of the most important mechanisms for businesses in extracting economic value from creativity and encouraging greater investment in innovation. Therefore, IP is recognized as a new currency in the society, gaining importance higher than ever before. Among intellectual property rights (IPRs), patents are of particular significance and we focus on them in this paper.

Patents are one of most important strategic assets for R&D-intensive firms. Moreover, patents are detailed sources of information. They provide technical, legal, business related and public policy relevant information and possibility to monitor and/or imitate competitors' innovative behaviour. The information function of patents consists in their capacity to disclose and disseminate know-how about competitors' state-of-the-art products and processes. Therefore, they are understood as a sort of signalling device. However, this function does not appear to be especially important, for SMEs. Recent study [1] shows that smaller firms are more likely than larger firms to put their patents to productive use or to licence out their technology. However, the same study shows that SMEs are also less likely than larger firms to use others' patents as a source of information for their own innovation activities, preferring customers, suppliers and trade fairs. There are at least two causes of this problem: first, expensive and complicated to use patent databases and tools are not affordable to SMEs; and second, lack of understanding of the value of information contained in the patent document. Bearing this in mind, the purpose of this paper is: to clarify the need for use of patent information as an important resource for SMEs and entrepreneurs; to explain a spectrum of possibilities for using patent information in core areas of business intelligence for SMEs benefit; and to describe demo version of PSALM – a tool for patent data analysis and management developed by academics from University of Novi Sad and practitioners from RT-RK Computer Based Systems LLC.

Reflecting the objectives, the remainder of the paper is structured as follows: in Section 2, we present the structure of patent document; in Section 3 we outline motivation to patent and patent functions; in Section 4 we explain different information contained by patents and their importance and possibilities for using them in business intelligence purposes; while in Section 5 we describe tool design and demonstrate its functionality on selected data set. Finally, in Section 6 we conclude with a summary of our results and a discussion of further research.

## 2. Patent Document – Source of Information

By definition a patent is an exclusive right of limited duration over a new, non-obvious invention capable of industrial application. The patent system promises to the owner the right to a temporary monopoly on a technical invention, in return for publication of that invention. Therefore, the patent application is the first document where the invention is disclosed. Moreover, approximately 80% of scientific and technical information can be found only in patent documents [2].

A patent document is fairly standard in its format. It is screened and published according to internationally agreed standards. Patent information is presented in a systematic manner as a combination of structured and unstructured data.

The patent document starts with the bibliographic data about the patented invention. Additionally, on the first or front page, there are also title of the patent and an abstract that

may be accompanied by an illustrative drawing of the invention. After the front page, we find the main body of the patent document. Generally, main body includes the standard contents about the invention in the following sequence:

- An identification of the technology or technical field to which the invention concerns.
- An assessment on the prior art in the technical field or background of the invention.
- A technical discussion of the problem or problems which the invention intends to solve.
- A description of the invention in sufficient detail with reference to one or more working embodiments, as required by the law for a skilled person to be able to practice the invention.
- Drawing(s) relating to the working embodiments to assist the understanding of the invention mentioned in the description.

The claims of the invention define the scope of protection for the inventions and differentiate the prior art from the new technology.

### **3. Patent Value and Motives for Patenting**

The value of a patent is different from the value of the patented invention. It is the difference between the value of the invention when the inventor holds a patent right (monopolistic situation) and if the inventor had no patent on it (competitive situation). The value of patents is highly skewed. Few patents account for a large share of their total value. For example, recent large scale study [3] showed that only 7.2 % of the patents in the sample were worth more than 10 million Euros (around 1% worth more than 100 million), while about 68% of the patents from the same sample produced less than 1 million Euros (with about 8 % worth less than 30,000 Euros)

These results are mirrored in the fact that many patents (inventions) are never exploited, and only a few of them are translated into commercially profitable innovations. The decision whether to use a patent and how to use it, depends on a number of factors. For example, possession of the downstream assets to exploit patent is important, as well as strategic decision to block rivals, to improve the company's bargaining power in cross-licensing agreements, or to avoid being blocked by competitors. Above mentioned study [3] identified six different motives for patenting: commercial exploitation of the innovation, licensing, cross-licensing, prevention from imitation, blocking rivals, and reputation. The same study also recognized that different types of employers have different motivations to patent. The commercial exploitation of a patent is more important for small and medium firms compared to the overall importance, while cross-licensing, prevention from imitation and blocking rivals is an important reason for patenting for large firms. However, among the most important findings is that small firms and individual inventors are the largest contributors to entrepreneurial activities based on patents.

### **4. Patent Data and Business Intelligence**

Besides being a way to protect IP, patents are a good window into competitors' R&D activities. Patent is multidimensional document which provides technical and legal as well as business and public policy relevant information. Patent information are either published in a patent document or derived from analyzing patent filing statistics. Technical information are derived from the description and drawings of the invention; legal from the patent claims and from its legal status; business-relevant information from reference data identifying the inventor, date of filing, country of origin, etc.; and public policy-relevant information from an analysis of filing trends. Table 1 summarises the format and information contents of patent documents.

Structure and contents of patent document offer a full spectrum of possibilities for using patent information in core areas of technology management and business intelligence. Patent information can assist users to: avoid duplicating research and development effort and infringing other inventors' patents; estimate the value of their or other inventors' patents; exploit technology from patent applications that have never been granted, are not valid in certain countries, or from patents that are no longer in force; gain intelligence on the innovative activities and future direction of business competitors; improve planning for business decisions such as licensing, technology partnerships, and mergers and acquisitions; and identify key trends in specific technical fields of public interest such as those relating to health or to the environment and provide a foundation for policy planning.

Main stakeholders interested in patent information are researchers and inventors, entrepreneurs and commercial enterprises, and patent professionals. In order to make decisions about usage and management of patents they have to understand the strengths, weaknesses, opportunities and threats related to the managed patent assets. Among the other things patent portfolio management should provide [4]: understanding the current patent position of the company in the market; monitoring competitors; forecasting technological development; improve the company's decision-making process: where/when to invest; and effective defensive tactics.

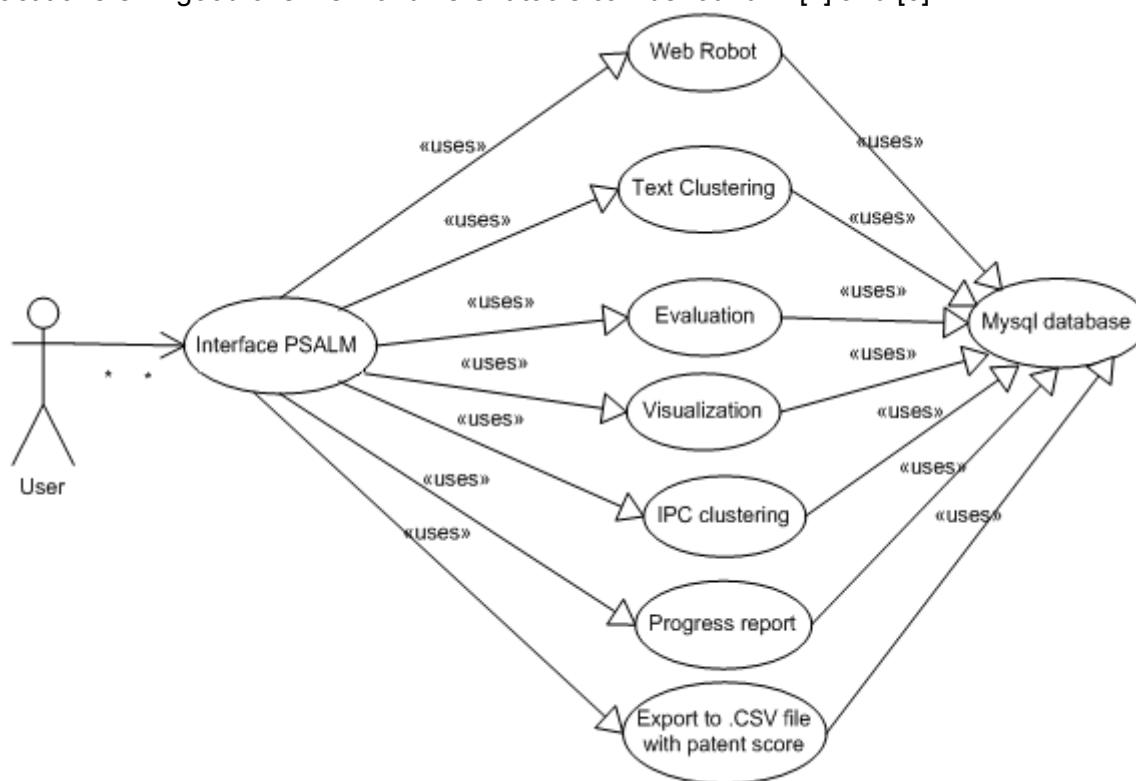
**Table 1** Format and information contents of patent documents

<b>Format</b>	<b>Where can be found?</b>	<b>Contents</b>	<b>Type</b>	<b>Use</b>
Title and abstract (may be accompanied by a drawing)	Front page	Gives a concise summary of the technology of the invention.	Unstructured – free text	Archiving
Bibliographic data	Front page	Provides bibliographic information on the granted patent or patent application, which includes the document number, filing and publication dates, name of the inventors, assignees and addresses, etc	Structured - information follow a strict format	Business and public policy relevant information
Description (in most cases including drawings)	Main body	Discloses clearly the technical details of the invention concerned, normally illustrated by working examples showing how to carry out the invention into practice.	Unstructured – free text	Technical and legal
Claims	Main body	Define the scope of protection for the invention under consideration; hence satisfying the legal aspect of the patent document.	Unstructured – free text	Legal

However, using and managing a set of patents is not easy. Ever increasing number of patents makes impossible to find and analyze relevant documents manually. World Intellectual Property Indicators for 2009 [5] show that despite economic recession, around 1.85 million applications were filed and 760,000 patents were issued around the world in 2007. With more than 60 million patent applications published since the patent system was established, and 6.3 million patents in force in 2007 and doubled number of granted patents over the last 15 years (1993 – 2007) [5], it is possible to imagine the size of a problem and understand why it is important to develop tools which will easier patent portfolio analysis and enable in-depth understanding technology trends, market place and competitors.

## 5. PSALM – Tool for Business Intelligence

Various software tools have been developed in the patent field. They could analyse individual patents as well as patent portfolios; retrieve patents and make basic statistics as well as visualize, map and landscape the same data. Most of these tools use statistical methods to analyze patent data in a specific period, and represent patent trends by visualization graphs and tables. They provide various facilities for researchers, managers, specialists and R&D practitioners. A good overview of different tools can be found in [2] and [6].



**Figure 1** PSALM use-cases diagram

However, most of the patent databases and tools available today are expensive and therefore not affordable to SMEs and academic institutions, especially those in developing countries. In addition, these tools can be complicated to use or require a strong expertise in the field of intellectual property. Bearing this in mind, a new tool for patent data analysis and management has been developed. In this section we will describe demo version of this tool.

Software tool presented here is named PSALM. It is composed of modules developed in programming languages Java and PHP, while database is developed in MySQL. The software consists of the following functional modules: web robot, text clustering, multi dimensional scaling visualization, analysis of the IPC codes, extraction and display of citing and cited patents, progress report module and module for recording data in the CSV file, and evaluation of a patent. An interaction between modules and user is presented at Figure 1. The software is structured to serve multiple networked users at the same time in server – client manner. The user interface is built using PHP, HTML and JavaScript programming languages as well as JQuery JavaScript library, DataTables and HighCharts library for displaying the results of data processing.

PSALM is a tool developed to analyze a larger number of patents. The whole system is case-based, where each case is made of group of patents selected on basis of the users defined criteria. Predefined criteria for case formation are based on: assignee, IPC codes and cited and citing patents. In addition to these criteria, the user can create unlimited number of criteria for grouping patents based on keywords, sorting and so on. Each case is



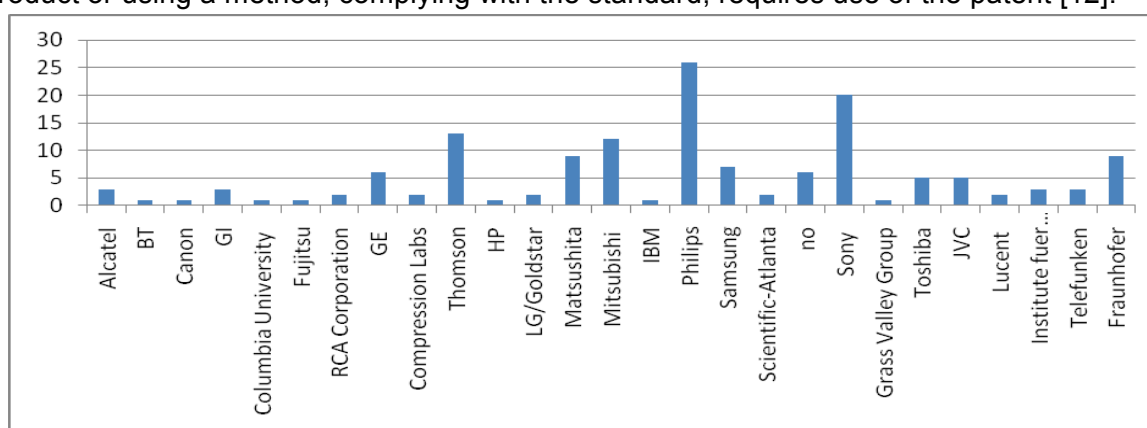
unchangeable after creation. However, it is possible to create a new case with a different set of patents combining existing cases.

PSALM is designed to analyse both structured and unstructured patent data, and to visualize the results of both categories. The tool assembles patent data from publicly available data bases (USPTO, WIPO and EPO), collects and analyses bibliographic parameters of patents (such as: title, inventor(s), applicant, date of application, priority date, country of publication, priority number, priority country, references cited by the patent, patents citing the patent, abstract, international patent classification), but also does text mining [7] using the term frequency – inverse document frequency (tf-idf) weighting scheme [8]. High-dimensional data contained in the patent documents are transformed into much lower dimensionality space (2D or 3D), maintaining the most similar structure to the original, using the multidimensional scaling (MDS) scheme [9]. The reduced patent data space is clustered using unsupervised clustering technique in order to group the given unlabelled collection of patents into meaningful clusters [10]. This approach enables to extract useful information from patents through the identification and exploration of keywords and key phrases of the textual data in the patents.

The PSALM enables visualizations of high as well as low-dimensional data. The PSALM tool enables visualizations high-dimensional data by mapping the documents and clusters in proportion to each other, i.e. creating patent maps. Documents with similar subjects appear close to each other in maps. This makes it very easy to locate the most developed areas in the technology. It also shows outliers in the data, patents that do not have much to the subject but are in the data by accident. Low-dimensional (structured) data are presented as bar charts and pie charts of bibliographic data and could also help in better understanding of the technology areas, changes in the technology development, company competitiveness etc.

## 5.1 Test case

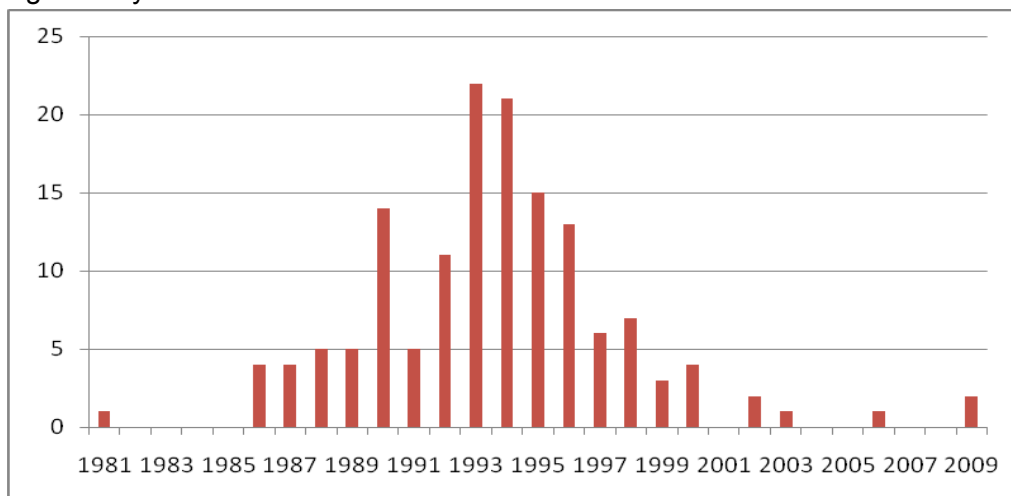
In this section the PSALM functionality is demonstrated. To do this, we selected 147 US patents which belong to MPEG 2 essential patent portfolio. MPEG-2 is a standard for the generic coding of moving pictures and associated audio information. It describes a combination of lossy video compression and lossy audio data compression methods which permit storage and transmission of multimedia contents using currently available storage media and transmission bandwidth [11]. A patent is essential to a standard, if making a product or using a method, complying with the standard, requires use of the patent [12].



**Figure 2** Portfolio structure by assignee

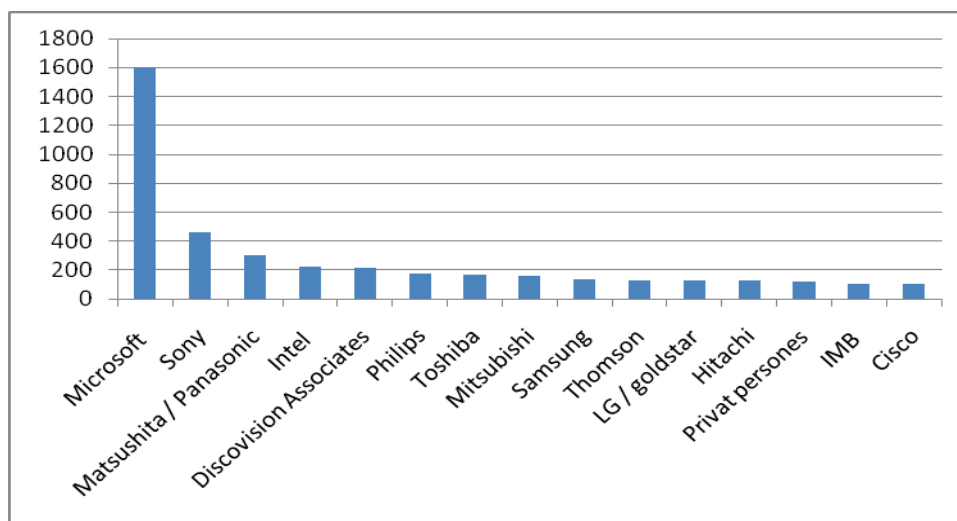
PSALM supports its user in easy understanding of the structure of the considered patent portfolio. In order to demonstrate some basic features of PSALM, the analysis of data such as: assignee, date of application and citing patents, is presented in Figures 2 – 5.

Figure 2 shows that Philips and Sony have the highest number of their patents in the portfolio. Figure 3 depicts that the highest number of patents has priority date in 1993 and 1994, while PSALM calculates that in the moment of analyses, patents in the portfolio were on average 17.5 years old.



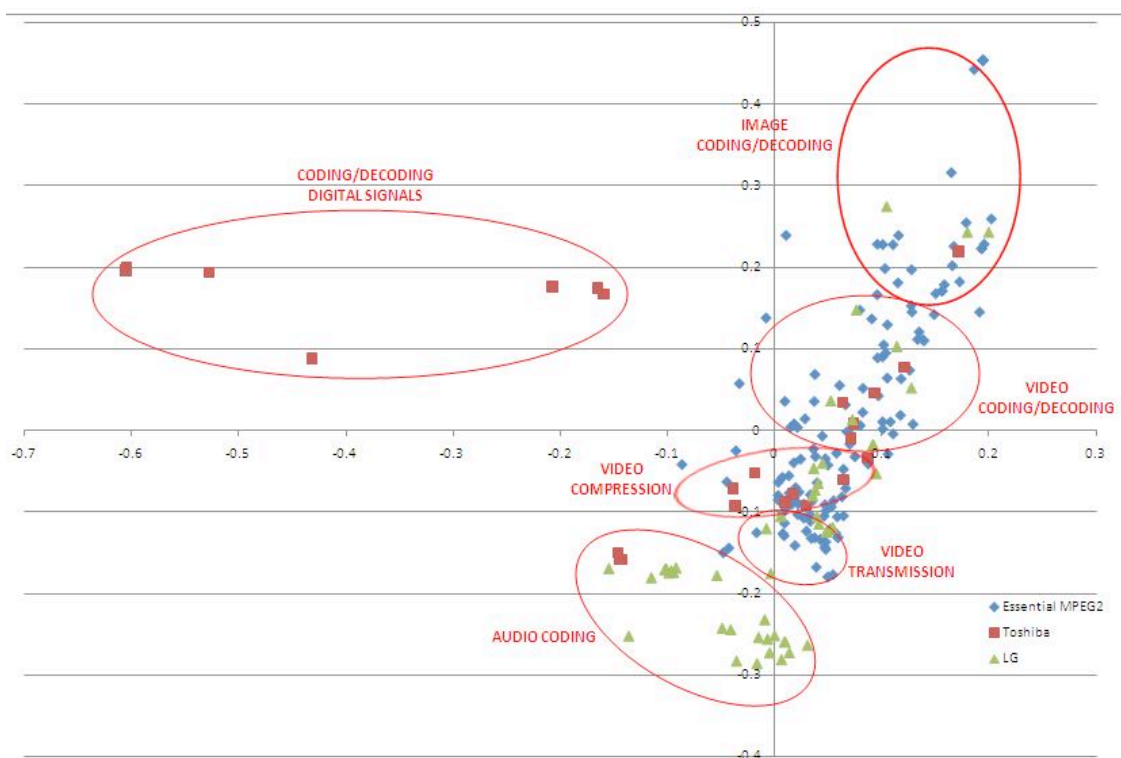
**Figure 3** Portfolio structure by priority date

In order to detect main players in the field of MPEG-2 one can be interested in companies whose patents have been citing essential patents. PSALM will quickly produce the results presented on Figures 4, indicating that Microsoft with 23.90% of all citations is much in front of Sony (5.21%) and Matsushita (3.73 %).



**Figure 4** Companies whose patents have been citing essential patents

Finally, in order to demonstrate software visualisation capabilities of high-dimensional data analysis using patent text mining and clustering. The task was to indicate strength of some companies in MPEG-2 field comparing essential patents and patents citing them. Figure 5 shows specific areas in which two selected companies LG and Toshiba have advantages or disadvantages and need some action.



**Figure 5** Example of high-dimensional data visualisation

## 6. Conclusion

In this paper we first presented the structure of patent document and explained information contained in it, as well as importance and possibilities for using them for a full spectrum of actions. We showed once more why SMEs should more actively use of patent information for different purposes, but mostly in core areas of business intelligence. Following these arguments, in the final section we described demo version of PSALM – a tool for patent data analysis and management developed by academics from University of Novi Sad and practitioners from RT-RK Computer Based Systems LLC.

A patent is a powerful business tool for companies to gain exclusivity in the market over a new product or process and develop a strong market position and/or earn additional profits through licensing. At the same time patents are a unique information resource. They can be used to provide free and valuable information to various users, including SMEs. Among barriers to use patent information more successfully, frequently and efficiently, in our opinion, the most important are: extremely high number of patents produced every year, increasing number of pages per patent, difficult language used in patents, lack of understandable relationships between patents, expensive patent databases and tools, and tools that are complicated to use or require a high expertise in the field of intellectual property.

Understanding this, PSALM software for patent data analysis and management has been developed. It allows fast access to free database, provides an easy way to build up patent databases and to automatically analyze patents. PSALM is designed to analyse both structured and unstructured patent data, and to visualize the results of both categories. The tool collects and analyses bibliographic parameters of patents but also does text mining. It shows huge potential for use in SMEs for the monitoring of competitors and technological trends. Results presented in this paper are results of demo version of PSALM and significant improvements are expected in the next period.

## Acknowledgements

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# The Dynamic Interplay Between Factors Determining Success in Spin-Out Process

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Today university spin-outs are widely recognized as a useful mean to boost economic development, an instrument for new venture creation, growth of existing firms, as well as creations of new jobs. Understanding start-up, growth and development activities in new ventures in terms of initial resources, infrastructure needed and opportunity recognition is a central topic of entrepreneurship studies. This paper investigates the factors influencing success in spin-out process, but more importantly their interactions and interdependences. The case study approach is used to reveal insights about the process of creating the high-tech start-ups. The case study focuses on HM, a UK-based manufacturer of innovative fetal monitors. Medical equipment industry is an excellent setting for the analysis because it combines two fastest growing technology fields – biotechnology and ICT – and generates a truly extreme environment for new companies with multidimensional challenges. The semi structured interviews are conducted with a representative of a research team (academic entrepreneur), manager of the University technology transfer office and outside consultant. The findings portray spin-out process as a complex, interactive development involving three main pairs of components: technology push and market pull; intellectual property and composition of entrepreneurial team; and finance available and supportive infrastructure developed. Our findings demonstrate the importance of understanding the complex interactions among these three pairs of components and propose a new framework for analyzing spin-out process. The described findings and the proposed framework provide a theoretical platform for the further exploration of the nature and dynamics of the high-tech spin-out firms' development.

## Keywords

Spin-out process, academic entrepreneurship, success factors and framework

## 1. Introduction

The potential to create wealth from the commercialization of scientific and technological knowledge created in publicly funded research institutions is an important issue in the era of globalization and increased competition. In the past, technology from academic institutions has been transferred to established companies through the licensing agreements. In the last 20 years many universities have begun to create spin-out companies as an alternative route to commercialize their technology. This change has been driven by reduced costs of technical experimentation to a level where university type laboratories and research methods

can make significant technical advances [1], as well as growing availability of public and private venture capital [2]. In this model, the university takes equity in the start-up company which is formed to develop and commercialize the technology. MIT is a pioneer in this endeavour, with an average of 25 companies spun-off from MIT each year in the 1980s [3].

Understanding start-up, growth and development activities in new ventures in terms of initial resources, infrastructure needed and opportunity recognition is a central topic of entrepreneurship studies [4]. Reflecting the importance of spin-outs, there have been a number of studies of start-up activities in these specific ventures. Consequently, it is recognized that such basic factors as money, people, and accesses to technology, intellectual property and information are crucial for launching a new business. Although the process by which an idea is transformed into a business reality is complex and multidimensional, above mentioned factors are discussed mostly in isolation. Therefore, there are still gaps in the literature about understanding dynamic interplay and interactions of influential factors, their complementary combinations and synergetic paring. While these aspects could have significant implications for survival and growth of businesses, they are not completely observed and explored. The aim of this paper is to contribute to the understanding about the dynamic interplay of factors influencing success in new venture creation by studying formation of spin-out Company. Two research questions are addressed. First, are there any interactions and interdependences among factors influencing success in spin-out process? And second, if dynamic interplay among factors is observed, is it possible to pair factors in a specific way that supports new venture creation? To answer these questions, to examine and explore relationships between factors, we consider and analyse in-depth a particular spin-out in medical equipment industry. This industry is an excellent setting for the analysis because it combines two fastest growing technology fields – biotechnology and ICT – and generates a truly extreme environment for new companies with multidimensional challenges.

## **2. Literature Review**

University spin-outs (USO) can be defined as new ventures created by universities to transfer and commercialize inventions initially developed at the university [5]. The USO is created mostly to commercially exploit a piece of intellectual property created in an academic institution [6] and to overcome technical and market uncertainties inherent in the perceived commercial opportunity [5].

Today university spin-outs are widely recognized as a useful mean to boost economic development [7], an instrument for new venture creation, growth of existing firms, as well as creations of new jobs [8]. They are seen as means of the economic development at the regional level [9] and an important mechanism for introducing new commercial products to the marketplace [10]. Finally, academic spin-outs are recognized as a key dimension in the link between industry and science [11] as well as a powerful mean of retaining human resources at the university [12].

Numerous researches have shown that both micro and macro level factors influence academic's decision to create a new company to exploit an invention. At the micro level, Steffensen et al. [13] and Shane [6] find that this decision is influenced by academics' motivational factors, while Levin and Stephan [14] correlated this to inventors' experience. Researchers find also that the attributes of technological inventions are important [15], inventors' psychological profile [16] and their research skills [17]. On the other hand, at the macro level it is shown that characteristics of parent research organization [18], availability of funding [19], strength of intellectual property (IP) rights protection [20], official university [18] and government policies towards spin-outs [6] influence this decision. Finally, Brush et al. [21] identified six types of resources – human, social, financial, physical, technological, and organizational – as the key to the spin-out process.

The evolution of new ventures is a complex phenomenon because the nature of business changes as it grows [22]. Spin-out development has been presented in various stage models. Clarysse and Moray [23], suggest that the founding of a spin-out is the three stages process with invention, transition and innovation phases. According to this funnel, only a few research ideas from the invention phase will become validated as having an economic value for a spin-out and become in “innovation” phase. According to Vohora et al. [5] the founding of spin-outs is a non-linear process of development that involves clear breaks (junctures). They identified five must-pass stages in development of a spin-out company: (1) the research phase; (2) the opportunity framing phase; (3) pre-organization phase; (4) the re-orientation phase; and (5) the sustainability phase. Critical junctures are the key challenges a USO faces in its development. Although the different stages are also important, it is difficult to move from phase to phase as the critical juncture must be overcome to enable progress to the next stage [5]. Critical junctures arise because the venture requires new configurations of resources, capabilities and network ties if it is to progress to the next phase of development. The venture will eventually fail if the critical junctures remain unresolved for a prolonged period of time.

### **3. Research Methodology**

This research is based on a case study method. Following standard guidelines [24], we use case study research method as an “empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used” [24] (p. 23).

This research utilises multiple levels of analysis within a single case study. HM is spin-out company from one of the leading UK universities (further in the text: the University) created in 2005. It has developed the world's first commercially available wireless fetal maternal monitor. The company is set up around patented technology based on the passive acquisition and advanced processing of the tiny electro-physiological signals generated by the fetal heartbeat and other events present on the maternal abdomen. Detection of these signals is useful for a number of parameters including fetal position, fetal heart rate, maternal heart rate, uterine activity, gross fetal movements and parameters describing fetal ECG morphology.

Single case approach enables deep and intensive investigation of a phenomenon in its natural setting [25] and can significantly contribute to theory building [26]. The main vehicle of data collection was the interview approach [25], [26] that encompassed multi-perspective analyses. The research considered not just the voice and perspective of the actors, but also of the relevant groups of actors and the interaction between them. The aim was to build up a potentially “true” picture of “reality”. In order to gain a wide coverage of issues, semi-structured one-on-one interviews were conducted with a diverse range of stakeholders - University Technology Transfer Office manager (TTO), academic entrepreneur and outside university consultant. The interview is conducted with a representative of a research team (academic entrepreneur), who is selected based upon the convenient sampling that relates to previous experience and leading position in team. TTO manager was involved in transferring technology from the University to HM, while outside university consultant was familiar with the case but not directly involved.

The interview is conducted separately for a period of approximately 1.5h with each interviewee. Two different interview procedures were used: face-to-face and phone approach. This is done to accommodate interviewees. Interviews are done in England, between January and May 2007.

The case study evidence was analyzed iteratively. All data were clustered and organized around key factors drawn from the literature to discover patterns [24]. In this way it was

possible to identify crucial activities in spinning out HM and to explore the interaction between the evidence and existing theory [27].

## 4. Results and Discussion

Table 1 summarizes the main results of our research. The starting point in the commercialization process is the ability to identify opportunities. In the case of high-technology products, it is not sufficient to have superior technology. Technology itself is not an innovation; it is just one side of the equation. The market place is equally important for business success [1]. Hence, it is crucial to frame evaluated technology within a commercial opportunity and to choose right market to compete within. Innovation is the combination of technology with market need to create a profitable opportunity [28]. Therefore, it is important to identify why potential customers might look for an alternative to the existing solutions. It may be because of lower costs, superior performance, greater reliability, or simply fashion. In other words, we need to identify where a gap in the market might exist or where changes in the market might act as a catalyst for developing a new solution that costumers will need. As a result, two components we need to understand and balance are technology push and market pull.

**Table 1** Results summary – Illustration of the factors determining success in spin-out process and the dynamic interplay between them

Key factors mutually connected	Evidence		
	Academic entrepreneur	TTO manager	Consultant
<b>Technology – Market</b>	... a demonstration [of technology] is very important. Another reason was that we could see that if feasible then this device would have a very large market.	First: Does the idea / technology provide a solution to a market need? Second: Market / business opportunity evaluation.	You need to learn about new market place and how it could be beneficial to your technology.
<b>Supportive infrastructure – Finance</b>	Finally, having won £25K Business Plan competition prize we were sure that opportunity for our technology is here.[After that] we were able to attract venture capital through our link with the University. ... The TTO would attend and guide us at most meetings especially on IP, finance, ownership, licensing etc	We wish to [...] support entrepreneurial academics. ... The factors that have increased the commercial interests in university technology are: an increase in the number of support services / regional investors; and an increase in government support for commercialisation.	At the early stage, the fundamental problem is that what universities have is not what VCs want to receive. This could be well-developed technology but with little proof of concept, no proof of market, and no commercial management, it is not fundable opportunity.
<b>IP – Team</b>	The University intellectual property was transferred to HM as well as the key people who developed it. Three out of four inventors from the University are currently part of HM management team. They provide invaluable scientific and technical expertise on an on-going basis. Their positions are: chief technical officer, chief research officer, and chief executive officer. They are backed by experienced industry experts, managers and entrepreneurs specialised in biomedical and other technology-based businesses.		



In case of technological products, the key issue in opportunity recognition is to identify where the technology has a cost or performance advantage within existing applications, as well as to identify new applications that could utilise new technology. Different ideas where and how to apply technology arise from different levels of information available to people, often implied by prior knowledge [6] or different access to networks [29].

Second, it is very important to understand the role of academic entrepreneurs and intangible assets (such as scientific know how and intellectual property) created by them and owned by universities. There is little doubt that IP and especially patents in the high-tech field have become a significant factor of success in spinning out new company. IP rights are seen as one of the most important strategic assets for R&D-intensive firms. They have been highly influencing firm's value at different ways, being at same time sort of signalling device to consumers, competitors, venture capitalists or other investors. However, the important role of 'people' in the foundation of any venture cannot be under-estimated. Numerous researches on entrepreneurs demonstrate the importance of entrepreneurial team and conclude that teams are significantly more likely to achieve success than individual entrepreneurs [25]. It is widely recognized [12], [30], [31] that the role of creator of the intellectual property, the individual scientist or engineer is essential to the success of technology transfer.

However, complementary skills and network contacts of team members is particularly important in technology businesses, because of the lack of business acumen of the founding technologists [16]. Experience has shown that it is the management of a new company that is the critical element in its success rather than the IP related to a new technology per se [32], [33]. Spin-outs formed with inexperienced managements are more likely to fail – thus desirable features of start-up teams are industry experience, leadership experience, managerial skills, and engineering/technological skills [32], [33].

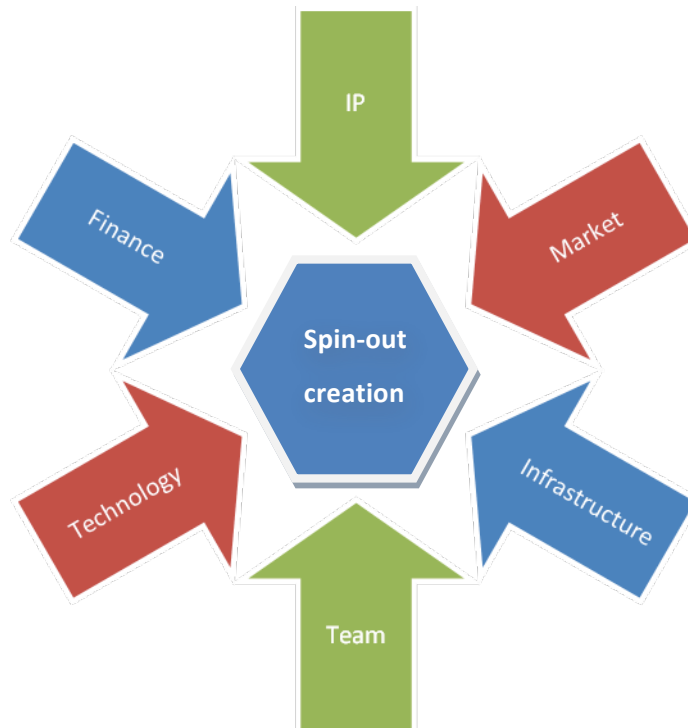
Finally, a vital element for entrepreneurship to succeed is the availability of capital for start-ups and growing businesses as well as supportive infrastructure. Although, Cruickshank's report [34] recognized wide range of external financing instruments available to SMEs, evidence [35] indicates a limited role for bank finance in the case of spin-outs. Venture capital (VC) firms' provision of risk capital has been seen as a major solution for university spin-outs [36]. However, VC's in Europe especially have been unwilling to invest at the seed stage at which proof-of-concept work occurs. Seed / proof of concept stage deals may be too expensive in terms of evaluation and future monitoring commitments [37] and create an 'equity gap' where formal venture capital is not available to projects below around £ 500,000 [36]. Therefore policymakers in many developed countries have responded by infrastructure measures (technology transfer offices at universities, business plan competitions, innovation funds and science enterprise centres) facilitating the commercialisation of scientific research outputs through public investment in schemes to promote business-university collaboration and entrepreneurship. In addition, the government can assist through the credit guarantee schemes which should be expanded to incorporate the majority of new business owners.

Our analysis of case study data indicates that creation of a technology-based spin-out is a multidimensional phenomenon. It results from an interaction between technology, market and entrepreneurial team characteristics; intellectual property, finance available and supportive infrastructure developed. Each of these factors describes only a single dimension of the phenomenon and cannot be considered in isolation.

Moreover, we argue that these six factors should be grouped in pairs of two complementing each other: technology push and market pull; intellectual property and composition of entrepreneurial team; and finance available and supportive infrastructure development; and analysed in this way in order to better understand spin-out process. By exploring HM case study this work has identified the symbiotic character of the elements of spin-out creation and development, thus demonstrating the need to synthetically model these interactions.

Based on these findings it is possible to offer a new framework for analyzing spin-out process (Figure 1). It proposes that spin-out process requires a mix of human, financial and infrastructural resources to turn a new technology into a market success. While all of these

factors have been identified in the literature earlier, they have been studied in isolation. The contribution of this framework is a new way of looking at the spin-out process. It demonstrates the importance of understanding the complex interactions among the three pairs of components: technology push – market pull, intellectual property – composition of entrepreneurial team and finance available – supportive infrastructure developed.



**Figure 1** The dynamic interplay between the three pairs of factors determining success in spin-out process: technology push – market pull, intellectual property – composition of entrepreneurial team and finance available – supportive infrastructure developed

## 5. Conclusions

Through all forms of technology transfer, but especially spin-out process [39], universities have become a driving force in the development of high technology industries and regional economic development. Understanding spin-out process, its success factors and main difficulties is crucial in order to develop capacities to convert scientific breakthroughs and technological achievements into industrial and commercial successes.

The research presented here contributes to overall understanding of spin-out process. In particular, this research provides insights about the characteristics and the development process of spin-out companies in extreme environment of medical equipment industry. To better understand the problem, we have used the interview approach encompassing multi-perspective analyses, securing that the research considers not just one perspective - university's or entrepreneur's or commercial, but views of all the relevant groups and the interaction between them. As a result, we have developed a new framework for analyzing spin-out process based on paring complementary factors: technology push and market pull; intellectual property and composition of entrepreneurial team; and finance available and supportive infrastructure development.

The described findings and the new framework provide a theoretical platform for the further exploration of the nature and dynamics of the high-tech spin-out firms' development. We also call for more case study material, from different situations in order to further develop the

framework. At the same time, this will help us to better understand how technologies developed at universities evolve into winning products and successful high-tech companies.

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# Social networks – Tools for Enhancement of Knowledge Management

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Social networks have gained large popularity in the last few years and successfully entered the private life of the internet savvy people providing them new tools for entertainment, sharing pictures and information, for communication, etc. At the same time, Web 2.0 is offering many opportunities to public and private organizations world-wide to collect feedback from their customers, ideas and knowledge from on-line communities or more generally take advantage from 'the wisdom of the crowd'. Due to their popularity, social networks have become useful tools in various management activities and have provided many gains to people, who are using them. Knowledge management could avail itself also on social networks in the analyses of the relationships between employees, and the identification of knowledge flows. At the same time, people use various channels and models for communication and exchange of information and ideas. Here, social networks have a lot to offer and their wider utilization for various knowledge management processes could be further explored. The aim of this paper is to provide an overview of the usage of social networks in knowledge management and the advantages that could be taken by using them. Initially, the authors focus on the theoretical aspects of social networks and their role in knowledge management. Subsequently, some ideas are presented for the application of social networks in different knowledge management processes, e.g. knowledge creation, knowledge sharing, knowledge evaluation, knowledge acquisition, knowledge collaboration, etc. Finally, the authors consider possible benefits from the point of view of the social network's users and their organization.

## Keywords

Knowledge management, knowledge management processes, social networks

## 1. Introduction

Social networks have gained large popularity in the last few years and successfully entered the private life of the internet savvy people providing them new tools for entertainment, sharing pictures and information, for communication, etc. At the same time, Web 2.0 is offering many opportunities to public and private organizations world-wide to collect feedback from their customers, ideas and knowledge from on-line communities or more generally take advantage from 'the wisdom of the crowd'. There is a fast growing penetration of social networks today [6]. Most of the scholars studying social network focus on their classification: according to the functionality they offer (e.g. searching and browsing capabilities [19], privacy protection scale [15] etc.) or the characteristics of consumers who use them (e.g. relationship classification [21]). The development of ICT offers an opportunity for fast analysis of social networks. A well-known technique for extracting information from social networks sites

(SNSs) is the social network analysis (SNA) – an approach which combines techniques from sociology and graph theory in order to extract dependencies.

On the other hand, the knowledge is determined as competitive advantage for organizations and knowledge management (KM) is becoming an important discipline for successful companies. Due to their popularity, social networks have become useful tools in various management activities and have provided many gains to people, who are using them. KM could avail itself also on social networks in the analyses of the relationships between employees, and the identification of knowledge flows. At the same time, people use various channels and models for communication and exchange of information and ideas. Here, social networks have a lot to offer and their wider utilization for various KM processes could be further explored. Having in mind the evolution of the KM strategy (Table 1), it is natural to link the social networks with knowledge management.

**Table 13** The evolution of knowledge management strategy [20]

<b>Knowledge Management Strategy</b>	<b>1998</b>	<b>2000</b>	<b>2002</b>
Technological	72%	66%	33%
Personalization	6%	8%	12%
Socialization	12%	26%	55%

It is noticeable that the socialization becomes important part of the strategy and it replaces more and more the technological aspects of knowledge management. The main question that the authors put on focus is how knowledge management could gain from social networks.

The aim of this paper is to provide an overview of the usage of social networks in knowledge management and the advantages that could be taken by using them. Initially, the authors focus on the theoretical aspects of social networks and their role in knowledge management. Subsequently, some ideas are presented for the application of social networks in different knowledge management processes, e.g. knowledge creation, knowledge sharing, knowledge evaluation, knowledge acquisition, knowledge collaboration, etc. Finally, the authors consider possible benefits from the point of view of the social network's users and their organization.

## 2. The Spread of Analysis of Social Networks

As a term, social network is defined by Barnes in the 1950s as “an association of people drawn together by family, work or hobby” [1]. With penetration of ICT in our everyday life the term became a synonym of social network site, which in fact is a representation of the social network in the virtual world.

Nowadays, when everyone shares information in SNSs, many people with different interests could gain from it. Of course, these benefits could be abused and used not for good purposes, but this is a question of security politics of SNSs. Scientists study different perspectives of social networks, but through the integration of knowledge social networks could bring benefits for all contributors [5]. For example, Christakis et al. find network phenomena in biological and behavioural aspects of obesity and claim that obesity spread through social ties [8]. There are hypothesis about what determines human social network structures, and one of them is that it is predicted by genes [13,14]. Some scientists use SNA in aspects of ecology [17]. By analyzing social networks the spread of diseases can be predicted as well [7]. It is obvious that social networks, SNSs and their analysis are currently among the most investigated topics.

A research shows that analysing a network could be done by using a mathematical model and applying mathematical rules for finding patterns and predicting events [5]. This approach is structural and easy for computer modelling which facilitates the research of the network. A

common technique for analyzing network members and their relationships is the use of affiliation graphs and metrics from graph theory which are interpreted in terms of the specific social network [2,4]. The common terms from specific graph metrics are centrality (degree, eigenvector, information), flow betweenness, betweenness, rush index and closeness.

Having in mind that many organizations have recognized the growing importance of KM for their own success [16], it is natural for KM to take advantage of the technologies and the methodologies related to social networks. The approach is suitable because the most common knowledge sources for people are other people [9]. The IBM Institute for Knowledge-Based Organizations defined four relationship dimensions in social network, which are important for effective learning [3, 9, 10]:

- Knowing what someone knows
- Quick access to people
- Creating viable knowledge through cognitive engagement
- Learning from a safe relationship.

These dimensions have impact on knowledge seeking. Identifying the knowledge holder is at the basis of knowledge sharing, but identification is not enough – the ability to access the knowledge holder is needed. The quality of learning process is affected by the level of engagement of both actors and the safety level of the environment [9]. By defining the dimensions SNA becomes more useful, because the network could be broken up into them, and precise evaluation of the knowledge processes could be accomplished [10].

The essential part of knowledge sharing is through informal social networks. Identifying and supporting informal networks in organizations can yield to performance benefits and can impact the employees' job satisfaction and performance [11]. By SNA it is possible to find important groups of employees and by working with them the collaboration will be facilitated [11]. The link between relationships in a network and knowledge creation process is proven [18] and by strengthening the relations between people, the organization can encourage new ideas and innovations. The three dimensions of social capital – social interaction, trustworthiness and shared vision – are marked as significant for knowledge exchange and combination [22].

### **3. SNSs and Knowledge Management**

ICT world representation of social networks eases especially the SNA. SNSs are built according to relations in the network, but events between actors are saved. The communications through SNSs are in written form, which allows performing SNA at later stage and stimulates reuse of shared knowledge. That makes SNSs suitable for knowledge management ICT system.

A given organization could build different SNSs in order to manage the knowledge in different networks – the network of suppliers, the network of customers, the network of employees, etc. The social approach presents a given business area as interconnected organizations and by applying SNA it will be easy to predict changes and make the organization's strategy more effective [12]. This could lead to fast development and better results.

Suppose that a network of customers is built by the following model:

- The nodes are organizations, people and products
- A connection between two nodes  $i$  and  $j$  exists if one of the nodes represents a person or an organization and the other represents a product and the person or the organization have bought the product

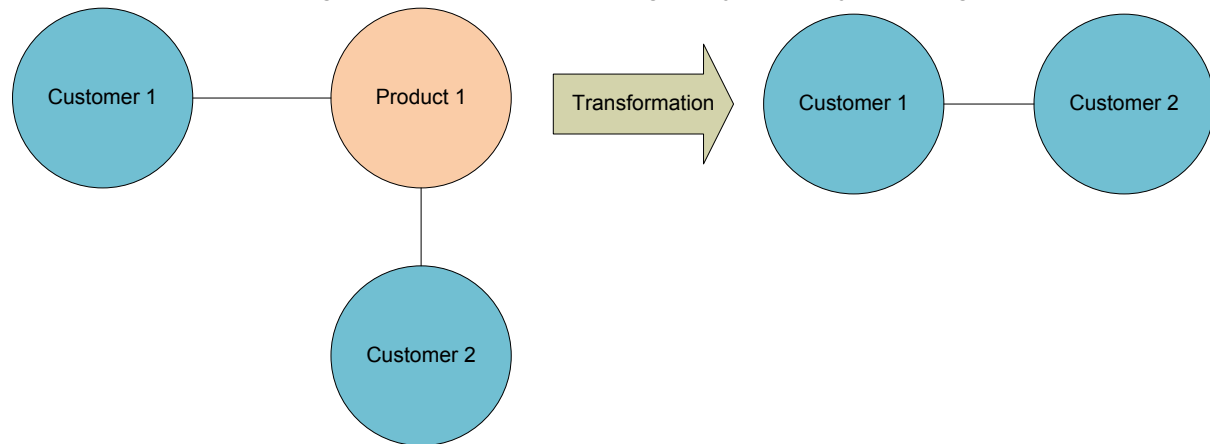
What knowledge could be gathered from such a network? The degree centrality of a node could be interpreted in two ways:

- If the node represents a product, the degree centrality evaluates how many customers have bought it

- If the node represents an organization or a person, it evaluates the number of bought products.

This example of evaluation is a simple demonstration on how knowledge about customers and products could be created. Furthermore, it could define “most sellable product” and “regular customers”. For more precise evaluation weight could be added to edges.

Let's transform the network in the following way: if the edges (i,j) and (h,j) exist and j is a product, then add an edge (i,h) and delete the edges (i,j) and (h,j) (see Fig.1).



**Figure 2** Transformation of the representation of the network

After this transformation the graph represents a network of customers, in which nodes with the highest degree formulate groups of interests. The hypothesis is that the influence of the customers on the market is relative to degree centrality of the node that they represent and the knowledge that these customers have about the product and market is important and accurate. This is a mechanism for defining knowledge holders – who knows what. Based on the postulate that customer has the best knowledge how to use the product, during the process of gathering requirements for new version of a product (or new product), these knowledge holders will contribute by their vision and ideas. But what will happen if the social network of customers of a given organization has its IT representation in SNSs? What will happen if the organization support building a network of customers and provide a SNS for easy communication between customers? A short catalog of benefits for organization is listed below:

- Gathering knowledge about customers – in saved information about the relation between customers the influence of each customer on the market could be predicted. This could help on identifying key customers and new market strategy.
- Gathering knowledge about how customers use the product – by sharing information about the usage of the product, customers identify important and supportive features. This knowledge could be used not only for designing new features and creating a priority support strategy, but for defining a pricing strategy.
- Understanding pros and cons of the product – by analyzing customers' satisfaction a list of competitive advantages of the product could be made. This could be a basis for competitor strategy
- Gathering ideas about problem solving from customers – customers solve their business problems and share information on how they use the product to solve their problem. This knowledge could be useful not only for the organization, that provides the product, but for other customers.
- Sharing ideas and collecting feedback – through the SNS the organization could share ideas about future developments and could collect comments to decide whether and how to change the product and the priority of the changes



- Fewer resources for support and trainings – shared solutions in SNS are reachable for employees and customers. The SNS could be treated as knowledge base in aspects of problems with a product, which could be used by employees and customers. On the other hand, the society of customers could find a solution and share it before the organization.

Knowledge, which is shared through SNS, is natural, because it is based on non-mandatory communication. There is no obligation on what to write, how to write it and when. Because of the lack of obligation, on the other hand, the SNS could remain empty. That is why a special politics and motivators should be designed by the organization in order to inspire its customers for collaboration.

An important dimension, which should be evaluated, is the level of engagement of the customers in knowledge sharing process. By using the SNA customers could be divided in two groups:

- Customers, who have knowledge and share knowledge – this group of customers is very important for introducing new ideas. They could be considered as partners who help with trainings for a new product or feature. If the company educates them well, they will spread the knowledge through the network and assist to other customers.
- Customers, who use the shared knowledge – these customers have a supportive role. They ask questions, which are based on their experience, and educate themselves about the product features.

By adding weight to customers in the network according to their level of engagement and calculating the product of degree centrality and rate will evaluate the customers. Based on this evaluation customers could be classified and different loyalty politics could be designed.

Designing the SNS, the organization should have in mind that customers may be competitors of each other and this could lead to not sharing knowledge. The organization should convince its customers that it has a strong confidence policy. It is important to develop two parts of the SNS – public and private one – and to give the customer the opportunity to choose the companies to which share knowledge.

The aim of the social network is to create a microenvironment for products, which will determine future development of products. The knowledge what customers knows, what they want, how they work is significant at the phase of definition of every product. Designing a good product is not only a producer's task, but also is a customers' task. But creating appropriate environment for gathering requirements is an arrangement of the producers. That's why the SNS should be provided and supported by the organization, which manufacture the product.

## 4. Conclusion

Nowadays, ICT provides lots of tools which could be integrated in a knowledge management system in order to enhance the knowledge management processes. The choice of a tool is important decision because the wrong technology could lead to not achieving the goals of the knowledge management process. As every approach, the usage of social networks in knowledge management should be evaluated against particular conditions. Implementing heavy SNA algorithms and providing supportive hardware is expensive and the decision for choosing them should be taken very carefully. Probably, minimizing of the costs of SNSs and SNA is achievable through cloud solutions and the lower price will make them more popular. The definition of criteria for usage is a subject of future research – analysis of costs and time needed for implementation and integration, analysis of the organizations for which they are suitable according to size and type of business, analysis of needed skills, etc.

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# Social Entrepreneurship: Challenges of Impact Assessment

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Social Entrepreneurship, having a long history as a practice, offers unique opportunities for academic research as a relatively young field of study. It challenges the practitioners and scholars to revise conventional ways of thinking in a variety of fields of business and management research. The paper examines the pallet of definitions and forms of Social Entrepreneurship offered by today's literature, further focusing on the challenges related to performance assessment and measurement of the social impact; reviews the qualitative and quantitative approaches in measuring social outcomes, with consideration of the complexity issues. To stimulate future research, the paper offers a discussion on importance of further development of social impact assessment standards based on sector by sector approach and the effective use of participative nature of the social enterprises that can provide advantages in efficient social impact assessment.

## Keywords

Social Entrepreneurship, Social Business, Social Value Assessment, Social Impact Assessment

## 1. Introduction

"Importance of building administrative and operational capacity among mission-driven organizations has emerged over the past several decades. Blending management principles from the for-profit world with social values of the non-profit sector, a vanguard of social entrepreneurs and non-profit managers has created a new generation of non-profit organizations, socially responsible businesses, and social-purpose enterprises that balances scale with quality, financial stability with social impact, and community ties with rapid growth. Meanwhile, a new generation of philanthropists and social investors has created strategic investment tools and grant making strategies that focus on improving the administrative and operational capacity of mission-driven organizations".[1]

This paper will try to outline the challenges related to social impact assessment and measurement of social value. And one of the first challenges one might face exploring such discipline as Social Entrepreneurship is lack of the unifying paradigm. While the pioneer of Social Business Professor Muhammed Yunus prefers to make clear separations between such terms as "Social Business", "Social Enterprise" and "Non Profit Organizations" [2], in many cases the wider concept of Social Entrepreneurship can be found in literature implying "socially driven organizations with social and/or environmental objectives combined with a strategy for economic sustainability"[3]. After examining the definitions and forms of social entrepreneurship offered by the latest research, the concept of social value and value creation as well as the concept of social impact are further covered in the third part of the paper. It also outlines some of the challenges social impact assessment faces today with differences in perception of the theory of change among the funders and grantees. In conclusion, the importance of consideration of complexity issues and participatory approach in social impact assessment are being discussed.

## 2. Social Entrepreneurship

Social entrepreneurship practitioners have always existed. Bacq and Janssen bring examples of Florence Nightingale, a British pioneer who has fought to improve the hospital conditions during the Crimean War in the XIX century, making mortality rate drop from 40% to 2%; a foundation in Columbia, which was established in 1911 with the aim of generating and devoting revenues to the creation of social value, and others. However, they point out that the concept is relatively new to the academic world and, due to lack of unifying paradigm in the field there is a proliferation of definitions, with differences in approaches depending on geographical location or schools of thoughts contributing to this phenomenon. Therefore, hunting for definitional clarity, they offer fixed definitions for the social entrepreneurship, defining it as “a process of identifying, evaluating and exploiting opportunities aiming at social value creation by means of commercial, market-based activities and of the use of a wide range of resources”; the social entrepreneur, being a “visionary individual, whose main objective is to create social value, able at one and the same time to detect and exploit opportunities, to leverage resources necessary to his/her social mission and to find innovative solutions to social problems of his/her community that are not properly met by the local system. This will make him/her adopt an entrepreneurial behaviour”; and the social entrepreneurship organization or social entrepreneurial venture (SEV). [4]

While there are distinct differences between the social and conventional entrepreneurship, the major ones being related to the primary mission being social value creation and profit-maximisation respectively, there are deep similarities at the roots of the two concepts. Bacq et. al outline the similarities in academic paths between the social and commercial entrepreneurship such as: 1) occurrence of the fields among practitioners long before attracting the researchers attention, making research itself mainly phenomenon-driven; 2) lack of unifying paradigm with fuzzy boundaries with other fields of research; 3) underdeveloped research base – the academic research in Social Entrepreneurship is still at the infancy stage, as it was for the academic research of its parent field of Entrepreneurship, which had undergone a dramatic theoretical evolution, being recognized as an academic field, steadily reaching its adolescence.

This being said, there are still discussions suggesting that since all of the successful enterprises generate social value directly or indirectly- through the innovative approaches, creating work places and generating tax, there is no need to distinguish social entrepreneurship from the conventional type. In response to the challenge of establishing characteristics and defining boundaries of the social entrepreneurship, Dacin, Dacin, and Matear offer dividing the term entrepreneurship into four domains: conventional, institutional, cultural, and social. [5] According to the authors, the following definitions identify the types of entrepreneurs:

- Conventional: An agent who enables or enacts a vision based on new ideas in order to create successful innovations (Schumpeter, 1950)
- Institutional: An agent who can mobilize resources to influence or change institutional rules, in order to support or destroy an existing institution, or to establish a new one. (DiMaggio & Powell, 1983)
- Cultural: An individual who identifies an opportunity and acts upon it in order to create social, cultural, or economic value. (DiMaggio, 1982; Wilson & Stokes, 2004)
- Social: An actor who applies business principles to solving social problems [5]

While the above concepts might be overlapping, there are great opportunities in better understanding of the distinctive nature of the mission, processes and resources leveraged in a social entrepreneurial context. Each of the domains can benefit from the lessons learned of the others, such as entrepreneurial failure cases in the conventional type, processes of resource mobilization from the institutional and cultural entrepreneurship practices.

### 3. Social Value, Social Impact and Its Measurement

#### 3.1 Concept of Social Value

The words “social value” is easily found throughout the academic literature related to social entrepreneurship, widely used by the practitioners of the field. Most of the definitions emphasize that the difference of social entrepreneurship from the other types of enterprises is the “social value creation”. However, value, and particularly social value, is the concept often used without being defined. The reason could be in differences of value perception by the different groups in society, created by the social inequalities, which also leads to the challenge of value measurement. Yet, here are some definitions that are being offered by the following resources:

- Social satisfaction of a social want (Nghia, 2009) [6]
- Unique benefit that is created for society (Global Social Venture Competition, 2011) [7]
- Principles and standards of human interaction within a given group that are regarded by members of that group as being worthy, important, or significant. (education.com) [8]

Nicholls J. notes that “Social enterprises represent a growing number of people that, through their businesses, recognise that business can create social (as well as environmental and economic) value. Social enterprises operate in markets in order to address social needs and reduce inequality, recognising that this has value...and within prevailing sets of relative prices, it can cost more to create social value.” [9] Measuring the social value is an important tool to understanding and improving the business performance, customer or stakeholder satisfaction, as well as can contribute to innovations, leading to creations of new goods and services.

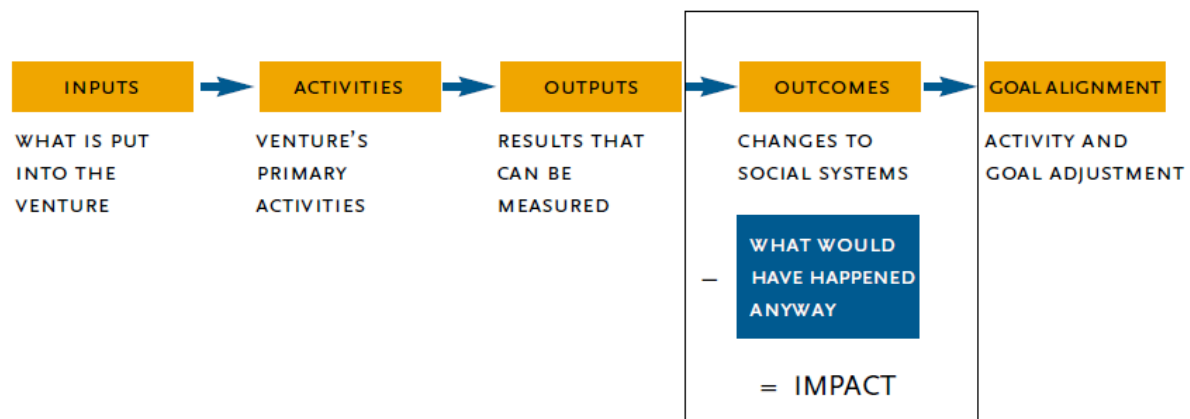
The difference between value measurement in the conventional business and social enterprise depends on their respective bottom-lines, whereas differentiating between the conventional business with social responsibility and social enterprise can get more complicated. It could be possible, however, to note that the businesses involved and practicing corporate social responsibility (CSR businesses) are more likely to focus on whether the organisation achieves its desired social impact while the business driven by social mission would rather focus on the means of revealing the missing value that is being created (or destroyed) by that organisation. Despite the seeming similarity in the missions of the two types of organizations, for a value-driven business, the measurement of this missing value is what allows the organisation to be sure it is true to its organisational values.

What is important to mention regarding the social mission-driven organizations, is that participatory approach at all stages of management from planning to implementation is of an immense importance. And while the development organizations are struggling with implementation of the participatory approach in project management, it happens to be something very natural in the socially oriented businesses as participation stays at the core of its value. “The stakeholder is the source of understanding value, so this means assessing value in relation to what the stakeholder wants from their involvement with an organisation and not assessing value in relation to the organisation’s perception of its value... This stakeholder approach to understanding value ensures that those affected across all stages, from production to consumption, are considered and that they develop an understanding of their role in the creation of value”. (Nicholls, 2007)

The case of Grameen Bank, where the conventional training in fund management for the poor borrowers was never used in firm belief that “they [the poor] don’t need us to teach them how to survive, they already know how to do this”, is illustrative. Their goal was “to liberate the potential of the poor to create better lives for themselves, not to force individuals to do anything they do not want to do”. At the same time the organization employees were trained intensively for “building a problem-solving attitude among the workers”. [10]

### 3.2 Understanding Social Impact

The International Association for Impact Assessment defines Social Impact Assessment (SIA) as “analysing, monitoring and managing the social consequences of development.” However, in the International Principles for Social Impact Assessment, where the abovementioned basic definition is being offered, the emphasis is made that the SIA as a practice includes “the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment.” Its objectives are set to ensure that “development maximises its benefits and minimises its costs, especially those costs borne by people.” [11] However, social impact itself is an “under-theorised concept” [3]. Catherine Clark et al. define impact as “the portion of the total outcome that happened as a result of the activity of the venture, above and beyond what would have happened anyway” [12 p.7]. As illustrated in Figure 1, the Impact Value Chain makes a very clear differentiation of output from outcomes. In this model it is also very easy to trace the flow of cause-and-effect relationships. According to this definition, outputs are “results that a company, nonprofit or project manager can measure or assess directly”, while the outcomes are “the ultimate changes that one is trying to make in the world.”



**Figure 1** Impact Value Chain Catherine (Clark et al. in Double bottom line project report, p.7)

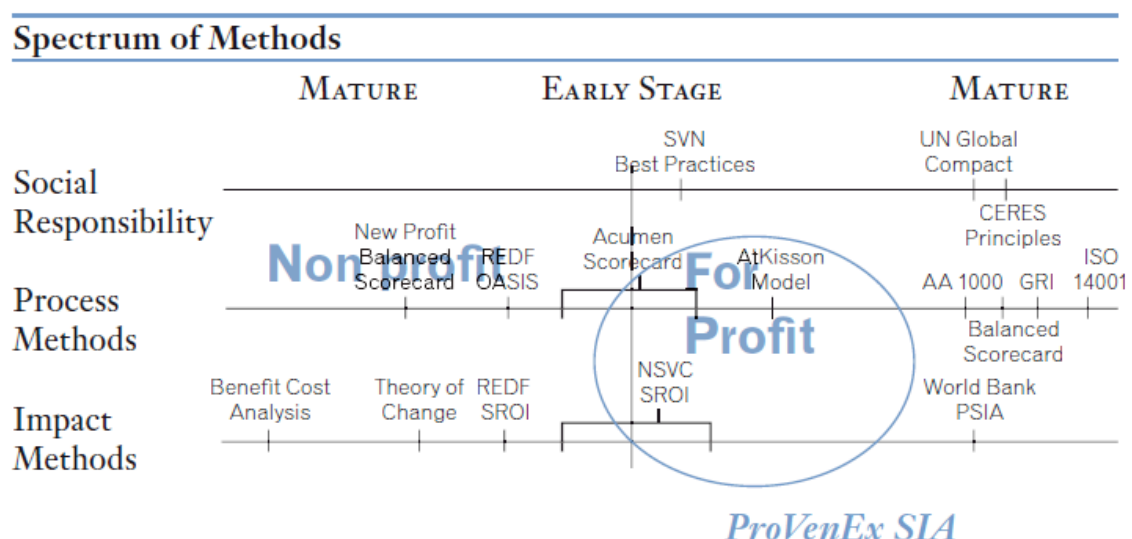
To visualise the social impact, it is possible to say that the concept is deeply connected to changes to people's way of life, their culture, community, political systems, environment, health and wellbeing, personal and property rights, their fears and aspirations. And therefore, all issues that affect people, directly or indirectly, are pertinent to social impact and SIA. [11 p. 8].

### 3.3 Challenges of Social Impact Assessment

The social and environmental reporting practices have been more and more aligned and standardised over the last decade of the past century. It was reinforced by such initiatives as the Kyoto Protocol in 1997 and Dow Jones Sustainability Index, Global Reporting Initiative in 1999, and associated with development of such standards as AA1000, principles-based standards adopted in 1999 to assure sustainability reports, and ISAE 3000, the International Standard on Assurance Engagement, that became a requirement after January 1, 2005. In 1999 also the Social Accounting Network has started in the UK, followed by other social audit and social return networks developing across Europe [9 p.7]

When it comes to measuring social outcomes and impacts, Ridley-Duff et al. mention two approaches widely used in the UK: more of a qualitative social accounting and audit (SAA),

advocated by the Social Audit Network, and comparatively quantitative social return on investment (SROI), based on work in mid 1990s by Jed Emerson in the US, and adapted by the New Economics Foundation in the UK. [3 p.231]. While, according to the authors, the agencies usually tend to use one or the other method, they do emphasize the added value of using both to of the methods by the companies. They compare the SROI method to the statutory accounts that are designed primarily to help investors in the conventional businesses, and compare SAA reports with the management accounts that are needed to supplement statutory accounts, providing internal view needed for management activities. There are many toolkits which support and even overlap with these approaches. Already in 2003 the Double Bottom Line Project, funded by the Rockefeller Foundation, has come up with the framework presenting sixteen different models used to assess the social impact of investments in double bottom line businesses and non-profit organizations. The Figure 2 shows the relation of these assessment methods in terms of three variables: the type of venture to which the method is most suited (non-profit or for-profit); the investment stage, to which the method is most suitably applied (early stage or mature); and the functional content (measuring outcomes, managing organizational processes, or gauging the level of social responsibility).[1 p.4]



**Figure 2** Sixteen Social Impact Assessment Methods Currently Used in the Nonprofit and For-Profit Sectors (Copyright 2003, Double Bottom Line Project: Clark, Rosenzweig, Long, and Olsen)

On one hand, rich set of conceptual frameworks and analytical tools might give an impression of social entrepreneurship as of a very well developed field of practice and study. However, on the other, the study showed that the major challenge of the field was associated with misalignments in goals, methodologies, and strategy due to differences in theories of change, goals, metrics, and reporting requirements among the funders and differences in theories of change and management priorities between the funders and grantees. Based on the comprehensive results of the abovementioned project by Clark et al, the main challenges in the field and principles needed to overcome them had been identified from the conceptual, operational, structural, and practical point of view. The findings are summarized in the Table 1.

**Table 1** Summary of challenges and principles needed according to Clark et al.(2003)

	<b>Challenges</b>	<b>Principles</b>
Conceptual	Best practices are not standardized. Theories of change need to be aligned among grantors, investors, and non-profits.	Funders and grantees should align goals, assessment tools, and best practices.
Operational	Value cannot always be measured. Quality implementation is essential. Measurements should be practical, technically sound, and useful. For quality assessment, the third parties need to be involved, which can be expensive and difficult Time horizons for output and outcome measurement are long.	Grantees and investors should acknowledge evaluation expenses as part of the cost of doing business where appropriate, invest in measurement systems and tools, and develop examples of proven impact.
Structural	Significant diversity exists within each field. Reporting requirements are usually not aligned.	Striving to balance breadth with consistency, each field and subfield should explore a range of possible outcome goals and best practices for measurement.
Practical	Goals are often unclear. Inconsistent funding priorities. Trust and mutuality are limited.	A commitment to outcomes assessment can be a fundamental part of the management structure and organizational culture among funders and non-profits alike.

The large number of approaches shows that the social impact assessment has become a busy area compared to the relatively small number of organizations using these approaches. And although the new approaches and ideas may bring improvements, the area remains potentially confusing. "The growing number of labels and tools and the difficulties of auditing these can confuse customers and perhaps even reduce demand for these approaches." [9 p.8] Nevertheless, the field is developing and growing as a practice and as an academic discipline. As the field is developing, some of the methods blend into systems of approaches, and others might transform into the new evaluation practice. The Global Social Venture Competition, organized by the Haas School of Business in its SIA Guidelines requires definition of social value proposition through the Theory of Change, measurement and quantification using the Impact Value Chain (Figure 1), and setting measurable social impact indicators, and monetization using the Social Return on Investment (SROI) analysis, therefore blending several approaches into one evaluation system. Different methods are being developed and standardised by the professional networks and organizations on sector by sector approach, as, for instance, the Social Performance Management (SPM) Principles emerged in the field of microfinance, connecting interested individuals and entities into the SPM Network.

## 4. Conclusion

Over the past decade the SIA as a field of research and practice has greatly matured. The International Principles for Social Impact Assessment (2003) were issued to outline the philosophy behind the SIA and serve as a basic document for the developing sector and national guidelines. [11] ISO26000- an international standard on social responsibility was adopted in 2010 and Human Rights Impact Assessment, adopted by the European Commission in 2011. There are professional associations of researchers and practitioners promoting collaboration and standardization in the field, such as the International Association for Impact Assessment, the SROI Network, regional Venture Philanthropy Associations that



are also interested in the matters of social impact assessment and many others. In order to give more room for innovation and for the sake of effective standardisation practises, the division by sectors in impact assessment, depending on the field of involvement, could make social impact assessment standardization process more practical. The examples of the abovementioned SPM network in microfinance or Health Impact Assessment developed and promoted by the World Health Organization (WHO) are the examples that this kind of sector-based division is effective.

Another concern is in a notion that most of the SIA driving forces are concentrated among researchers and funders, leaving the social entrepreneurial ventures only the implementation part. That the tools and methods developed are mostly used as an ex-ante (in-advance) prediction or external reporting tools by the social enterprises to be eligible for funding opportunities, rather than effectively implementing the SIA into the organization's internal planning and capacity-building tool. Impact assessment are currently practiced to its full by large foundations previously experienced in impact assessment. A good example is Melinda and Bill Gates Foundation that puts a lot of effort into research, evaluation, and learning. However, it might be too difficult for small social venture start-ups to put as much resources into evaluation of its impact. The difficulties are not only related to the challenges mentioned above, but mainly are due to the complex nature of social innovation itself. Traditional approaches in evaluation can be misleading, missing the uniqueness of the organization objectives and values, while, on the other hand, the social entrepreneurial venture constantly developing might outgrow or change the direction. Therefore the complexity concept should be taken into consideration from the point of view of developmental evaluation. [13]

Social enterprises need an understanding of SIA being an important investment of time and resources and as an important step for its constant development, growth, and improvement. The field has established rich conceptual frameworks with best practices and lessons learned that can be implemented by the social venture depending on its field of practice and sale. Increased participatory nature of relationships within such enterprises can make the process of social impact assessment more transparent and effective. And while the concept of social value will be different in different markets and for different people, understanding that the results are relative, and will arise based on the various stakeholders' negotiations and commitment to the core mission and values of the organization could play an essential role in future success of the social enterprise.

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# The Youth Entrepreneur Profile - Initial Steps

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Over the last decades theoretical and empirical researchers tried to record the necessary for the business start-up and growth, entrepreneurial qualifications. Many efforts focused on those competences that should be taught to the educational system, rather to the tasks that an entrepreneur should cope with. The present paper proposes the youth entrepreneur profile and especially the functions, activities, tasks and qualifications that he/she should do or meet in order to start and growth his/her business. Empirical research is needed in order to verify and test the proposed profile.

## Keywords

Youth Entrepreneurship, Knowledge, Skills, Competences, EQF

## 1. Introduction

Many theories and models were supported for the explanation of the entrepreneurial phenomenon. These theories and approaches are related to personal characteristics, attitudes, environmental and economic factors and also relates to the degree of entrepreneurial culture that a society promotes and to the personal cognitive state during the decision making procedure. Of course most of the supported theories converge to the opinion that an entrepreneur should demonstrate several qualifications [1], which according to European Qualification Framework should be described in terms of three types of learning outcomes such as a) knowledge, b) skills and c) wider competences. Learning outcomes (personal and professional) refer to the “set of knowledge, skills and competences that an individual has acquired and/or is able to demonstrate after completion of a learning process and also are statements of what a learner is expected to know, understand and/or be able to do” [2].

Knowledge “is the facts, feelings or experiences known by a person and means the outcome of the assimilation of information through learning and is the body of facts, principles, theories and practices that is related to a field of study or work [3] such as entrepreneurship. Concerning skills in the European Qualification Framework working document these are defined as the knowledge and experience needed to perform a specific task or job and the personal ability to apply knowledge, to use know-how to complete tasks and solve problems. Additionally, it is supported [4] that the definition of skills is used for a specific level of performance, while Proctor and Dutta [5] define skills as the targeted and well organized

behavior and the required knowledge and experience for the execution of a specific task or project. Finally, skills usually refer to “a level of performance, in the sense of accuracy and speed in performing particular tasks (skilled performance)” [6].

Trying to define the term competences, the majority of researchers and practitioners support that these are the knowledge, skills and know-how in a specific task. Competences also are the ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and/or personal development including: i) cognitive competence; ii) functional competence; iii) personal competence; and iv) ethical competence [7]. Fulfilling a competence level an individual is able to use his/her knowledge, skills and wider competences according to the requirements posed by a particular context, a situation or a problem and is able to deal with complexity his/her level of competence [8].

Highlighting the importance of the qualifications that a person should acquire, European Commission [9] propose eight (8) key competences for personal fulfillment and development, active citizenship, social inclusion and employment and among them are the sense of initiative and entrepreneurship. The sense of initiative and entrepreneurship refers to an individual ability to turn ideas into entrepreneurial action. It includes creativity, innovation and risk-taking, as well as the personal ability to plan and manage tasks in order to achieve these objectives. [10].

Moreover, it is necessary to identify and measure the entrepreneurial competences in a reliable and valid way [11] and new analytical frameworks and empirical research is needed to correlate thinking on entrepreneurship and competences [12]. The identification and assessment of the entrepreneur competences are important from a scientific as well as a practical point of view [13]. The present paper deals with the young entrepreneur profile and the basic learning outcomes for business start up. Moreover, the aim is to identify the functions, activities and tasks for the youth entrepreneurial activity and the necessary learning outcomes, because until recently small amount of effort is posed for the youth entrepreneur profile and the necessary for the startup and entrepreneurial development and success qualifications. Such a research could contribute to the effective design, planning and development of the educational and training programs and curriculum which will be more related to the market needs.

## **2. Basic Knowledge Skills and Competences for Youth Entrepreneurship**

For many years researchers and practitioners tried to investigate the competency-based education [14], and the qualifications that should be taught to young people in order to be successful entrepreneurs. This curriculum development method does not necessarily consider the educational content as the starting point, but the competencies that should be acquired in order to be successful in a certain task or job [15]. Competencies are seen as characteristics that a person brings to a job situation, which can result in effective and/or superior performance in such job [16] and include among others motives and traits, social role and self-concept, knowledge and skills [17], [18], [19]. Concerning entrepreneurs, it seems that they do not have specific jobs but tasks to comply with as they start and manage their enterprise [20]. Therefore, Izquierdo and Deschoolmeester, [21] posed the question: what are the entrepreneurial competencies that the entrepreneurial education and training should address for entrepreneurs? This question is more important as far as it concerns young people and the tasks that a youth person should fulfill in order to start and run successfully an enterprise and the qualification that he/she should meet.

Back in the '80s Boyatzis [22] supported that competences are the underlying characteristic exhibited by a person that can result in a job, and based on this definition [23] Bird supports that entrepreneurial competencies are the personal characteristics which result in new venture creation, survival, and/or growth. According to the level of exhibition, entrepreneurial

competencies are categorized as a) threshold which are those considered as baseline or at a minimum standard, and include the competencies required to successfully start an enterprise and b) success competences which are those for going beyond start up into organizational survival and growth [24].

Only few approaches were supported for the competence based education, with the first to focus on personal traits and characteristics, and the second on competences. Personal and psychological factors are important for entrepreneurial success and Lans et al. [25] supports that competences are a) context-bound, b) subject to change, c) connected to activities and tasks, d) subject to learning and development processes and e) they are interrelated. A second method consists of the Behaviorally Anchored Rating Scales (BARS). BARS are used to identify criteria for effective performance, using evaluation of job performance and the third method is the action research. Finally, Caird [26] proposes another method for describing the competences. This analysis is a known technique for curriculum development and concerns the analysis of task related to a certain job or profession. Specific knowledge, skills and competences for each task should be met for the profile of the entrepreneur.

A question that should be addressed is which are the qualifications that a young entrepreneur should meet in order to start and growth his/her enterprise? According to Bird [27] different levels of entrepreneurial competencies are exhibited by individuals who start an enterprise or manage existing organizations, but he also points out that research is differentiated, especially when the success criteria is considered. Furthermore, Spencer and Spencer [28], support that competencies can include: recognizing the relevance of relationships in a business context, high quality of work, assertiveness, self-confidence, and taking actions to overcome obstacles. At the knowledge and skill level, finance/cash management, accounting, marketing, and sales have been frequently cited as important topics for entrepreneurship [29] and also leadership, communication, and human relations are crucial for entrepreneurial success. Another proposed skill for the entrepreneur is creativity, [30], [31], [32] and this presupposes differentiation, persistence and curiosity by individuals who should recognize new and innovative ideas. Other competencies and personal characteristics that are proposed for the entrepreneurial success are the tolerance for ambiguity, the opportunity recognition and evaluation, networking, intuitive thinking, and identifying and solving problems, and team building skills [33], [34], [35], [36], [37]. Moreover, the extant literature highlights the importance of decision making competency as crucial within the entrepreneurial process [38], [39], [40], [41].

Also, Izquierdo and Deschoolmeester [42] in their extensive literature review suggested that the entrepreneur should meet the below listed knowledge/skills/competences:

- Decision making, Innovative thinking, Identifying and solving problems, Communication skills, Deal making and negotiation, Identifying business opportunities, Evaluating business opportunities, Team working skills, Intuitive thinking, Coping with stress, Coping with uncertainties, Team building, Taking calculated risk

However, according to Javier [43] the entrepreneur should also have a technical background, and previous job experience. This point of view is based on an open exposition where the entrepreneur should have:

- Knowledge of business sector and markets, knowledge on production process, technical knowledge of the product or service to be produced, knowledge for potential clients, knowledge and relationship with potential suppliers, management knowledge, leadership

Moreover, Byer & Fairmont [44] suggested that the IT ability is crucial for business development while, Velegarakis et al. [45] in their extensive research stated that the personal characteristics/knowledge/skills/competences that an entrepreneur should have are:

- Attitude towards uncertainty and risk, Innovative spirit, Fulfillment of tasks and goals, Self-confidence, Communication skills, Ability to discover new opportunities, Conceptual ability (understanding the business as a system), Negotiation and decision-making abilities, Time management for own work and team's work, Fully leverage the capacities

and the knowledge of employees, Promotion of mutual confidence, Ability to build and lead a team (leadership spirit), Project management ability, Ability to create and provide Strategic/Tactic/Operational plans, Allocation/attribution of tasks to human resources in an organization, Management ability of other (non-human) resources, Knowledge of what to think about when deciding whether to found a business or not, Awareness of corporate social responsibility, Knowledge of legal requirements for business, Knowledge of the most important legal forms of business ownership, Knowledge of the administrative/bureaucratic procedures for a business startup, Knowledge of general business conditions and functions, Knowledge about foreign trade and international business relations, Knowledge about the difference in financial issues between different types of enterprises, Knowledge about how to manage the different functions within an enterprise (production, sales, financial management, research & development.), Understanding the different forms of financing (self-financing, external financing), Basic skills for sales, Knowledge about accountancy and taxes, Ability to plan and control: direct costs, overhead costs, cost prices, gross and net sales price, and earnings/profit

Finally, a research conducted in the frame of a Leonardo da Vinci project named Student starter ([www.studentstarter.eu](http://www.studentstarter.eu)) highlighted several personal and management competences and indicators for entrepreneurship and for the entrepreneur profile. These are:

- Planning and organization, Awareness of the market, Taking risks on a calculated base, To be proactive, Initiating, Perseverance / drive / motivation, Communication skills, Decisiveness, Customer orientation, Knowledge of environmental aspects, Networking ability

Moreover, Vasiliadis [46] categorized the knowledge, skills and personal characteristics that an entrepreneur should meet, and these are presented to the following table:

**Table 1** Knowledge, skills and personal characteristics

Knowledge about	Skills for	Personal Characteristics
Promotion of the entrepreneurial idea	Market research	Creativity
Start up and enterprise development	Competition analysis and entrepreneurial strategy	Entrepreneurial potential
Developing strategies to address threats and integrate changes	Identifying business opportunities	Self-control
Funding	Management skills	Innovation
Sustainability plan	Sales skills	Risk taking
Financing	Problem solving	Tolerance for change
Small enterprises principles	Business plan	Leadership
Low issues	IT skills	
Human resources management	Writing and oral communication	
Different types of enterprises	Decision making	
Planning entrepreneurial resources	Negotiation techniques	
Basic management knowledge		
Entrepreneurial advantage		
Entrepreneurial difficulties		
Successful entrepreneurship		
Product quality		

Based on Vasiliadis, [47]

The above literature review is only a small part of the discussion for the qualifications that an entrepreneur should meet in order to be successful at starting and managing his/her enterprise. On the contrary small amount of literature exists for the description of the youth

entrepreneur profile and especially for the functions, activities and tasks that he or she should fulfill during the entrepreneurial process and the learning outcomes for these qualifications. The next paragraph deals with the research methodology for the investigation of the proposed youth entrepreneur profile.

### **3. Methodology**

The development of the proposed youth entrepreneur profile was based on the task analysis approach and a desk research and extensive literature review within the European Network on Youth Employment and the Working Group of Entrepreneurship. Preliminary quantitative research was conducted with academics (using the methodology proposed by Vasiliadis, Christodouloupoulou, Leontarakis, [48]) in order to increase the credibility and the reliability of the research. Initially the basic tasks and the learning outcomes were developed by academics using the Delphi method. The findings of this research lead to the research questions development which was used for the quantitative research conducted in four (4) European countries. The research population of the quantitative research constituted a) of individuals above 18 years old which established their own enterprise and b) educators in the topic of entrepreneurship. The final sample consisted of 96 persons, 30 from Lithuania, 16 from Spain, 25 from Sweden and 25 from Greece. A random sampling method was used but there were no specific quotas and for that reason the results need to be verified by other empirical and theoretical researches.

### **4. Research Instrument**

The research instrument was a structured questionnaire which was used for the collection of the necessary data and was based on a literature review concerning the included questions and the measurement scale of each variable.

During February and March 2011 a survey was implemented to make a value-study with young entrepreneurs as a sample. Both paper and web-survey questionnaires was used. The questions were developed after an extensive literature review and they were standardized in a focus group. These questions investigate the Knowledge, Skills and Competences that the Youth Entrepreneur should demonstrate in order to start and manage successfully his/her own enterprise measuring how often they use specific topics. Pilot testing conducted in order to increase the questionnaire reliability. Moreover, the credibility of the research instrument was very high as the Cronbach Alpha indicator of each variable was very strong, and for the variable of Knowledge was 0,88 for the variable of Skills was 0,86 and for the variable of Competences was 0.88.

After the completion of the literature review and the focus group, the proposed Youth Entrepreneur Profile was developed according to Caird [49] suggestions and the job function analysis approach. This approach involves the profile analysis divided in tasks and detailed learning outcomes (Knowledge, skills and competences) for each task were developed. The base for the development of the youth entrepreneur profile and the clustering process was the extensive literature review and two workshops with international participation which took place in Berlin and in Madrid and in which the outline was proposed to expert attendances and peer reviews took place. The next paragraph describes the results of the quantitative research and the proposed Youth Entrepreneur Profile.

### **5. Results**

The results confirmed the knowledge, skills and competences proposed by the literature that the youth entrepreneur should have and in parallel the proposed functions and activities. The

average importance of the proposed knowledge, skills and competences that the entrepreneur should have is presented to the following table 3 where the number 1 is non-important and 5 the most important factor.

**Table 3** Tasks and Learning outcomes for young entrepreneurs

	Knowledge area*	Skills area*	Competences area*
Advertising	2,28	2,39	2,23
Business development and success	2,45	2,45	2,32
Choosing places and equipment	2,35	2,39	2,29
Communication	2,57	2,56	2,54
Create a business plan	2,50	2,57	2,38
Financial analysis	2,22	2,26	2,14
Finding and choosing funding means	2,23	2,21	2,12
Identify and evaluate entrepreneurial opportunities	2,51	2,53	2,49
Leadership and Human Resources management	2,44	2,47	2,39
Market analysis and research	2,39	2,46	2,24
Marketing	2,42	2,45	2,43
Monitoring financial flows	2,12	2,17	2,08
Pricing	2,28	2,38	2,29
Quality management	2,25	2,34	2,25
Risk Management	2,26	2,29	2,18
Sales	2,41	2,43	2,40
Time management	2,44	2,48	2,34

\* The average per topic

The quantitative research results were the base element for the two international workshops with experts as participants, clustering the above learning outcomes in functions, activities and tasks which are presented below (table 4):

**Table 4** Functions, Activities and Tasks for youth entrepreneur

Functions	Activities	Tasks
1. Entrepreneurial idea recognition and evaluation	1.1. Opportunity and recognition evaluation	1.1.1. Identify and evaluate entrepreneurial opportunities 1.1.2. Time management 1.1.3. Risk Management
2. Start up an enterprise	2.1. Creation of business plan 2.2. Funding scheme and placement 2.3. Financial issues	2.1.1. Create a business plan 2.1.2. Market analysis and research 2.2.1. Finding and choosing funding means 2.2.2. Financial analysis 2.2.3. Choosing places and equipment 2.3.1. Monitoring financial flows 2.3.2. Financial analysis
3. Entrepreneurial development and success	3.1. Management	3.1.1. Business development and success 3.1.2. Leadership and Human Resources management 3.1.3. Time management



	3.1.4. Risk Management
	3.1.5. Quality management
	3.1.6. Financial analysis
	3.1.7. Monitoring financial flows
3.2. Marketing	3.2.1. Marketing
	3.2.2. Market analysis and research
	3.2.3. Communication
	3.2.4. Pricing
	3.2.5. Advertising
	3.2.6. Sales

As it can be seen to the above table only an initial categorization can be done according to the profile and far more research should be conducted in order to verify or not the proposed clustering. As far as it concerns the overall learning outcomes these are available at the European Youth Employment Network website.

## 6. Conclusions

The development of the entrepreneur profile and especially the youth is an open research practical and theoretical issue. The aim of the present paper is to contribute to the open dialogue for the qualifications that a young person should comply with in order to start and manage successfully an entrepreneurial activity. Also, the conducted research aimed to find out what are the main problems that obstruct business start-up and development of the young entrepreneurs. The present research also measures the importance of various steps and personal characteristics needed in successful business development. From the quantitative research came up that personal characteristics, propensity towards enterprise and thorough initial preparation are important factors to successful business start-up and development by young entrepreneurs. The last ones feel the least confident while trying to cope with various administrative problems, such as monitoring financial flows, doing financial analysis, setting competitive prices and other. The lack of knowledge, skills and competences in the aforementioned issues aggravate competitive abilities and thus entering the entrepreneurial market.

The paper proposes the youth entrepreneur profile divided in functions, activities and tasks for each activity, but more theoretical and practical research should be done. Especially future research should focus on the analytical qualifications that the youth entrepreneur should have and the learning outcomes such as knowledge, skills and competences and how these could be validated and accredited within the European Union organizations and institutes. This accreditation could be related to the European Qualification Framework in order to promote effectively the youth mobility and employment in the European economic area.

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# Student entrepreneurial characteristics and attitude toward change in Macedonia

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Individual attitudes toward change emerge as one of the most pervasive factors in individual resistance to processes of change. Positive attitudes toward change represent the basic of human development. In modern world and life it's crucial for the people to be open for new ideas, new events, to be the creators of most of them. This roll is specially expected to be part of the entrepreneur's everyday life. There is general agreement that attitudes towards the change, entrepreneurial activity, and its social function are determinant factors for university students to decide an entrepreneurial career. The purpose of this study is to determine whether there is a correlation between student entrepreneurial characteristics and their attitudes toward changes. In this paper, attitudes toward changes are seen throughout these aspects- the traits of change-readiness: resourcefulness, optimism, adventurousness, passion/drive, adaptability, confidence and tolerance for ambiguity. The survey was conducted after participation of the university student in the class Entrepreneurship.

## Keywords

Attitude, change, entrepreneur, university student

## 1. Introduction

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 lifelong learning are considered to be most effective ways of promoting creativity and innovations. Entrepreneurship has a more critical role for economies - especially in developing countries - since it can be an engine of economic progress, job creation, and social adjustment. Entrepreneurial intention is a state of mind when people wish to create a new firm or a new value driver inside existing organizations. It seems that university students are potentially suitable for directing their capabilities toward entrepreneurial actions. From a societal perspective, both entrepreneurship and the educational system are important for economic growth, but the importance of education for entrepreneurship has been acknowledged only recently. [1] The university is an institution through which students pass on their way toward a productive working life. Students will make career decisions after, and often before, graduation. In fact, a university education has a significant role in career formation and business development after graduation. [2]

## 2. Characteristics of Entrepreneurs

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 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. 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 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. [4]

### 3. Attitudes Toward Change

We can define change readiness as "individual change-readiness - the willingness and ability of every individual to accept, embrace, and support change provides the cornerstone for change-readiness". Psychologists Robert Kriegel and David Brandt have researched into this and maintain that individuals do need to cultivate the following personal characteristics. They are:

Passion: feeling excited and challenged by new possibilities; relishing new experiences; having intensity and determination.

Resourcefulness: making the most of any situation and using resources at hand to create plans.

Optimism: having a positive view of the future.

Adventurousness: wanting to take risks and to pursue the unknown.

Adaptability: being able to shift expectations in the face of new realities and rebound from adversity quickly.

Confidence: believing in one's own ability to handle a difficult situation.

Tolerance for ambiguity: being able to live with uncertainty and surprises.[5]

In students life there are many changes that occur on individual level: they enroll at university, spend their time studying and participating in project that are new for them, many of them change their environment-came in bigger cities, for the first time living independently, facing a lot of challenges as grown-ups. They also make lot of career choices by taking specific courses, being an internship in particular company or working on different projects while studying.

### 4. Entrepreneurial Characteristics and Attitude toward Change among Macedonian Students

The purpose of this paper is to explore the research questions: What are the student entrepreneurial characteristics and their attitude toward change in Macedonia? Is there a correlation between their entrepreneurial characteristics and the attitudes they have toward change? Are these students future entrepreneurs? Will their attitudes toward change have the influence in the process of becoming a entrepreneurs? How much are Macedonian students ready for change?

Based on the research problem and theory the following hypothesis is formulated: There is a correlation between the student entrepreneurial characteristics and the traits of change-readiness: resourcefulness, optimism, adventurousness, passion/drive, adaptability, confidence and tolerance for ambiguity. Also, it was expected to find high scores on the seven traits of change-readiness for Macedonian students.

### 5. Methods

#### *Sample*

The sample group consisted 43 students at FON University. Because of incomplete data 6 students were not included in the final analyzes of the results, which induced the sample to 37 students. The sample group consisted 14 males (37,8 percent) and 23 females (62,2 percent). The respondents in this survey were third year students at the Faculty of Economics. Their age was between 19 and 24 years, and the average age was 20,4 for all students.

## ***Data collection***

The survey was conducted after participation of the university students in the class Entrepreneurship. They received an explaining of the study and were invited to participate. Data was collected during the winter of 2011.

## ***Measurement of variables***

In this survey were measured two variables: entrepreneurial characteristics and readiness to change. To assess the entrepreneurial characteristics we used developed by National Council on Economic Education: How Entrepreneurial Are You? [6] We've chosen this questionnaire because is developed for students, part of the self-activity assessments in the class for Entrepreneurship. Here are some questions that we asked our students to assess themselves:

- Are you a self-motivated?
- Are you a leader?
- How organized are you?
- Do you take responsibility?
- Are records important to you?

Asking these questions we wanted to find out if Macedonian students have well developed entrepreneurial characteristics.

To assess readiness to change we used questionnaire made by Robert Kriegel and David Brandt. We measured seven traits of change-readiness: resourcefulness, optimism, adventurousness, passion/drive, adaptability, confidence and tolerance for ambiguity. Here are some questions that we asked our students to assess themselves:

- I prefer the familiar to the unknown
- I rarely second-guess myself
- I'm unlikely to change plans once they're set
- I can't wait for the day to get started
- I believe in not getting your hopes too high
- If something's broken, I try to find a way to fit it
- I get impatient when there are no clear answers
- I'm inclined to establish routines and stay with them
- I can make any situation work for me
- -When something important doesn't work out, it takes me time to adjust

Asking these questions we wanted to find out how much are Macedonian students ready for changes. For better understanding of these traits we will offer short description on each one separately.

## ***Resourcefulness***

Resourceful people are effective at taking the most of any situation and utilizing whatever resources are available to develop plans and contingencies. They see more than one way to achieve a goal, and they're able to look in less obvious places to find help. They have a real talent for creating new ways to solve old problems. When people low in resourcefulness encounter obstacles, they get stuck, dig in their heels, and go back to the old way. Very high scorers (over 26) might overlook obvious solutions and create more work than is necessary.



## ***Optimism***

Optimism is highly correlated with Change Readiness, since the pessimist observes only problems and obstacles while the optimist recognizes opportunities and possibilities. Optimists tend to be more enthusiastic and positive about change. Their positive outlook is, founded on an abiding faith in the future and the belief that things usually work out for the best. Very high optimism scorers (over 26) may lack critical-thinking skills.

## ***Adventurousness***

Two ingredients capture this adventurous spirit: the inclination to take risks and the desire to pursue the unknown, to walk the path less taken. Adventurous people love a challenge. Since change always involves both risk and the unknown, they usually perform well during organizational shake-ups. They are the proactors, the employees who initiate and create change. But very high scores (over 26) may indicate a tendency toward recklessness.

## ***Passion / Drive***

Passion is the fuel that maximizes all the other traits. If you have passion, nothing appears impossible. If you don't, change is exhausting. Passion is the individual's level of personal dynamism. It shows up in a person's level of intensity and determination. To make a new procedure work, to overcome the myriad of problems that any plan for change unwittingly produces, you've got to have passion and enthusiasm.

## ***Adaptability***

Adaptability includes two elements: flexibility and resilience. Flexible people have goals and dreams like everyone else, but they're not overly invested in them. When something doesn't work out, they'll say, "Plan A doesn't work, let's go to Plan B." Resilience is the capacity to rebound from adversity quickly with a minimum of trauma. Failure or mistakes do not throw them. They don't dwell on them and get depressed but bounce back quickly and move on. High scorers on this trait are not wedded to specific outcomes. Scoring too high (over 26) in this trait indicates a lack of commitment or stick-to-it-ness.

## ***Confidence***

If optimism is the view that a situation will work out, confidence is the belief in your own ability to handle it. There is situational confidence - "I know I can swim across this channel, learn this program, write this report" - and self-confidence - "I can handle whatever comes down the pike." Self-confidence is the kind of confidence the Change Readiness Scale measures. High scorers are generally individuals with a strong sense of self-esteem. But more specifically, they believe they can make any situation work for them. Scorers above 26 may indicate a cocky, know-it-all attitude and lack of receptivity to feedback.

## ***Tolerance for Ambiguity***

The one certainty surrounding change is that it spawns uncertainty. No matter how carefully we plan it, there is always an element of indefiniteness or ambiguity. Without a healthy tolerance for ambiguity, change is not only uncomfortable; it's downright scary. But too much tolerance can also mean trouble because is correlated with difficulty finishing tasks and making decisions.

## 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 entrepreneurial characteristics and the traits for change-readiness. For all the variables descriptive statistics (means, standard deviations) were also calculated.

## 6. Results

The descriptive statistics are reported in following tables. In table 1 are reported means and standard deviations of all variables.

**Table 1** Means and standard deviations for all variables

Variable	Minimum	Maximum	Mean	Std. Deviation
entrepreneurial characteristics	66,00	97,00	83,6757	8,48873
resourcefulness	15,00	30,00	23,5135	3,86308
optimism	4,00	29,00	14,5946	5,78532
adventurousness	5,00	30,00	19,8108	5,05985
passion/drive	11,00	30,00	22,8919	4,43962
adaptability	11,00	29,00	18,2973	4,37712
confidence	14,00	30,00	22,8649	4,09038
tolerance for ambiguity	10,00	29,00	18,8378	3,57082

If we compare the result that we received on the variable Entrepreneurial characteristics we can say that the lowest score 66 and the highest score was 97. The mean of this variable shows that the respondents have well developed entrepreneurial characteristics (83,67). According to the questionnaire developers the respondents should continue their learning, especially focusing on the weaknesses they have and overcoming them and building their confidence.

According to the results that we received from the second questionnaire we can conclude that the most developed traits these respondents have are: resourcefulness (23,51), passion/drive (22,89) and confidence (22,86). On the other hand traits that are less developed are: adventurousness (19,81), adaptability (18,29) and tolerance for ambiguity (18,83). The least developed trait was their optimism (14,59).

If we compare the results from the first questionnaire between the male and the female respondents we will receive the following results.

**Table 2** Mean and standard deviation for entrepreneurial characteristics among male and female respondents

Entrepreneurial characteristics	Mean	Std. deviation
male	81,00	8,63802
female	85,30	8,15439

Our conclusion from these results is that female respondents have higher entrepreneurial characteristics (85,30) than the male respondents (81,00).

If we compare the results from the second questionnaire between the male and the female respondents we will receive the following results.

**Table 3** Mean for traits for change-readiness among male and female respondents

Variable	Male	Female
resourcefulness	23,2857	23,6522
optimism	15,0000	14,3478
adventurousness	17,4286	21,2609
passion/drive	22,2143	23,3043
adaptability	16,7857	19,2174
confidence	23,5000	22,4783
tolerance for ambiguity	17,7143	19,5217

According to the results we can see that there are some differences between male and female respondents on these variables: adventurousness (17,4286-21,2609), adaptability (16,7857-19,2174) and tolerance for ambiguity (17,7143-19,5217).

To provide evidence for our hypothesis we made correlations between the variables (Table 4).

**Table 4** Correlations between the entrepreneurial characteristics and traits for change readiness

Variable	resourcefulness	optimism	adventurousness	passion/drive	adaptability	confidence	tolerance for ambiguity
Entrepreneurial characteristics	0,216	-0,083	0,320	0,495**	0,170	0,390*	0,250

Notes: \*p<0,05; \*\*p<0,01; n=37

Correlation between entrepreneurial characteristics and passion/drive is 0,495 (p<0,01). The level of significance for this correlation is very high and statistically valid. Correlation between entrepreneurial characteristics and confidence is 0,390 (p<0,05). The level of significance for this correlation is high and statistically valid.

## 7. Conclusions

The 2008 Report "Entrepreneurship in Macedonia" prepared by the Global Entrepreneurship Monitor about the perceptions and attitudes on entrepreneurship run on 2000 respondents between the age 18-64, showed that in Macedonia there is a positive perception about entrepreneurship and moreover Macedonia showed highest entrepreneurial activity from the countries in Europe where this study was undertaken. Entrepreneurship is considered as a good career choice by 80 % of the respondents; 40 % said that were ready to start business activity in the next 3 years and only 35 % had a fear of failure that can prevent them from starting a business. The main motivation for entrepreneurship in Macedonia is the unemployment especially between the young people which means that willingness to grow the business (and get more profit) is less present. [7]

The results of this survey showed that the hypothesis was partially supported because we only find positive correlations between some variables. We found significant correlation between entrepreneurial characteristics and their passion/drive trait. It is expected for a future entrepreneur to be very passionate and driven from inside if he/she wishes to accomplish great deals. When we describe the best entrepreneurs we were surely say that they are very motivated from inside and are not working for salary but for realizing their dreams and ideas. Also, to even start on the journey of entrepreneurship these young

students must be very confident in their capacities and always expected best results. Unfortunately, the reality in Macedonia for these students is not so bright so their low optimism it can easily be understood. From the results that we found we can see that female students have better developed entrepreneurial characteristics than the male students. Also, female students have greater scores on resourcefulness, adventurousness, passion/drive and tolerance for ambiguity.

Implications for future theory and research

This research provided an initial examination of the relationship between entrepreneurial characteristics and attitudes toward change. 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 students to provide more data about Macedonian students as future entrepreneurs. Further surveys will probably enhance the educational system to take bigger steps in educating the students and create greater awareness for entrepreneurship and starting new businesses.

Implications for practice

The implications of the findings presented in this study are also important for practice because it offers information that will help educational institutions and policymakers to consider more the students as new entrepreneurs and encourage them in the process of self-employment.

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# Economic Resilience and Entrepreneurship: Lessons from the Sheffield City Region

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Resilience is an emerging concept within the social sciences, which has been employed to examine economic performance and responsiveness to exogenous shocks such as the 2007 financial crisis. Although a fuzzy concept, the lens of resilience has been applied to examine individual and organizational resilience as well as studying the performance of regional, local and city economies. Drawing on evidence from a case study of the Sheffield City Region (SCR) this paper contributes to the emergent literature by considering the link between entrepreneurship and economic resilience. Entrepreneurship has come to be viewed as integral to sustaining a dynamic and diverse economy, by stimulating competition, driving innovation, creating employment and increasing productivity. As such this paper argues that entrepreneurship is being fore fronted in policy debates as an important aspect in creating more resilient economies and also providing an engine for future economic growth.

## Keywords

Entrepreneurship, Economic Resilience, City-Region, Sheffield, Public Policy

## 1. Introduction

Within the social sciences, the concept of resilience has emerged relatively recently (Martin, 2012), and with no universally agreed definition is an understandably fuzzy concept (Pendall et al, 2010). That said, the concept has become a fashionable lens for illuminating regional and local economic change, representing a 'highly relevant' framework to analyse the causes and effects of uneven development in regional and local economies (Simmie and Martin, 2009, Martin, 2012). Bristow (2010) notes resilience is attracting increasing interest from academics and policymakers alike, as local and regional development debates move beyond the hitherto relatively narrow focus on economic growth (Dawley et al, 2010). This heightened focus on resilience is particularly pertinent in a UK context, following the financial crisis, economic recession and ensuing government austerity measures (HM Government, 2010; HM Treasury 2011).

Parallel to this growing interest in resilience, other strands of academic and political debate have come to recognize the importance of entrepreneurship as an engine of economic development and competitiveness. The regional and local scales are particularly important for understanding the nature of entrepreneurship as it is clear that there are substantial differences in the competitiveness and economic performance of different regions within nations (Verheul et al. 2001; Porter 2003). As Hudson (2010) notes localities are competing to develop, attract and retain entrepreneurial people, not least as entrepreneurship is regarded as critical to sustaining vibrant and diverse economies (Desrochers and Sautet, 2008; Hospers et al, 2008). Consequently entrepreneurship is viewed by policymakers and

many scholars as a key factor underpinning future trajectories of (regional) economic development (Reynolds et al. 2001, 2002; Fritsch and Mueller 2004; Huggins and Williams, 2009).

Given the prominence of entrepreneurship and increasingly resilience in the social sciences, and management studies in particular, this paper argues that entrepreneurship needs to be considered as a factor affecting the resilience of economies. While this point has been mooted by Wolfe (2010) who briefly states how entrepreneurial businesses contributed to economic resilience in Ontario in Canada, there is limited research, which thoroughly examines the links between the two concepts. Accordingly this paper contributes to the emergent literature on economic resilience by examining the role of entrepreneurship as a facet of regional policy and as an integral piece in the jigsaw of making city-regions (more) resilient.

The remainder of this paper is structured as follows. Section 2 reviews the literature on the emergent field of economic resilience, while section 3 considers the rescaling of regions in the UK and how policy has incorporated entrepreneurship as a facet of economic development. Section 4 sets out the research framework and presents the methodology as well as presenting an overview of the Sheffield City Region. Section 5 presents the findings of the study in three parts. First, it outlines the economic structure of the SCR, the second examines enterprise development policy in response to changes to the structure, while the third outlines adaptation of the City Region economy. The paper then contributes to the emergent literature on economic resilience by reflecting on a framework of resilience and entrepreneurship, and concludes by reflecting on the wider implications of considering entrepreneurship as a dimension of resilience in terms of the implications for policymaking and academic research.

## **2. Economic Resilience: The Region, the Firm and the Entrepreneur**

The concept of resilience has been applied in a wide range of disciplines from ecology to strategic management, focusing on different geographical and organisational contexts, from countries and regions to firms and individuals. The common denominator across all of these different approaches is how the concept seeks to understand different responses to exogenous changes and shocks (Bharma et al, 2011; Burnard and Bhamra, 2011; Sullivan-Taylor and Branicki, 2011, Martin, 2012). The exogenous shock at the core of much recent social science research has been the recent economic crisis, and as Dawley *et al* (2010: 650) note “local and regional development have recently broadened from a preoccupation with growth to one which captures the notion of resilience”. While this paper specifically seeks to uncover the linkages between resilience and entrepreneurship, first, it is important to outline theoretical notions of resilience at the regional scale in order to understand the role that entrepreneurship can play in making regions (more) resilient.

As noted above, resilience has come to be regarded as an increasingly popular and relevant conceptual approach to study the economic performance of regions. Yet while the central tenant of resilience is clear there is no universally agreed definition of what constitutes resilience (Pendall et al, 2010). That said, the definitions presented in Table 1 shows that there is a broad consensus among scholars with respect to what constitutes regional economic resilience. These definitions also highlight that resilience is a dynamic concept, and therefore highlight the evolutionary dynamics and trajectories of regional economies and their differential capacity to adapt over time (Simmie and Martin, 2009, Martin, 2012). Indeed, resilience has been argued to provide a mechanism to evaluate the vulnerability of regional economies to exogenous shocks, disturbances and stresses in addition to their capacity to creatively and flexibly respond (Petersen, 2000; Pendall et al, 2010; Simmie and Martin, 2009).

**Table 1** Defining Resilience: The common denominator

Christopherson et al (2010:p. 6) "A resilient region is not just economically successful but maintains economic success over the long term in face of the inevitable adaptation required by...'shocks' to the system"
Dawley et al (2010: 651) "the ability of regions to be able to 'bounce-back' or 'comeback' from economic shocks and disruptions."
Foster (2007a: 14) "the ability of a region to anticipate, prepare for, respond to, and recover from a disturbance"
Hill et al. (2008: 4) "the ability of a region to recover successfully from shocks to its economy that either throw it off its growth path or have the potential to throw it off its growth path"
Simmie and Martin (2010: 28) "a regional economy's ability to recover from a shock but also to the degree of resistance to that shock in the first place"
Burnard and Bhamra (2011: 7) "Resilience is the emergent property of organisational systems that relates to the inherent and adaptive qualities and capabilities that enable an organisations adaptive capacity during turbulent periods"

While regional economies have emerged as a preferred unit for researching economic resilience, the empirical focus often examines the institutional arrangements and infrastructure within the different regions as a means to analyse economic resilience. Pendall et al, (2010) identify other factors affecting the economic resilience of regions to include the presence of a highly skilled and mobile labour force, formal and informal business (support) associations, and local inter-firm networks and knowledge spillovers. However, it is the entrepreneurial and strategic acumen of economic agents (i.e. firms and individuals), which affects their dynamism and responsiveness in relation to the adaptive cycle. This in turn determines the resilience of regional economies. Without this dynamism, Simmie and Martin (2009) assert, leads to a reduction in responsiveness with regional economies being less able to adapt to the threat of potential shocks.

Consequently when an exogenous shock occurs there is a threat that economic development will stall and there is the prospect that firms will close or move out of the region. As such, the resilience of a region has come to be regarded as dependent upon its firms (Ponomarov and Holcomb, 2009; Demmer et al, 2011; Sullivan-Taylor and Branicki, 2011). Indeed the notion of external shocks affecting firms is not new, and they are often linked to other traditional challenges facing firms such as resource scarcity, cash flow and dependence on infrastructure (Storey, 1994; Sutcliffe and Vogus, 2003). Therefore while the focus on exogenous shocks is not new, recent debate has come to emphasize the implication of shocks in relation to organizational resilience and how firms adapt to these shocks in order to remain competitive and thus resilient (Starr et al, 2003; Burnard and Bhamra, 2011). Barnett and Pratt (2000) found that firms have the dynamism to process environmental feedback that will overcome external shocks, whereas more rigidly organized firms were found to more exposed. To this end, Weick and Sutcliffe (2001) identify four aspects of resilient behaviour by firms, as shown in Table 2, and how different responses of firms to these different areas affect their resilience.

**Table 2** The four dimensions of resilience (adapted from Weick and Sutcliffe, 2001)

<b>Resourcefulness:</b> the capacity of managers to identify potential problems, establish priorities and mobilise resources to avoid damage or disruption
<b>Technical Systems:</b> the ability of managers to ensure that organisational systems perform to high levels when subject to extreme stress
<b>Organisational:</b> the preparedness of managers to make decisions (however counterintuitive these might sound initially) and to take actions to reduce disaster vulnerability and impacts
<b>Rapidity:</b> the capacity of managers to make decisions on threats without undue delay

Beyond the firm, de Vries and Shields (2005) identify resilience as a core quality of entrepreneurial individuals which enable them to react to exogenous factors and adversities. Comprising multiple attributes, within entrepreneurs this 'set of qualities' has been found to include flexibility, high motivation, perseverance and optimism (London, 1993; Hagevik, 1998; Cooper et al, 2004; de Vries and Shields, 2005). Entrepreneurship has potentially both short and long-term consequences for regions, including the creation of employment and wealth, and the stimulation of competition and innovation employment (Audretsch and Thurik, 2001; Mueller, Van Stel, and Storey 2006; Huggins and Williams, 2009). Consequently, regions with high levels of entrepreneurship and which are less dependent than other areas on large employers and/or the public sector may be considered to be less exposed to exogenous shocks, as entrepreneurial environments are generally more creative and flexible which enhance the innovative capacity to contribute to new firm formation (Dawley et al, 2010). Indeed for this reason resilience has become a theme that resonates with the entrepreneurship literature, focusing not just on the behaviour and coping styles of entrepreneurs but on the deeper significance of entrepreneurialism to the wider economy. The diversity and flexibility of entrepreneurs represents an integral source of resilience to exogenous shocks, but is also critical to an economy's competitiveness and growth more generally.

While Simmie and Martin (2010) show that the economic resilience of regions has largely been understood in terms of 'punctuated equilibriums' and 'periodic shocks', this brief review demonstrates and underlines the importance of enterprising firms and entrepreneurial individuals as additional and/or alternative sources of economic resilience and future competitiveness and growth. Enterprise and entrepreneurship, therefore, provide an alternative perspective from which to understand the resilience of regional economies. While policymakers have taken a number of steps to create more enterprising and entrepreneurial regional economies, we argue that entrepreneurship is in fact central to creating more diversified economies. The following section outlines the emergence of entrepreneurship as a focus of public policy debate, and considers the importance of entrepreneurship as a mechanism to make regional economies more resilient to exogenous shocks.

### **3. Regions, Policy and Entrepreneurship in the UK Context**

In much the same sense that the region has emerged as the preferred unit for researching economic resilience, so it has been the preferred scale of government over the past two decades for examining economic development. While the emphasis on regional politics shifted over the past 18 months, to favour city-regions, this section outlines the evolution of regional economic development policy debates and the position of entrepreneurship therein. In addition to the changing scale of policy, the focus of policy has shifted from sector specific interventions to facilitating entrepreneurship (Desrochers and Sautet, 2008; Huggins and Williams, 2009), which promotes resilience through entrepreneurial diversity.

The regional approach is designed to drive economic development and enable regions to improve their relative competitiveness, as well as reducing the disparities that exist within and between regions (HM Treasury, 2007a; Pearce and Ayres, 2009; van Dijk et al., 2009). Historically, regional economic policy has assumed an exogenous or re-distributive approach towards stimulating growth by attracting economic activity to regions characterised by high employment for example (Acs and Szerb, 2007; Huggins and Izushi, 2007). However, such top-down approaches have chiefly been concerned with directly incentivising economic activity to locate in less competitive regions through 'hard' policy instruments such as through infrastructure improvements or financial subsidies (Halkier and Danson, 1997; Huggins and Izushi, 2007). Acs and Szerb (2007) describe how such approaches can culminate in a zero, or possibly a negative sum game for the national economy with competitive regions cross-subsidising less competitive regions. As a consequence regional policy has evolved to



assume a bottom-up approach aimed at improving the supply-side with softer measures such as increased education and training (Amin, 1999; Lagendijk and Cornford, 2000; Webb and Collis, 2000).

Policy has moved away from intervention which seeks to support specific industries perceived to be of long-term value to a region or locality (Huggins and Williams, 2009), and in favour of creating environments which foster entrepreneurship (Acs and Szerb, 2007). By recognising the impacts of entrepreneurial activity to be wider reaching than both the individual and the firm, Mas-Verdu et al (2009) identify the importance of entrepreneurship as an engine of (regional) economic growth. However, while Henry et al (2003) find that entrepreneurship can be developed in the most economically deprived regions, there remains debate as to whether and how government policy should promote entrepreneurship (Minniti, 2008; Santarelli and Vivarelli, 2007; Pages et al, 2003). Despite these contrasting perspectives concerning the role of government the importance of policy in creating an entrepreneurial environment is widely acknowledged. To this end Mas-Verdu et al (2009) identify how policy aimed at fostering entrepreneurship can be grouped into three broad areas: 1) supply and demand side policies (e.g. technological development, regional development, tailored taxation); 2) education and cultural change (e.g. improved general and enterprise education) and; 3) resorting entrepreneurs (e.g. venture capital, financial support, knowledge capacity).

Rice and Venables (2003) describe the regional disparities within the UK as both significant and persistent, and the challenges this poses for public policy in improving the economic performance and reducing regional disparities. Following the election of a Labour government in 1997 the region and regionalism were back at the core of the UK policy agenda (Gibbs, 1998; Pearce and Ayres, 2009). Mueller et al (2006) identifies how the introduction of Regional Development Agencies (RDAs) across England in 1999 saw responsibility for economic development was primarily devolved to the region, while other policy initiatives such as the Local Enterprise Growth Initiative were also a catalyst to the spatial devolution of policy (Huggins and Williams, 2009). In keeping with the policy shift discussed above, Lodge and Mitchell (2006) state how Labour's regional strategy was based upon addressing the persistent gaps in innovation, skills, labour market participation and income levels.

With an emphasis on enterprise, rather than entrepreneurship, the fivefold statutory remit of the RDAs were to: 1) further economic development and regeneration; 2) promote business efficiency, investment and competitiveness; 3) promote employment; 4) enhance development and application of skill relevant to employment; and 5) contribute to sustainable development. To achieve these objectives the RDAs were afforded a financial commitment exceeding £2bn in 2008/09 and 2009/10 (HM Treasury, 2007b). However, the regional approach to economic strategy has been found guilty of lacking vision and regional distinctiveness, and criticised for simply replicating national policy rather than translating it into a regional context (Hull, 2000; Tewdwr Jones and Phelps, 2000; Charles and Benneworth, 2001; Peck and McGuinness, 2003).

While the RDAs marked a significant phase in the evolution of regional policy, following the formation of a Conservative-Liberal Democrat coalition government in 2010 it was announced that the RDAs were to be abolished in May 2012 (Richardson, 2011). This change was part of wider raft of reform embodied in the coalition's *Strategy for Growth* (HM, 2010: 4), which also recognised the need to "maintain a diverse economy that is more resilient to economic shocks". In addition to rescaling policy to reflect the more diverse economic realities of city regions (Clifton, 2008), there was an extension in the enterprising focus of regional policy which was centred on the premise of the entrepreneurial society (Audretsch, 2010). The responsibility for this intensified enterprising and entrepreneurial policy agenda now lies with a series of 38 Local Enterprise Partnerships (LEPs), whereby joint local authority-business bodies promote economic development (HM Government, 2010). Consequently, a reshaping of regional policy, both spatially and ideologically, can be

seen to have occurred in the UK, which has sought to increase the intensity of enterprise and entrepreneurship within LEP/city-regions as a source of competitive advantage.

In summary, this section has sought to outline the recent evolutionary features of regional policy and entrepreneurship debates in the UK context. While the RDAs were conceived to reduce regional disparities and promote competitiveness, the evidence suggests that they have not been entirely effective in this respect. Although some progress has been made in terms of improving regional infrastructures it is ultimately premised on public sector funding, and despite positioning themselves as business-led organisations the RDAs ultimately floundered as drivers of the entrepreneurial economy. In particular, LEPs are now regarded to provide the step change that is required to achieve more enterprising and entrepreneurial economic development through genuine public-private partnerships; a change that is necessary to create more diversified, competitive and resilient economies. The following sections of this paper seek to empirically assess how regional policy has positioned entrepreneurship as an agent of economic resilience and engine of future of economic growth.

## **4. Methodology**

Having outlined the key literatures, the purpose of this section is threefold. First, we introduce the Sheffield City Region as the empirical focus of the paper. Second, we outline the methodological approach of this paper, which is based upon both in-depth interviews with key stakeholders in the Sheffield City Region and a review of current policy documents relating to enterprise and skills in the Sheffield City Region. Third, we present our research framework which is derived from the empirical study and literature review to understand the coupling of entrepreneurship and resilience in what is a new policy context.

### ***The Sheffield City Region***

As discussed above, entrepreneurship has come to be recognised as a means of stimulating economic growth in prosperous and lagging regions alike over the last decade. Indeed as the empirical focus of the paper the SCR has been characterised as both lagging and comparatively prosperous region. The Sheffield City Region (SCR) is situated within Yorkshire and the Humber Region in the UK. It has a population of approximately 1.7 million people, and contains the major urban areas of Sheffield, Doncaster, Rotherham, Chesterfield and Barnsley (Sheffield City Region, 2006). Following the decline of Sheffield as a major centre for coal, steel and manufacturing in the 1970s the rigidity of city-region saw it experience a prolonged period of decline and stagnation until embarking on sustained economic restructuring premised on changing the orientation of the economic base led to a shift in the evolutionary path. By the 1990s the SCR economy had diversified and become more knowledge based, while also benefitting from substantive infrastructural investment (Sheffield City Region, 2006, 2010a). It is important to note however that the revival of the SCR has been premised on growing levels of public sector employment which accounted for c.31% of the workforce in the SCR (Yorkshire Futures, 2010), of which the majority was concentrated in the city of Sheffield (Northern Way, 2009).

With regards to entrepreneurship, the Sheffield City Region has historically had a low business to population ratio, although there was some improvement in the early 2000s (Sheffield City Region, 2010c). The number of VAT registered businesses grew by 5,600 between 2000 and 2007 to 43,675 or from 278 businesses per 10,000 of the adult population to 305 (Sheffield City Region, 2010c). The England average in 2007 was 419 businesses per 10,000. For the Sheffield City Region to have achieved this ratio another 16,250 VAT-registered businesses would have been needed to be established (Sheffield City Region, 2010c). Such figures contribute to Sheffield being seen as one of the least competitive city

economies in the UK (Huggins and Thompson, 2010). Further to this variation in enterprise, rates of entrepreneurship also vary across the SCR. Sheffield accounts for 30% of the total number of SCR businesses, and if the City Region as a whole had the same ratio of businesses to population the SCR would have an additional 17,7000 businesses (Yorkshire Futures, 2010). The numbers of business start-ups per 10,000 people for the areas of Sheffield City Region are shown in Table 3.

**Table 3** Business start-ups per 10,000 populations

	2004	2005	2006	2007	2008
Barnsley	44	41	40	45	38
Doncaster	43	42	38	42	39
Rotherham	44	41	40	44	37
Sheffield	46	46	41	45	36
Bassetlaw	58	50	52	49	39
Bolsover	43	45	39	44	38
Chesterfield	47	49	48	49	42
Derbyshire Dales	75	78	68	74	57
North East Derbyshire	51	45	48	49	38
SCR	47	45	43	46	39
Yorkshire and Humber	50	48	45	48	44
England	62	59	55	60	57

*Source: Yorkshire Futures (2010)*

Table 3 shows that the SCR start-up rate has been consistently lower than the average for England and the Yorkshire and Humber region. Furthermore, in the recessionary year of 2008 the SCR saw a much steeper decline than the England and regional figures. The Derbyshire Dales area, which had been consistently higher than the national and regional averages, also fell to equal the national average in 2008. In addition to business birth figures, business survival rates also show the impact of the recession. One-year business survival rates have slipped marginally below the England average, two year survival rates (i.e. for those businesses started during 2006) have fallen 2.6% below the England average from being 1% above in 2006 years ago they were nearly 1% above, while three year survival rates also fell from above the national average to below (Yorkshire Futures, 2010).

Consequently, and in the aftermath of the 2007 financial crisis, the foundations of the economy established in the wake of the de-industrialisation that occurs in the 1970s and 1980 again see the SCR in crisis. While the full impact of the recession and public sector spending cuts still remain uncertain, cuts in public spending are set to have an acute impact on the Sheffield, the impact will undoubtedly be felt across the city-region.

## **Method**

In order to understand how entrepreneurship has become integral to making city-regions (more) resilient the empirical method is two-fold: 1) an analysis and review of relevant policy documents relating to the SCR; and 2) in-depth interviews with key stakeholders in the SCR.

In the first instance regional policy documents and reports relating to economic development were reviewed to identify themes relating to entrepreneurship and resilience. The review also captured secondary data to provide a more comprehensive portrait of the economic structure of the SCR. The themes identified also served as the basis of the interview schedule, for which twenty-five semi-structured were conducted with key stakeholders in the SCR (included representatives of the City Region's city and town councils, Chambers of Commerce, former executives of the RDA and private sector economic development and regeneration consultants who held a responsibility for the development and/or

implementation of policy and/or programmes in this area).As Martin (2012: 28) states, understanding why some local and regional economies are more resilient than others is a key question for the social sciences, and “a full explanation would need to analyse the reactions and adjustments of both firms and workers at the local level, as well as the reactions of local institutions and policy actors.” The research therefore contributes to developing explanations through examining the responses of local policy stakeholders.

Given the political sensitivity of the research and the position of many interviewees in public office, it was a stipulation of the research that the participating individuals remained anonymous, the quotes used in the findings section simply identify the area in which the respondent is based. The interviews were undertaken between May and July 2011.

The use of in-depth interviews are acknowledged as particularly applicable to policy research, since they address objectives concerning contextual, diagnostic, evaluative and strategic issues and provide rich and worthwhile data (Burton 2000; Silverman, 2000). Moreover the nature of semi-structured interviews meant that a number of issues not on the interview schedule were raised by some respondents, which where relevant were subsequently explored further. Collectively, the interviews provided a broad and comprehensive overview of the economic structure and institutional arrangements across the SCR as well as providing deep insights into the extent to which policy has sought to harness entrepreneurship as a means of improving economic resilience. The interviews were transcribed and the responses coded into the themes policy documents and reports, and where necessary some themes recoded to grapple with the complexities of economic development in the wake of the financial crisis. The analysis of the data explored themes, which emerged from the interviews and policy review, and rather than themes being imposed by the researcher a constant comparative method of analytic induction was used (Bryman, 1989, 1998; Silverman, 2000).

## **5. Findings**

The findings presented here build on the literature review by examining the links between entrepreneurship and economic resilience in the Sheffield City Region. Entrepreneurship has come to be viewed as integral to sustaining a dynamic and diverse economy, by stimulating competition, driving innovation, creating employment and increasing productivity. The concept of resilience is less clear. However, by linking it to entrepreneurship and examining it through the case study of the Sheffield City Region (SCR) key lessons for research and policy development can be drawn out. The findings are presented in three parts: the first outlines the economic structure of the SCR, the second examines enterprise development policy in response to changes to the structure, while the third outlines adaptation of the City Region economy.

### ***The Economic Structure of the Sheffield City Region***

A key component in understanding the ability of a city region to be resilient begins with an examination of the economic structure of the area. In considering the structure of the SCR, many stakeholders stated that the economy had evolved; having moved away from a large manufacturing industrial base to a more knowledge-based economy. However, the traditional manufacturing base of the SCR was seen as a key strength of the area and stakeholders felt that these strengths could and should be built on.

Many of the stakeholders stated that when compared to the past the SCR of today was much more likely to be resilient to external shocks, including recessions and public sector funding cuts, as the economic structure of the area was much more diversified. In the past, stakeholders stated that there was too much reliance on a relatively small number of large-

scale employers. However, given the decline of the traditional manufacturing base this reliance has declined:

“Compared to twenty years ago, the economy is much more diverse. We are less reliant on large employers.” (Economic Development Officer, Sheffield)

“The City Region has a more diverse economy than it has done previously. Fifteen or twenty years ago we were too dependent on a small number of large employers and we have diversified more due to the decline of some of the traditional industries ... That decline may have been forced on us to a certain extent by a general national decline in manufacturing but overall we are probably better off for it.” (Economic Development Officer, Doncaster)

“Manufacturing is still important but it doesn’t create the jobs it used to. We need to develop businesses in new, high technology industries so that we continue to diversify our economic base.” (Economic Development Officer, Sheffield)

Despite these views, there was concern among the stakeholders that the Sheffield City Region was over-reliant on public sector jobs, which means that public spending cuts, such as those introduced by the Conservative-Liberal Democrat government (HM Treasury, 2011), will have a large impact on the area:

“We lack a large private sector base. More than half of our employees are in the public sector. That is where the challenge is.” (Business Development Manager, Barnsley)

“We have some real strength, like the Advanced Manufacturing Park, but overall we have too many people employed in the public sector.” (Economic Development Manager, Sheffield)

The stakeholders communicated the need to fully consider the future of the economic structure of the SCR and how public sector job losses could be offset by private sector growth. With regards to the economic structure of the City Region, this was considered to be the key challenge in ensuring the economy is resilient now and in the future. The research found concern among stakeholders that private sector growth would not be able to match or exceed public sector job losses due to spending cuts. However, the stakeholders also stated that there was a need to tackle these challenges and develop long-term strategies which would have the maximum impact. According to many of the stakeholders this required collaboration among partners to develop strategies which support business growth in areas which would have the most impact on future employment, productivity and innovation. This meant examining what competitive advantages the SCR had and trying to support growth in these areas. In particular, stakeholders saw growth potential in harnessing a larger number of businesses with export potential. The stakeholders stressed that such activities were by their nature long term. However, they stated that strategies need to take a long term view as the City Region would take time to grow following the recession and public spending cuts.

The views of the stakeholders reflect the fact that the Sheffield City Region has a fragmented economy, with Sheffield the strongest economic centre and increasingly interdependent with Rotherham, and can be described as “weakly monocentric” (Northern Way, 2009). The stakeholders stated that building on the strengths of the SCR would lead to greater levels of entrepreneurship and resilience, however key challenges would remain with regards to improving the economic structure of weaker areas, including those dependent on public sector employment.

## **Response**

As Dawley et al (2010: 655) state, notions of path dependency, how the past shapes the future, are seen to either enable or constrain local and regional development in response to a shock.” Furthermore, the evolution of the economic structure, as outlined above in relation to the Sheffield City Region, will influence the ‘response’ of a locality as it develops over time (Martin and Sunley, 2006; Hassink, 2010). Consequently, this section examines the ‘response’ of the Sheffield City Region through enterprise development policy to changes in the economic structure of the locality.

The stakeholders stated that in response to changes in the economic structure of lagging regions and localities of the UK, which have moved from a traditional manufacturing base to broader, more diverse economies, public policy has prioritised enterprise development policy. Harnessing higher levels of entrepreneurship has been seen as a way of closing the gap between lagging and more affluent localities, and as a method of supporting shifts in employment from traditional manufacturing industries towards the service sector (Huggins and Williams, 2009). The stakeholders stated supporting higher levels of entrepreneurship in the SCR had been a direct response to the decline of other industries, as well as a response to entrepreneurial opportunities being created in new industries.

As the economic structure of the SCR has changed, the stakeholders that some areas have been more successful in fostering higher levels of entrepreneurship than others, with the urban core of Sheffield being the most successful area:

“Sheffield has had the historical strengths to build on. It has had concentrations of traditional industries around it, and as the economy has diversified its service sector has grown ... Opportunities for entrepreneurs have been created in Sheffield through that change.” (Economic Development Officer, Sheffield)

In contrast, areas such as Barnsley and Doncaster were identified as having achieved little improvement in levels of entrepreneurship. Despite this view, the data presented in Table 3 demonstrates that rates of business start-ups in Sheffield have not been higher than in Barnsley and Doncaster in recent years, and in all areas of the SCR start-up rates have declined. At the same time, the areas of Barnsley and Doncaster were identified as seeing little improvement in their resilience, due both to their relative lack of entrepreneurship and their high rates of employment in the public sector:

“We haven’t seen any improvement in start-up rates in areas like Barnsley and Doncaster ... Public sector employment have grown in those areas so they are not going to be resilient in the face of recession and public spending cuts.” (Business Development Manager, Doncaster)

“Start-up rates have improved a little but we were starting from a low base, particularly in areas like Barnsley and Doncaster ... Too many were lifestyle businesses. We need more innovative businesses with the potential to grow.” (Economic Development Officer, Barnsley)

The quotes convey the stakeholder’s view that the parts of the SCR which have not seen growth in entrepreneurship, yet have seen growth in public sector employment, will be less resilient to external shocks. As one stakeholder noted: “some areas of the City Region are more resilient and more entrepreneurial than others.” The literature review demonstrates that policy moves to refocus activity and strategy away from regions to City Regions represents an increased emphasis on how economic activity clusters around an urban core (Clifton, 2008). Yet the stakeholder views demonstrate that a key challenge for enterprise development policy in City Regions is to ensure that all areas can become more resilient and grow.

Despite the policy priority of harnessing higher levels of entrepreneurship, many of the stakeholders stated that the investments made in enterprise support had resulted in more businesses, but businesses of a low quality. Therefore, while enterprise development policy was broadly seen as positive, many stakeholders stated that it had made little contribution to the resilience of the SCR:

“Business support has been over-saturated ... Providers have been too target-focused. Supporting 500 businesses is pretty pointless if they do not have the potential to grow.” (Business Development Manager, Rotherham)

“There has been unprecedented support for entrepreneurship over the last ten or fifteen years but it has had questionable impacts. We haven’t seen a huge increase in the start-up rate, so we need to look again at what works and what doesn’t. All of the investment hasn’t

made us more resilient because the sustainability of the businesses supported can be questioned.” (Economic Development Officer, Sheffield)

As these quotes demonstrate, stakeholders felt that many of the business supported were not resilient as they would not contribute to the economy over time and would be adversely affected by external shocks such as recession. This demonstrates that path dependency can be negative as local economic development can be constrained over time, with resilience and entrepreneurship not being enhanced over time (Dawley et al, 2010). The stakeholders stated that supporting lifestyle businesses would have no impact on competitiveness and resilience. In terms of developing future ‘resilient’ entrepreneurial ventures, the stakeholders emphasised the need for to move away from the “any new business will do” by removing support for lifestyle businesses and only supporting ‘ambitious entrepreneurs’ and businesses with high-growth potential (Stam et al., 2011).

Many of the stakeholders stated that with reduced investment in enterprise support as a result of the government’s financial austerity programme and reprioritisation of entrepreneurship and competitiveness policy (Huggins and Williams, 2011), refocus is required at the City Region level. To many of the stakeholders, this meant a more judicious view of which businesses to support and which did not require it, with support removed from those with little potential to grow and contribute to the local economy, and targeted at those with high-growth potential:

“We need to think more clearly about what success means in terms of supporting entrepreneurship. Is it about number of jobs, quality of jobs, growth potential? ... We need to be more focused. Entrepreneurship is not a numbers game, and we need all of the stakeholders to understand where growth comes from, so that we are focused on the high growth potential businesses.” (Economic Development Manager, Sheffield)

“We need to look at supporting more businesses to grow from within the City Region, and will need to look at those that have the ability to innovate, employ people, and work in developing industries like digital technology.” (Economic Development Officer, Chesterfield)

Despite these views, there was also recognition among some of the stakeholders that there were challenges in being able to “pick winners”, i.e. those businesses with the potential for growth. The entrepreneurship literature demonstrates the challenges of picking winners, by outlining how government agencies do not possess the knowledge to enable them to succeed in the selection process and as such there is no reason to think the support will achieve a positive outcome (Kirzner, 1979; 1985; Desrochers and Sautet, 2004).

Despite concerns regarding the over-saturation of enterprise support, some of the stakeholders stated that progress had been made in harnessing a more enterprising culture in the SCR. By fostering a more positive culture, the stakeholders stated that individuals within the City Region would be more resilient to changes in the economy and more responsive to new opportunities:

“Some programmes ... have had benefits by engaging with groups that were previously excluded, for example in terms of some ethnic minority groups and potential female entrepreneurs. It has had some positive impacts in terms of facilitating a more entrepreneurial culture as some of those individuals will set up businesses and then influence other people to do the same. It hasn’t had an impact in terms of broadening the business base, but some population groups now have a more positive enterprise culture so that is a positive impact.” (Economic Development Officer, Doncaster)

“We have made some progress in terms of fostering a more enterprising culture ... There are more positive role models now for people to be inspired by ... But the benefits will only be seen in the long term.” (Investment Manager, Sheffield)

As these quotes show, by fostering a more positive enterprise culture feedback loops will influence other people to start their own businesses as entrepreneurship is self-reinforcing (Feldman, 2001; Minniti, 2005). Such feedback loops can influence the path dependency of a locality through the enforcement of positive perceptions of entrepreneurship, thereby

contributing to the number of people willing to start-up a businesses and thus the resilience of the area. Yet the quotes also demonstrate that such changes in culture and resultant feedback loops are long-term by their nature, emphasising that the resilience of a region is an ongoing process and one which requires long term policy objectives and strategies (Dawley et al, 2010).

## **Adaptation**

The preceding section demonstrates how enterprise development policy has responded to changes in the economic structure of the SCR as a method for enhancing resilience. This section examines the adaptation of the local economy, which can be understood as the ability of the area to respond to an economic shock with a move back towards regional development which may have been successful prior to the shock (Dawley et al, 2010). The two key shocks facing the SCR identified by the stakeholders were the recession and the changes in governance arrangements with the abolition of RDAs, refocus on City Regions and launch of Local Enterprise Partnerships and Enterprise Zones.

The SCR literature states that the economy of the area is increasingly diverse and has the “resilience to weather the worst of the recession and to emerge stronger and more dynamic (Sheffield City Region, 2010a, p. 6). The ability of the SCR to bounce back from the recession will play a key role in determining path dependency of creating a more (or less) entrepreneurial and resilient economy. The stakeholders stated that the SCR was in a reasonable position to bounce back from the recession, given the relatively diverse economic base and strengths in manufacturing:

“The economy is more diverse than it once was. That means it should be easier to bounce back from the recession ... We have real strengths to build on, in sectors like manufacturing and healthcare ... As the UK will need to increase its exports to move ourselves out of recession that should help businesses in the City Region.” (Economic Development Consultant, Doncaster)

“Assets like the Advanced Manufacturing Park will be critical to how we bounce back from recession ... We need to build on that success by increasing our exports among our businesses (Economic Development Officer, Sheffield)

While Dawley et al (2010) state that old industrial regions can experience weaker adaptation due to entrenched path dependency and protracted decline associated with lagging regions, the views of the stakeholders show that policy makers in the City Region feel that the area's industrial heritage will be beneficial to its adaptation. In analysing this industrial heritage, some of the stakeholders compared the SCR to other neighbouring City Regions, particularly the Leeds City Region. Leeds has experienced strong economic growth in recent years, with much of that growth driven by the financial services industry (Williams and Williams, 2011). As a consequence, some of the stakeholders stated that this would make it more difficult for the Leeds City Region to bounce back from recession compared to the SCR:

“There are major problems in the financial services industry and there will be a rebalancing of the economy towards more manufacturing and innovation in other industries, so areas like Leeds which have based their economies on finance will struggle to respond as positively to the recession as the Sheffield City Region.” (Economic Development Manager, Sheffield)

“Financial services has grown massively but will see a decline in the next few years ... We have a financial services industry in the City Region but not to the same extent as a place like Leeds, so the problems facing financial services should not hit us as hard.” (Economic Development Officer, Barnsley)

However, the stakeholders identified that the key challenge facing the SCR in light of the recession would be the cuts in public spending introduced as part of the government's financial austerity programme (HM Government, 2010; HM Treasury 2011). As the literature



on the SCR and the respondents' comments on its economic structure demonstrate, the level of public sector employment is a challenge for policy development. With the austerity programme leading to redundancies in the public sector, the SCR will therefore face a challenge:

"Our ability to comeback from the recession strongly will depend on how we integrate the large numbers of people likely to be made redundant back into the economy (Economic Development Officer, Doncaster)

"We will need private sector growth to offset the job losses in the public sector ... Whether the national economy and the City Region economy are strong enough to do that remains to be seen." (Economic Development Manager, Barnsley)

In addition to recession, a further external "shock" to entrepreneurship, enterprise development policy and resilience is changes in governance structures used for supporting new and existing businesses. The Conservative-Liberal Democrat coalition government elected in 2010 announced plans to replace the RDAs and regional level Business Link organisations with Local Enterprise Partnerships, which will be joint local authority-business bodies to promote local economic development, and the establishment of new Enterprise Zones to foster locally led approaches to harnessing entrepreneurship (HM Government, 2010). The change in governance will alter the nature of regional and local policy intervention, although the government states that the Local Enterprise Partnerships will "take the form of the existing RDAs in areas where they are popular" (HM Government, 2010, p. 10). Such governance changes clearly provide challenges as well as opportunities for harnessing economic resilience and entrepreneurship in City Regions, and successful strategy development and implementation will contribute to enabling or constraining the SCR economy.

The interviews found mixed views of the changes in governance brought about by the abolition of the Regional Development Agency which covered the SCR, Yorkshire Forward, and new arrangements such as the Local Enterprise Partnerships, and what the implications would be for economic resilience in the Sheffield City Region. Some of the stakeholders expressed concern that inward investment projects which benefitted the region would not be won in future without a regional policy dimension, while others stated that the new governance structures presented an opportunity to rethink support for entrepreneurship:

"We are losing some of the recent structures, like the Regional Development Agency, and we will have a paired back Business Link, so we need to think about what the priorities are, and how we can use our resources most effectively ... We need to be more innovative and only support those businesses with the most potential." (Investment Manager, Sheffield)

"The abolition of the Regional Development Agency will leave a vacuum. Not everything they did was good, but they could harness inward investment in a way that smaller organisations like Councils cannot do. The LEPs will struggle to have a regional dimension and the focus will no doubt be much more locally based. They are hamstrung by a lack of resources so it is going to be difficult to replace the structures that attracted investment into the City Region." (Economic Development Consultant, Barnsley)

The stakeholders provided a lukewarm welcome for the new governance arrangements of Local Enterprise Partnerships and Enterprise Zones, stating that time would tell whether they are effective, but also providing recommendation on what they should be focused on:

"New policies like the Enterprise Zones and Local Enterprise Partnerships have potential but only time will tell. We need to make sure they are focused on the right things, and that means supporting new start-ups and trying to attract in more investment." (Investment Manager, Sheffield)

"For the Local Enterprise Partnerships, we need the focus to be on the key industries that will help us to grow and will help to build an effective supply chain that will create further opportunities for other businesses." (Economic Development Officer, Doncaster)

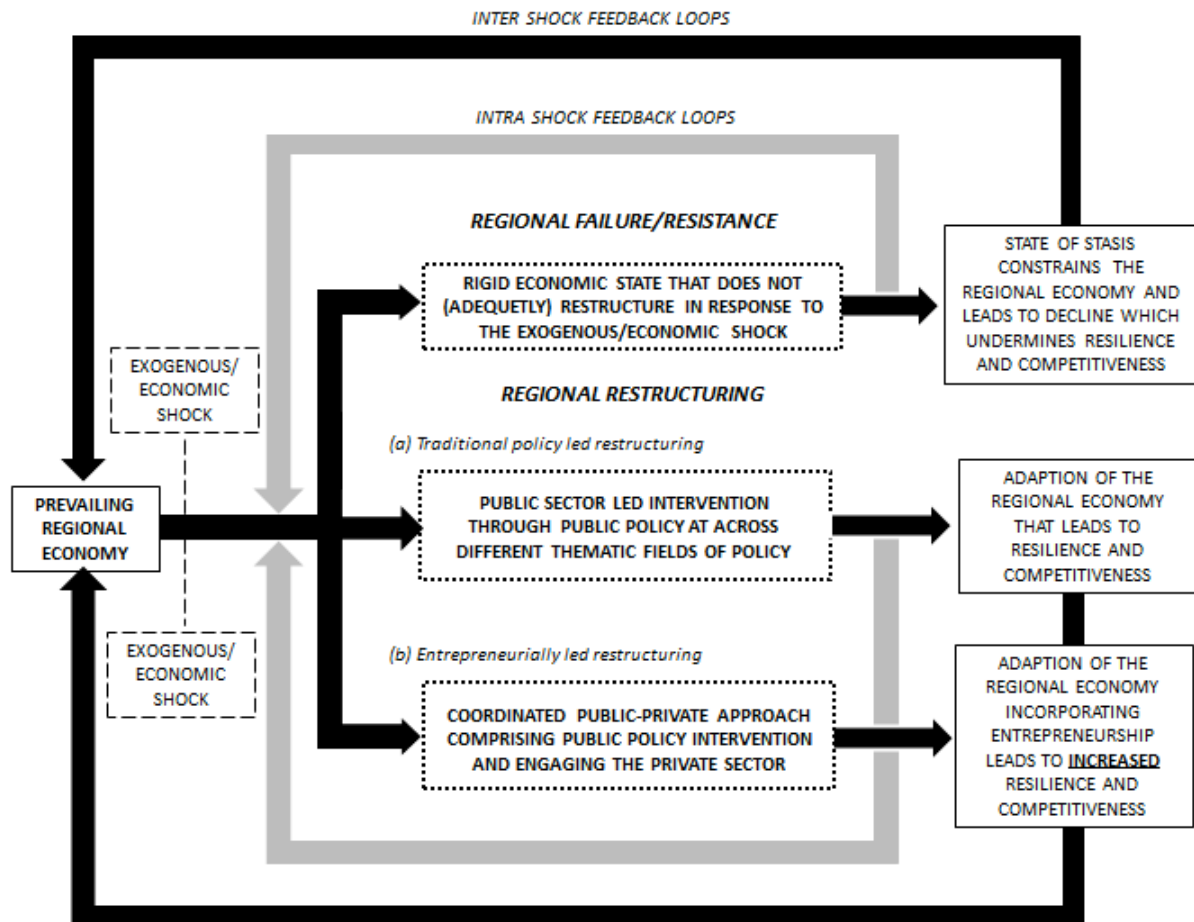
“Enterprise Zones have been tried before and had limited impact, so there are question marks about whether it will work this time. We need to make sure that we fit it around areas that we already have strengths, so for example by linking things to the Advanced Manufacturing Park.” (Economic Development Manager, Barnsley)

The new governance arrangements will impact on support for entrepreneurship in the Sheffield City Region and how it bounces back from the recession. The focus and potential benefits of the LEPs and Enterprise Zones will take time to emerge. The stakeholders emphasized that the focus of both programmes should be on encouraging new high-growth potential start-ups and attracting new businesses into the SCR which build on the area's historical strengths. By doing so, a critical mass of dynamic, flexible businesses, which is vital to regenerating lagging areas (Porter, 1995), can be built up which enhances the resilience of the SCR through positive adaptation to external changes.

## **6. Discussion and Conclusions**

The findings of the study demonstrate the interlinked concepts of entrepreneurship and economic resilience by examining policy development in the Sheffield City Region. Having analysed the empirical findings, the key themes were considered alongside those identified in the literature review to establish a framework for understanding how entrepreneurship has been incorporated into the restructuring of the economic structure following an exogenous/economic crisis. While there have been attempts to conceptualise a framework of economic resilience, these have failed to account for and explain the 'role' of entrepreneurship. According to Dawley et al (2010) the resilience of a region requires long term policy objectives and strategies, of which we contend that entrepreneurship is a central tenet. Moreover, as noted above, it has been argued elsewhere that entrepreneurship is integral to promoting the diversification and capacity building of regional economies - traits which are characteristic of (more) resilient economies. Therefore, in conceptualising economic resilience our framework seeks to incorporate and explain the value added of entrepreneurship as a driver of resilience.

Building on the work of Simmie and Martin (2010) which outlines a path dependence model of industrial evolution this paper has considered how entrepreneurship can promote (greater) resilience. The framework of regional economic resilience presented in Figure 1 the framework views the evolution of a region as premised by its historical economic structure (i.e. hysteresis), consistent with Martin (2012) and Hassink (2010). Figure 1 distinguishes between resistance and restructuring as responses of which three paths are identified: the first relates to the failure/resistance of a region to restructure; the second to traditional policy led regional restructuring; and the third entrepreneurially led regional restructuring. These paths can be subject to an intra-shock feedback loop whereby the response is modified and adapted until a consolidated path is realised and integrated in to policy and practice.



**Figure 1** A framework of regional economic resilience

As per the first path, where a region fails to adapt or simply resists the impetus to restructure following an exogenous/economic shock the lock-in effect sees the resilience of the region undermined. In the inter-shock period this is likely to culminate in stagnation, if not economic decline of the region, and thereby compromising competitiveness and economic growth. The failure/resistance of a region to restructure might be attributed to ineffective governance as much as it is the capacity of the region itself. The resistance and failure of a region to respond and adapt is embodied by the SCR following the decline of Sheffield as a major centre for coal, steel and manufacturing in the 1970s

Traditionally, following an exogenous/economic shock the response has been one of policy led restructuring across different thematic fields of policy (i.e. Research & Innovation, Transport, Health, Education and Training etc.). The goal of (city) regional policy, as noted above in relation to RDAs, is to ensure an appropriate policy mix to develop their strengths and tackle their weaknesses. Where invoked effectively policy led restructuring can see regions respond and adapt, which would see the region return to its pre-shock growth path – thereby demonstrating resilience to the exogenous/economic shock and the sustained competitiveness of the region. Again, the revival of the SCR in the 1990s, which was premised on public sector investment and reform, is a clear example of policy led restructuring.

Central to the argument at the core of this paper and the empirical study of the SCR, is in exploring the link between entrepreneurship and economic resilience. To this end an entrepreneurially led approach towards restructuring can be distinguished from traditional policy-led approaches, whereby there is a more coordinated public private approach. As an exogenous/economic shock the 2007 financial crisis has transformed the economic

landscape, which coupled with the contracting public sector has come to demand an alternative perspective towards engineering the SCR as a more resilient region. As the empirical study has shown how entrepreneurship has come to be incorporated as an integral aspect of the framework of regional economic resilience, and the intra-shock feedback loop has been fundamental to normalizing the entrepreneurial ideology in policy and practice (Verheul et al, 2001; Minniti, 2005; Huggins and Williams, 2011). Indeed it is clear from the interviews with stakeholders that managing the impact of public sector spending cuts and promoting private sector growth are the twin challenges in the SCR that requires an entrepreneurial solution. While the 'bounce back' of the SCR economy will take time to be fully understood, the contribution of this paper is in recognizing how entrepreneurship has become a defining ideology and practice which permeates both the public and private sectors alike if a more resilient economy characterised by greater diversity and flexibility is to be realised.

Entrepreneurship has come to be viewed as integral to sustaining a dynamic and diverse economy, by stimulating competition, driving innovation, creating employment and increasing productivity. As such this paper argues that entrepreneurship should be fore fronted in economic resilience debates as engine of competitiveness and economic growth. Indeed the framework of regional economic resilience presented here supports the prevailing view that economic resilience needs to be understood is an on-going process in a geographically situated context. To this end, three broad lessons can be distilled.

First, if restructuring and adaptation is to be effective it needs to occur at the appropriate scale and forms of governance. Having been part of the Yorkshire Forward RDA since its inception in the late 1990s, the challenges facing the SCR were set among those of other city-regions across Yorkshire and the Humber. The findings of the empirical project suggest that the capacity to respond to the specific challenges of the SCR has increased as the somewhat arbitrary boundaries of RDAs have been superseded by the more functional organisational regions of economic activity as represented by the LEPs. However, if LEPs are to succeed where RDAs failed there is a need for the coordinated commitment of both public and private stakeholders. Whereas the response to exogenous/economic shocks has formerly been public sector led this is increasingly unsustainable given the public sector funding cuts streamlining of the public sector.

Second, there is a need to identify and understand the core competencies of the region, while not suffering the decline of lock-in, and the means to harness them. This paper has shown how the SCR has learnt to harness and build on its strengths in how it has responded and adapted to successive economic shocks. This path dependence requires strengths (or weaknesses) are developed based on the pre-existing resources, competences, skills and experiences inherited from previous patterns of economic development (Simmie and Martin, 2010). This is not about pick winners but rather creating conditions which allows entrepreneurship to emerge leads to a diverse economy which is less likely to see severe economic downturns compared to regional economies which are highly specialised (Desrochers and Sautet, 2008) – as was formerly the case in the SCR.

Third, the study has highlighted the importance of real public-private partnerships focused on promoting dynamic and diverse private sector growth. While this lesson is not new, with successive UK governments have taken a number of policy approaches to promoting enterprise (Huggins and Williams, 2009, 2011). While successive Labour administrations have provided abundance of enterprise support there was no distinction between 'ambitious entrepreneurs' intent of creating business with high-growth export orientated potential and those entrepreneurs establishing lifestyle businesses do little to enhance the economic resilience. In the SCR where there has historically been dependent on a relatively small number of large employers an overarching policy objective has been to promote a more diverse entrepreneurial mix. The rise of "knowledge-based" industries and growth of advanced manufacturing in the SCR has been central to creating a more diverse and dynamic economy which is better placed to withstand exogenous/economic shocks.

Finally, while this paper has drawn lessons from the SCRit has also sought to develop the concept of economic resilience by linking it with entrepreneurship. Further research is clearly required to supplement and expand this understanding. Future research should aim to understand the impact of external shocks on entrepreneurs, for example by examining the impact of recession on growth, investment and development in specific localities. Such research can contribute to furthering understanding on these important, inter-linked concepts. If this paper encourages such wider research to be conducted, and therefore a further development of the nature of economic resilience and entrepreneurship both in other socio-spatial contexts, then it will have achieved its wider objective.

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# Choosing Sides? The Balance in Regional Innovation Systems between Public Research on the Supply-Side and Business Innovation on the Demand-Side

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Using a typology based on a large set of indicators for over 200 regions in the EU shows that the dominant knowledge-base and the innovation trajectories differ between the various types of regions. In some regions the innovation capacity is based on business R&D, patenting and high-tech manufacturing, while other regions have a high innovation capacity based on knowledge intensive services, university research and a large share of high-educated people. Also among the less developed innovation systems there are clearly different types of regions. Some types of EU regional systems have a relative strength concerning universities, while the catching-up dynamics of others is based on skilled population indicated by the share of secondary educated<sup>81</sup>. Do policymakers prefer to strengthen their dominant knowledge-base?; How can regional innovation policy balance the policy support towards the various knowledge bases? For some EU regions we show that policymakers prefer to support the dominant knowledge-base, by showing how they use EU Structural Funding. At the end of this paper we discuss which of the identified types of regions and development trajectories fit best with the situation in candidate countries of the West Balkan.

## Keywords

Demand-side policies, Innovation systems, Public R&D, Regional innovation policy, Typology

## 1. Introduction

All regions in Europe rely on innovation to increase development: in technologically leading regions to remain ahead; in peripheral regions to catch-up. Regional innovation policies are therefore relevant for each region in Europe. When we look at the increased share of EU cohesion policy spending on R&D, innovation and ICT, we can indeed conclude that innovation policies have become pervasive, since both in the technologically leading, as well as many lagging regions, more than 40% of all EU Structural Funds for regional development are currently related to research and innovation.

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<sup>81</sup> The typology and foresight-results used in this paper are based on the findings [1] obtained in the EC funded project "The regional impact of technological change in 2020" (Framework Service Contract 150083-2005-02-BE); We gratefully acknowledge the financial support from the European Commission.

Even if we would limit ourselves to R&D activity, there are different regional ‘faces’ of R&D. We can for instance observe that the distribution of public and private R&D differs. In many countries the region with the highest public R&D intensity is often not the same as the region with the highest business R&D intensity.

But, whether based on public or private R&D, excellence in technology generating research does not automatically materialise in commercially successful innovations. Deriving economic impact from technology and innovation depends on dynamic interactive processes involving individuals, firms and institutions which absorb, apply and diffuse technology. Therefore a broad set of framework conditions matter for maximising the impact of innovation processes. In terms of policy, a shift can be observed from supply-side or technology-push policies towards demand-side policies. Applications, entrepreneurship, user-driven innovation, innovation in services and in the government sector and the grand societal challenges have become more important on the innovation policy agenda.

In many regions (and in many firms), most new technologies originate from outside the region. Besides promoting R&D and technology generation there are many other policy options to promote innovation at regional level. Innovation should therefore be considered in a broader sense, beyond the supply-side (linear, research- or science-based) approach. The OECD [2] suggests a broader approach to innovation. An approach which also includes non-technological innovations (organisational, new markets and marketing processes); which looks at new forms of collaborations and entrepreneurship as ways in which innovating agents interact and organise the process of innovation; and which includes innovation addressing societal challenges such as climate change or ageing.

## 2. Typology of Regions

Most existing typologies classify regions along a single dimension (for example GDP, R&D intensity or summary of innovation indicators), which allows to identify leading and lagging regions. A broad set of indicators have been grouped around five dimensions: employment, human resources, activity, technology and economy. By grouping the indicators and running a factor analysis separately for each group, the effect of over sampling of factors should be minimized.

The indicators related to employment measure the employment share of relevant groups of industries for the economy. The first four indicators capture activities in high-tech and knowledge-intensive sectors, the following three indicators show the relevance of industry, services and government sector for employment:

- Employment share of High-tech manufacturing (NACE 24.4; 30; 32; 33; 35.3);
- Employment share of Medium-high and high-tech manufacturing (NACE 24; 29; 31; 34; 35);
- Employment share of High-tech services (NACE 64; 72; 73);
- Employment share Market services (NACE 61; 62; 70; 71; 74);
- Employment share of Industry (including NACE C to E);
- Employment share of Services (including NACE G to K);
- Employment share of Government sector (including NACE L to P).

Human resources related indicators measure the share of people with different educational attainment relevant for the knowledge economy and the share of people with tertiary education working in a science and technology occupation (HRST):

- Share of Human resources employed in science and technology occupations (HRSTO) (% of labour force);
- Share of employees with completed secondary education (% of labour force);
- Share of employees with completed tertiary education (% of labour force).

Activity related indicators capture the involvement of females and tertiary educated in the labour force. High rates of activity foster economic growth as does a low share of long-term unemployed as these are more readily available for the labour market:

- Activity rate females (% of employed females out of female labour force);
- Activity rate tertiary educated (% of employed workers with completed tertiary education out of total labour force with completed tertiary education);
- Share of Long term unemployment in total unemployment.

The indicators related to technology include both total R&D expenditure as a proxy for the investments in creating and absorbing technology, the share of public sector R&D by universities and research institutes and the number of patents that result from (private) R&D activities:

- Total R&D intensity (Total R&D expenditures (GERD) as a % of GDP);
- Share of university R&D (HERD) in total R&D;
- Share of government R&D (GOVERD) in total R&D;
- EPO patent applications per million population.

The indicators grouped under economy measure the effect of technological change on labour productivity in industry, knowledge-intensive services and the investments in new machinery as measured by Gross Fixed Capital Formation (GFCF):

- Gross Fixed Capital Formation as a % of GDP;
- Labour productivity in Industry (value added per employed person, NACE C to E);
- Labour productivity in Services (value added per employed person, NACE J to K).

Using factor analysis the above information has been reduced to eight knowledge-economy factors. For 'employment' two factors emerge: knowledge-intensive services and high-tech manufacturing. The first factor captures the relevance of services employment, in particular knowledge-intensive services. The second factor captures the relevance of medium-high and high-tech manufacturing activities. For 'human resources' two factors emerge: creative workers and skilled workers. The first factor captures the relevance of tertiary educated workers in S&T occupations, or the more creative workers. The second factor captures the relevance of skilled workers, for example those with a completed secondary education. For 'activity' one factor emerges summarizing performance on the 3 selected indicators. For 'technology' two factors emerge: private technology and public knowledge. The first captures applied research and development activities by the business sector. The second captures the research activities of public knowledge institutes. For 'economy' one factor emerges, notably productivity which captures high levels of productivity in both industry and knowledge-intensive services.

These factors have subsequently been used to identify seven different types of regions using hierarchical clustering analysis:

*1 Metropolitan knowledge-intensive services (KIS) regions*, including 23 regions in densely populated metropolitan areas in Western Europe. These regions show high rates of urbanisation and their level of economic performance is highest of all regions. Many regions serve as their country's capital region;

*2 Knowledge absorbing regions* including 76 regions mostly in France, British Isles, Benelux and Northern Spain. Their level of economic performance is just above average;

*3 Public knowledge centres* including 16 regions, mostly in Eastern Germany and metropolitan areas in Eastern Europe. Their level of economic performance is close to average and economic growth has been strong;

*4 Skilled industrial Eastern EU regions* including 44 regions in Eastern Europe. These regions are rapidly catching-up from low levels of economic performance;

*5 High-tech regions* including 17 R&D-intensive regions in Germany, Finland, Sweden and the Netherlands. Their level of economic performance is above average;

6 *Skilled technology* regions including 38 regions in Germany, Northern Italy and Austria. Their level of economic performance is above average but their growth record has been below average;

7 *Traditional Southern regions* including 39 regions in Southern Europe (Portugal, Italy, Greece and Spain). Their level of economic development is below average and many regions rely on agricultural and tourism activities.

Figure 1 shows the average factor performance for the different types of regions.

### 3. Regional Differences in Impact from Public and Private R&D Confronted with Regional Policy Expenditures

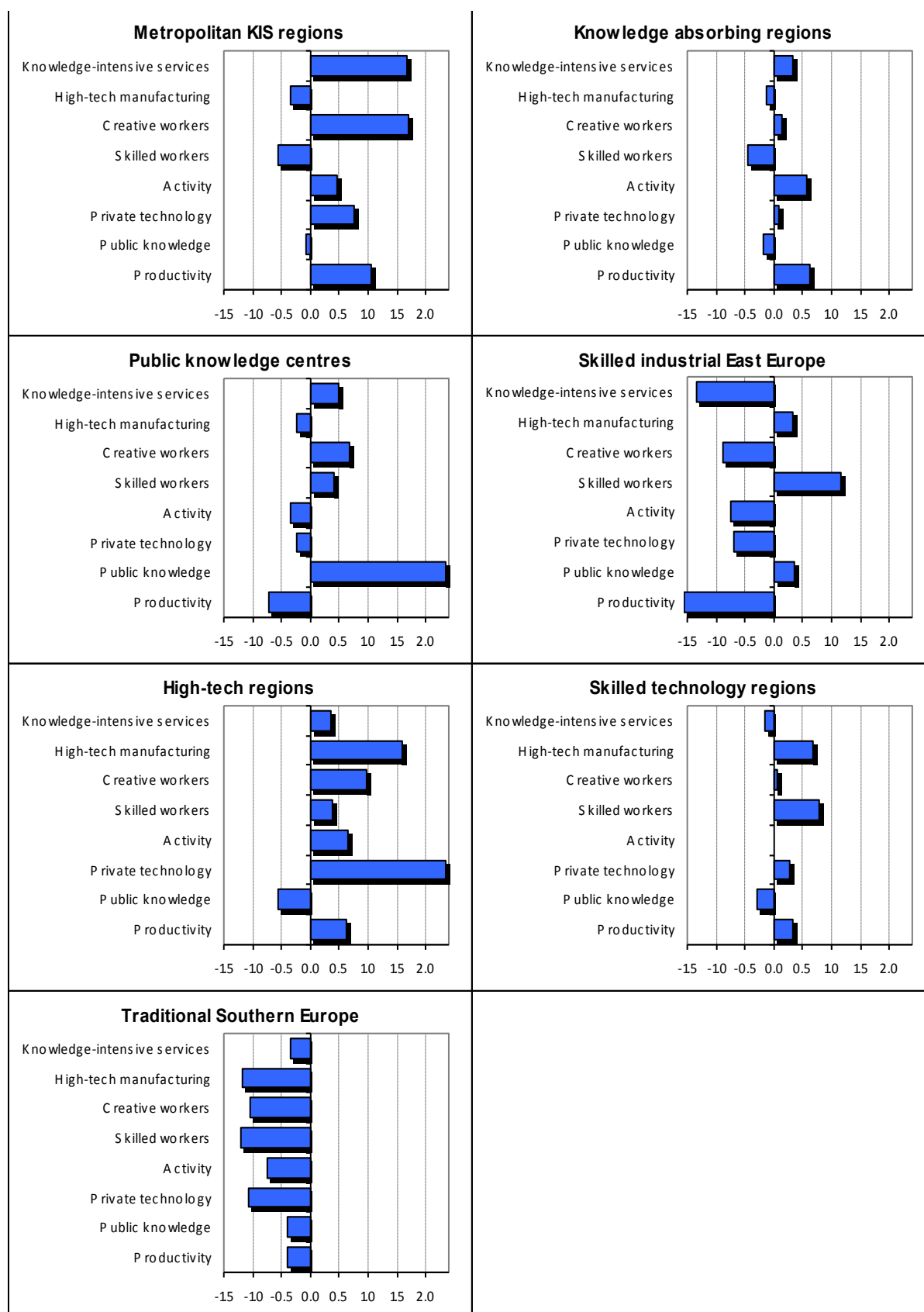
All factors contribute in explaining the level of GDP per capita (Purchasing Power Parity). Of the knowledge generating factors representing the technology supply-side the factor 'private technology' is not significant and the factor 'public knowledge' has a significant negative relation to the level of GDP level (Table 1). Also concerning the growth in GDP per capital between 1999 and 2005 the factors 'creative workers' and 'activity' have a significant positive effect, which shows the importance of absorption capacity.

**Table 1** The impact of knowledge and technology factors on GDP per capita, for all regions

	Significance and direction of impact on regional GDP per capita (all regions)*
Factor Knowledge-intensive services	++
Factor High-tech manufacturing	++
Factor Creative workers	++
Factor Skilled workers	--
Factor Activity	++
Factor Private technology	
Factor Public knowledge	--

\* ++/--: Level of significance 5%; +/- Level of significance 10%; else not significant.

Due to regional diversity, GDP for all EU regions cannot be explained in one model. The sample has been split into two, distinguishing the types of regions according to the level of GDP. The policy opportunities to maximize regional impact in terms of GDP per capita seem to differ among the identified types of regions. For the regions of the leading and following type, education and training is most important. Among regions of the lagging types (mostly in the east and south of the EU) not only high-tech manufacturing, but also business R&D has a positive impact on the level of GDP per capita, which is however not a patent generating kind of R&D (Table 2). It seems to be the kind of R&D needed to absorb, apply and diffuse technology.



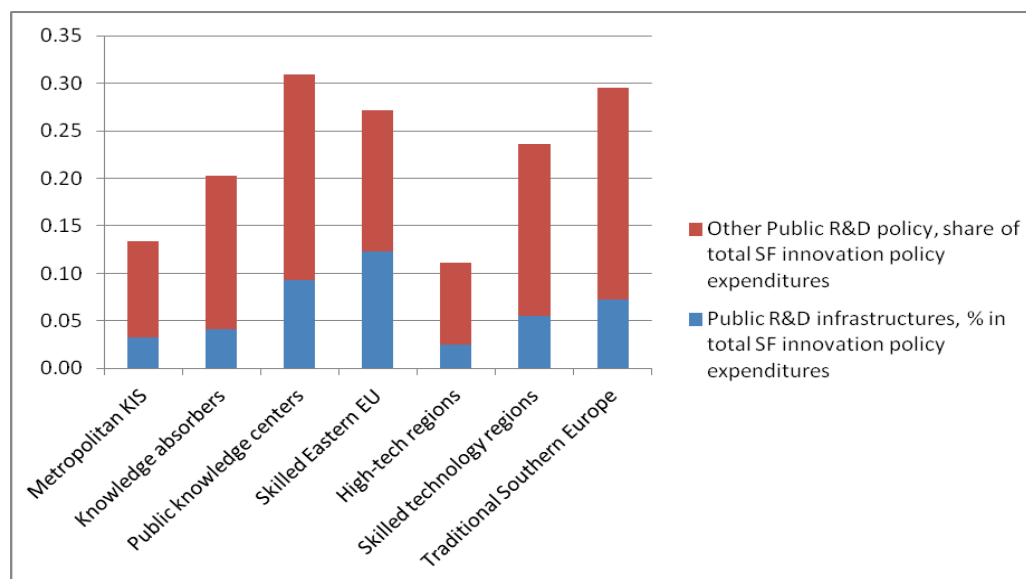
**Figure 1** Average factor performance for the different types of regions, 0 is average of all regions

**Table 2** The impact of knowledge and technology indicators on GDP per capita among regions of leading and lagging types of regions

Impact on GDP per capita 2005	Significance & direction of impact*	
	Regions of Leading & following types (1,2,5,6)	Regions of Lagging types (3,4,7)
GDP per capita in 1999	++	++
Employees with tertiary education (%)	++	++
Employment share High-tech services		+
Employment share High-tech manufacturing		+
Employment share Med-high-tech manufacturing	--	
Lifelong learning	+	
Business R&D (% GDP)		+
Patents per million population		--

\* ++/--: Level of significance 5%; +/- Level of significance 10%; else not significant.

So, for the types of regions which have a low level of GDP per capita, where public R&D is on average the dominant knowledge base (Public knowledge centres, Skilled industrial Eastern EU regions, Traditional Southern regions), the results indicate that increasing R&D and innovation in the business sector is important to maximise the economic impact. On the other hand, the statistical analysis and Delphi-study by type of region shows that for 'high-tech' regions (with private R&D as its dominant knowledge-base), the impact of increasing public research expenditures would be very high.



**Figure 2** Averaged share per type of region of EU Structural Funds innovation policy expenditures spend on public R&D policy (Source: EC, DG Regional policy)

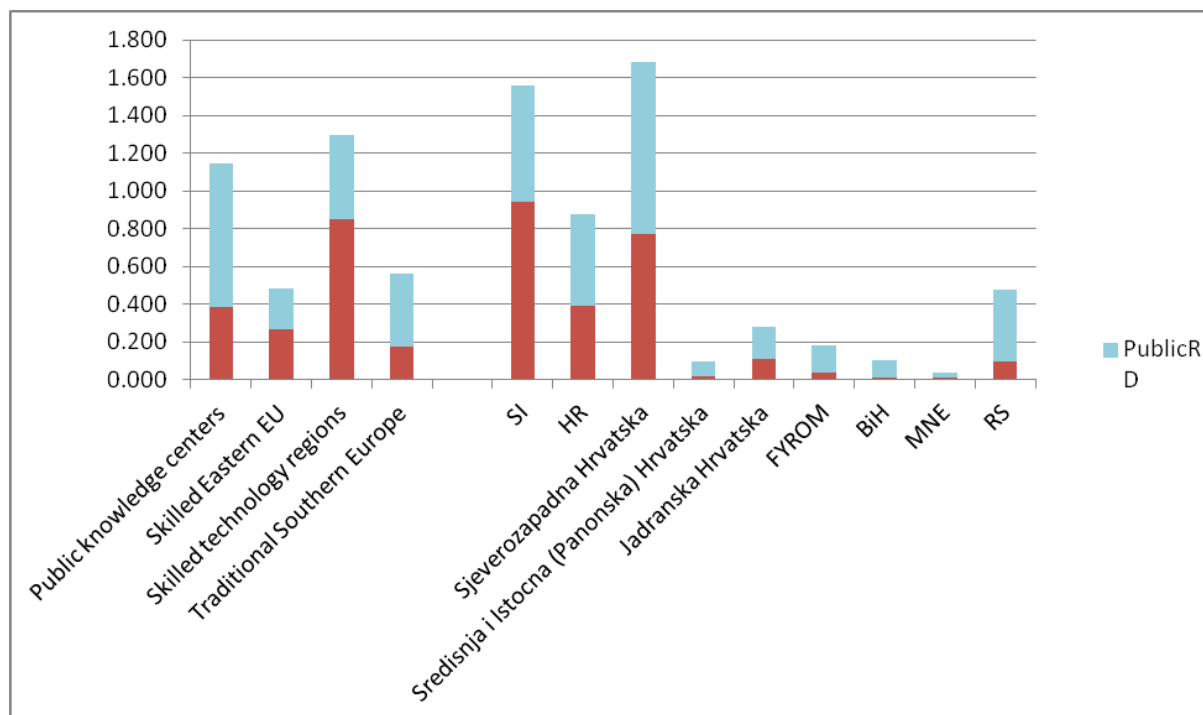
We confront these results with policy expenditures in these groups of regions of RTDI related EU Structural Funds (Figure 2). First, we conclude that most of these research and innovation related funds for regional development are spend on innovation in the business sector. The highest average share of almost 90% spend on innovation in businesses can be found in the 'high-tech' type of regions (only 10% is spend on public R&D policies). Secondly, for the types of regions where public R&D is the dominant sector (Public knowledge centres,

Skilled industrial Eastern EU regions, and Traditional Southern regions), the averaged share of 'Lisbon related' Structural Funds spend on public R&D policies is relatively high: close to 30%. So indeed, policymakers seem to prefer to strengthen their dominant knowledge-base.

The Dutch region Noord-Brabant is a good example of a 'high-tech' region where the private sector is the dominant stakeholder in the regional innovation system [2]. Philips is one of the important companies in terms of R&D and especially patents. Firms are also very active in developing policy projects themselves, and the business sector is well represented in platforms and steering groups which are set-up to define regional innovation strategies. E.g. the committee that wrote the Brainport 2020 programme was headed by a captain of industry. Draft strategies were discussed during several 'breakfast' meetings where SME's and others were given the opportunity to commend, amend and contribute.

The public research sector is relatively young and small, compared to the metropolitan part in the West of the Netherlands, where traditionally the national research institutes are concentrated, and it has proven difficult to change this historically grown distribution pattern. The region hardly invests in public research, but has some recent success in lobbying for public R&D funds from national programmes.

Regional policy in the region of Noord-Brabant has very successful programmes (co-funded by EU Structural Funds) to support R&D projects of cooperating firms. Other regions in the Netherlands have tried to copy those programmes, but it was not successful because there were not enough applicants, or it took quite some effort to engage and commit firms. It is one of the reasons why some other Dutch regions rather preferred to use Structural Funds to strengthen the public research sector. Moreover, in regions such as Groningen and Gelderland the public R&D institutes have a much larger influence on the development of Regional innovation strategies. This path-dependency due to co-evolvement of policy preference and dominant knowledge-base can be a barrier in improving the balance between the supply- and demand-side of regional innovation systems.

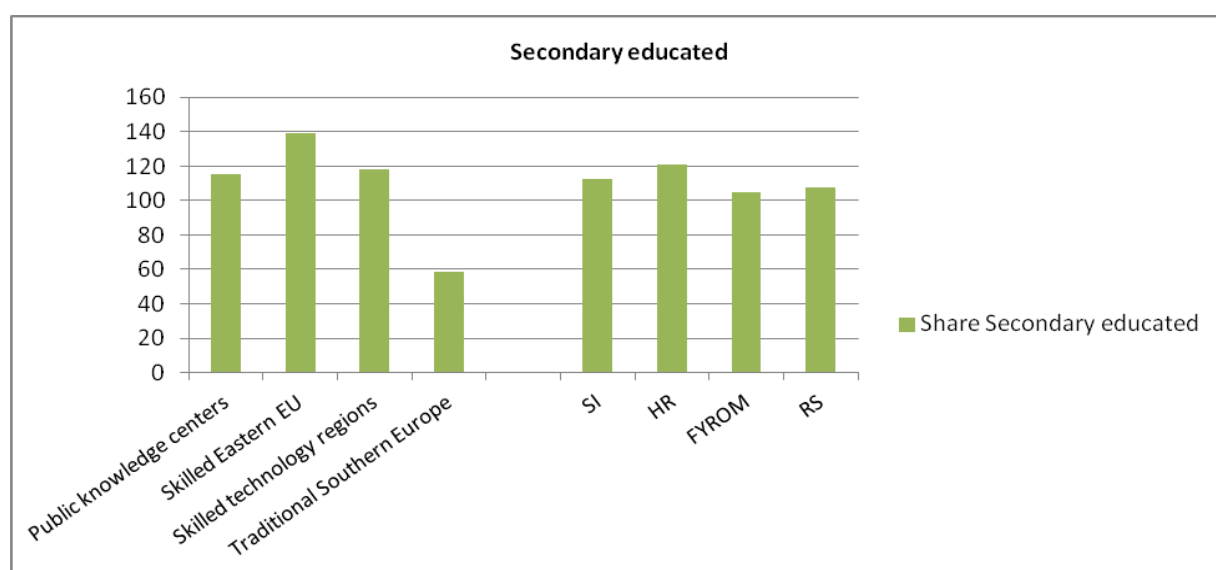


**Figure 3** Public and business R&D expenditures as % of GDP

## 4. Positioning Western Balkan Countries

Since not every of the indicators used for the typology of EU regions are available for countries and regions of the West Balkan at Eurostat, we limit the comparison to three of the most distinctive indicators. When we look at the public and private R&D expenditures (Figure 3), we see that the 'profile' of the region of Sjevorozapadna Hrvatska resembles the profile of Slovenia, which belongs to the 'Skilled technology regions'. Other countries and regions more resemble the public/private R&D profile of 'Skilled Eastern EU' and 'Traditional Southern EU'.

However, when we look at the the indicator on secondary education (Figure 4), which is typically low for the 'Traditional Southern EU' regions, the West Balkan is clearly different from the 'Traditional Southern EU' regions.



**Figure 4** Share of people with secondary education as highest obtained (2006/2008)

The basic methodological problem in case of the West Balkan area is the very rare statistical data on the regional level: except Croatia, just minor data are available for other countries, and first R&D and innovation data on regional level appeared in Serbia just recently (in December 2011 and only for year 2010).

**Table 3** Regional GERD and BERD as percentage of GDP in Serbia, 2010

	Serbia	City Belgrade	of Region Vojvodina	of Region Šumadija and Western Serbia	of Region of Southern and Eastern Serbia
Regional GERD as % of GDP	0.764%	0.561%	0.143%	0.035%	0.025%
Regional BERD as % of GDP	0.089%	0.070%	0.004%	0.012%	0.004%
Total R&D personnel (FTE) in region	17,273.9	9,893.59	4,143.3	1,363.9	1,873.11

A crucial challenge for research governance in Serbia is the question how to increase R&D and Innovation activities in the Business Enterprise Sector (BES). Official figures showed that BERD share in GERD was only 14.319% in 2009, compared to 62.046% in EU. There was no significant funding for innovation activities in Serbia from any source other than MES (Ministry of Education and Science), MoERD (Ministry of Economy and Regional development) and NARD (National Agency for Regional development). A significant change



in that sense happened in 2011: financial scheme for financing of the Innovation fund (the World Bank, the European Investment Bank, and the European Commission as source for funding) with €75.5m for the period 2011-2014 is established. Public call for innovation projects under Mini Grants Programme (co-financing up to €80t) has been launched in December 5th, 2011. Public call for Matching Grants Programme (co-financing up to €300t) is about to be launched in Spring, 2012. There are no similar Programmes in other West Balkan Countries so far, but it is on-going initiative for establishment of Regional (i.e. West Balkan) Innovation fund.

Recent analysis of national innovation capacity (NIC) in South East Europe (the NIC index) reveals considerable differences in innovation capacity between countries. Slovenia emerges as the clear regional leader. It is the only SEE economy which ranks around the EU average in the majority of NIC indicators. In terms of innovation capacity in the region, Slovenia is followed by Hungary, Croatia, Bulgaria and Greece. These countries are above the SEE average. The national innovation capacities of Serbia, Romania, FYR of Macedonia and Turkey are least developed. If data were available for Bosnia and Herzegovina and for Albania, we suspect that these economies would belong to the lower segment of SEE countries [4].

## 5. Conclusions

While for the 'high-tech' region of Noord-Brabant a major policy challenge is to strengthen the public research sector, in the case of most Western Balkan Countries strengthening business innovation seems the most important policy challenge.

Overall we conclude that many regions prioritise investments in capacities which are already relatively strong, or where policy impacts are more easy to generate. Regional 'weaknesses' and the more difficult policy challenges are often neglected. Concerning Western Balkan countries we question if it is enough to strengthen in a linear approach the supply-side of public research, followed by technology transfer and then private research, in the hope it will lead to a more innovative business sector? Therefore, a crucial challenge for research governance in WB is the question how to increase R&D and Innovation activities in the BES. Strengthening sub-national support structures which directly enhance the innovative capacities of existing firms would be a good option to improve the balance in the innovation systems. Restructuring of the public R&D system and integration of the BES into the national innovation system is the primary task for the governments in WB. In addition, legal frameworks should be much more in favour of private sector engagement in R&D and innovation activities.

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# The impact of the Settlement Disparity on the Involvement of Adult Population into Entrepreneurial Activity and Factors Influencing it in Russia

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Entrepreneurial activity (EA) largely depends on the «bundle» of external framework conditions [1]. These differ between regions and types of settlement – especially, in large transitional countries like Russia [2]. Here, a large territory, different density of infrastructure, big disparities in the development of economic and social institutions [3] largely influence the peculiarities of entrepreneurial start-up, and also path dependency [4] which differs in different settlement environments result in a highly uneven level and even type [5] early entrepreneurial activity. This research examines the factors of diverging levels of EA in Russia according to the settlement type on the base of the APS Survey data collected within the framework of the «Global Entrepreneurship Monitor» for Russia (2006-2011). The paper aims to explain adult individuals' early-stage EA level and structure as a result of institutional and socio-economic characteristics of a settlement (mega police – city - medium-sized town – small town – rural area) where he (or she) lives. So this investigation argues that as a rule there is a lower level of EA in the settlements with a higher developed system of economic institutions – especially in bigger cities. Moreover, the statistical data show the significance of social capital of entrepreneurs (knowing of an entrepreneur that has launched a business in recent 2 years) which largely differs between the settlement types. It is also important to note that the least optimistic about the prospects of starting a business in the area of residence are early entrepreneurs in mega polices. They are also characterized by the weak involvement in social networks of entrepreneurs, and they have the highest level of fear of failure of business. Thus, cities with population exceeding one million, most of which are regional centers and it should seem they have more developed infrastructure of business support and a wider field of opportunities for entrepreneurial activity in Russia, in our day they are the most problematic in terms of not so much the level of development as psychological and motivational characteristics of the early entrepreneurs. Summarizing the above, it is important to notice that practical outcomes of our research relate with the determining of the factors stimulating or obstructing entrepreneurial activity for every type of settlements that can be used to specify the policy on entrepreneurship development in transition economies. The results of the research can be also used for further elaboration of social and information policy in this field, organization and distribution for educational and retraining programs.

## Keywords

Global Entrepreneurship Monitor (GEM), entrepreneurial start-ups, types of settlement, institutional system, development of society, level of economic development, social networks

## 1. Introduction

Entrepreneurial activity, in particular small and medium-sized businesses, is increasingly being recognized as a primary engine of economic growth [6]. Entrepreneurship stimulates growth through knowledge spillovers, increased competition, expanded product diversity [8], enhancing technological innovation [5] and improvement of employment rate [7].

Nowadays, the efficient government support to small business enhancement is a strategic direction of development in Russia. The introduction of the effective programs should be based on the entrepreneurial distribution structure analysis according to their position in the socio-economic environment. This argument is underpinned by the fact that entrepreneurial activity largely depends on heterogeneity of the external conditions where it arises.

Entrepreneurship development and its conditions analysis in Russia are extremely hampered by the absence of reliable information about the differences across the territory, in particular, across the settlement types. Large territory, national features of Russian statehood establishment and the hearth principle of resources concentration are the main reasons for the high heterogeneity within all economic spheres in Russia, including the unevenness of the business organization distribution.

However, a settlement aspect overcomes the regional one in terms of the context of small entrepreneurship development analysis. In Russia, it can be explained by the fact that the comparison of Moscow or Saint-Petersburg with their suburbs, for example, and small towns is inappropriate because of different socio-economic conditions and living standards. The application of spatial economics shows that the same types of settlement form the homogenous entrepreneurial groups across the country territory.

Many psychologists argue that entrepreneurship can be explained by the possession of personality traits that differentiate people who start businesses from those who do not [9].

The decision of individuals to become an entrepreneur is shaped by the demographic and economic factors, such as education, gender, age, wealth. People also act under the influence of a set of subjective perceptions about entrepreneurship that they form based on the presence of role models, confidence in one's skills and ability and risk aversion [10]. One of the unique aspect of entrepreneurship research pertains to the question of how individuals recognize opportunities for business creation [11]. Empirical studies revealed strong correlation between personal perceptions and judgments about the environment and an individual's decision to start a new business [1]. At the same time individuals differ in terms of their perception of opportunities because of the differences between the networks they are embedded in [12]. Entrepreneurs in different settlement types are characterized by different rates of involvement in social networks.

Consequently, the main objective of the research is to explain different levels of entrepreneurial activity in Russia according to the settlement type as a characteristic of certain (particular) socio-economic development pattern and to analyze the factors influencing it. The subject of the research comprises the settlement features rendering the early-stage entrepreneurial activity among adult population in Russia. The object captures the individuals involved in early-stage entrepreneurial activity in Russia.

## 2. Theoretical background and Hypothesis

Nowadays, more and more researchers are wondering: Why does entrepreneurship exist and what factors are important drivers of entrepreneurial behaviour?

The empirical analysis made by Gary Becker, Edward Glaeser and Kevin Murphy shows that there are considerable differences in rates of entrepreneurial activity in various countries. They establish correlation between a levels of economic development in particular cities of the country and economic growth. Authors prove that under conditions that tend to prevail in poorer, mainly agricultural, economies with limited human capital and rudimentary

technology, higher population usually does tend to lower per capita incomes. However, these effects would be much weaker in modern urban economies with small agricultural and natural-resource sectors. In these economies, the increased density that comes with higher population and greater urbanization promotes specialization and greater investment in human capital, and also with more rapid accumulation of new knowledge and consequently increase in per capita income. Cities accept the increasing value. So, concentration of the population in cities is a key driver of economic development as the dense population leads to market expansion, and, accordingly, to growth of incomes per capita. [13] According the North's theory, institutions are establishing «rules of the game» for a society or formal and informal constraints on political, economic, and social interactions. From this perspective, «good» institutions are viewed as establishing an incentive structure that reduces uncertainty and promotes efficiency-hence contributing to stronger economic performance. Toward the other end of the spectrum, and giving more specific shape to this broad concept of institutions, would be particular organizational entities, procedural devices, and regulatory frameworks. Such institutions affect performance primarily by fostering better policy choices [3]. Thus the institutions' quality that varies across different types of settlements is also the factor of the level and the structure of early-stage entrepreneurial activity.

Summarizing the forgoing theoretical material it is possible to make assumptions concerning situation in Russia. Due to highly uneven level of population displacement, different density of infrastructure, big disparities in the development of economic and social institutions in Russian territory [3] and path dependency [4] there will be uneven distribution of entrepreneurial start-ups across different settlements. Based on this judgment, there has been formulated the first hypothesis:

H1: The rate of early-stage entrepreneurial activity differs across various settlement types in Russia.

Besides this Maria Minniti and Pia Arenius emphasize factors affecting new firm formation: socio-demographic factors and factors describing subjective perceptions and beliefs of the individual which are not reflecting necessarily objective circumstances [1]. Number of scholars agree that opportunity perception is the most distinctive and fundamental characteristic of entrepreneurial behaviour [14]. Moreover, entrepreneurial opportunities arise from individuals' differential access to information. Individuals gain access to information through interaction with other people, who in turn are linked to others. The entrepreneurship research has pointed to the importance of networks to entrepreneurs, and even argued that social networks may be the most significant source of knowledge for entrepreneurs [15]. In a consequence of the fact that various settlements are characterized different socio-economic conditions and living standards it would be reasonable to expect that individuals' perception concerning possibilities to start their own business are different. Hence, the following hypotheses can be formulated:

H2: Socio-demographic portrait of early-stage entrepreneurship differs in various settlement types in Russia.

H3: Estimation of external conditions for entrepreneurial start-ups and the level of self-efficacy of early-stage entrepreneurs differ across settlement types in Russia.

The previous two hypotheses allow us to understand who are early-stage entrepreneurs in various settlement types. Also it is obviously important to answer the question: "Why do people decide to start a new business in one or another type of settlement?" Factors influencing the individual's decision to start a business (push factors) form different types of individual's start-up motivation (opportunity vs. necessity driven business) [16]. Fritsch & Schroeter [17] showed that motivation could be different across countries because of many national characteristics of individuals. Since alternatives to economic activity differ by types of settlement, consequently, reasonably to make the assumption that:

H4: The motivation of the early-stage entrepreneurs differs between types of settlement. Moreover, the rate of involved in necessity-driven early-stage entrepreneurial activity is higher among entrepreneurs in rural areas and small towns than in larger settlement types.

### 3. Data Collection and Questionnaire Description

The following study is a part of the international project Global Entrepreneurship Monitor (GEM). This longitudinal research project is based on a harmonized assessment of the level of national entrepreneurial activity for all participating countries (more than 300 thousand respondents in 60 countries including Russia) [18].

The APS survey in Russia is steadily based on the nationwide, multi-stage, stratified and probability sample that represents the entire randomly selected adults older than 18 years. The sample size varied from 1 894 in 2006 till 7 500 individuals in 2011. In order to draw conclusions generalizable to the populations, raw data were assigned appropriate weights to match Russian sample with the actual age and gender structure. The sample design is based on the Census 2002 data revised by the data of Rosstat (Russian Government Statistical Committee) on January 1st in a year of Adult Population Survey (APS) [19].

GEM's research promotes entrepreneurship as a process comprising different phases, from intending to start, to just starting, to running new or established enterprises and even discontinuing these. Through the wealth of GEM Questionnaire, it is possible to understand which kinds of people are (and are not) participating in entrepreneurship.

Based on Russian GEM database of APS survey was differentiated five types of settlement by the number of residents:

- Rural areas - rural and urban settlements with population less than 10 000 people;
- Small towns - towns with population from 10 000 till 100 000 people;
- Medium-sized towns - towns with population from 100 to 500 thousand people;
- Cities - big cities with population from 500 thousand to 1 million people;
- Megalopolises - large cities with population over 1 million people.

All early-stage entrepreneurs have been divided into five clusters by settlement type according to variables «size of the settlement» for 2006, 2007 and «strata» for 2008 - 2011.

### 4. Settlement Features of Early-Stage Entrepreneurship in Russia

#### *4.1 Dynamic analysis early-stage entrepreneur in the context of settlement types in Russia*

The first point of present investigation is structural and dynamic analysis of entrepreneurial activity at early stages.

On the basis of samples of 2006-2011 the rates of early-stage entrepreneurs among adult population for each group has been determined in every year (see Tab. 1). Also the growth rate for the whole period from 2006-2011 has been calculated. Thus, it is possible to observe an upward trend for the rates in each settlement group.

**Table 1** Structure of early-stage entrepreneurial activity by settlement types in dynamics, 2006-2011

Type of settlement		The share of early-stage entrepreneurs						Growth rate
		2006	2007	2008	2009	2010	2011	2006-2011
Megalopolises	N	3	2	4	8	9	66	189,39%
	%	1,61%	1,04%	2,31%	2,68%	2,45%	4,67%	
Cities	N	11	6	11	9	6	52	83,87%
	%	3,81%	2,01%	3,70%	4,81%	3,77%	7,00%	
Medium-sized towns	N	2	6	5	3	21	76	741,11%
	%	0,60%	1,72%	1,46%	0,87%	6,10%	5,01%	

Small towns	N	9	8	18	10	14	68	66,93%
	%	2,04%	1,75%	4,07%	2,21%	3,00%	3,41%	
Rural areas	N	7	8	12	6	18	77	144,64%
	%	1,72%	1,90%	2,96%	1,45%	4,50%	4,21%	
Total	N	32	30	50	36	68	339	134,30%
	%	1,93%	1,75%	3,01%	2,13%	3,92%	4,52%	

The highest growth of early-stage entrepreneurship activity for the period from 2006 to 2011 was observed in the middle-sized towns (approximately 8 times). Another finding is that the rate of early-stage entrepreneurs was decreasing everywhere in 2009 (in comparison with 2008), except megapolises and cities. The main reason for this declining, presumably, was the world economic crisis. However, comparison of early-stage entrepreneurial activity among 5 various types of settlement by years didn't show any substantial difference at 5% level of significance. Thus, it makes sense to combine the studied periods into one sample. So, H1 should be rejected: the rate of early-stage entrepreneurial activity does not differ by 5 settlement types in Russia.

#### ***4.2 Socio-demographic portrait of an early-stage entrepreneur in the context of settlement types in Russia***

Gender structure of entrepreneurial activity is an indirect indicator of the women emancipation degree within certain types of settlement. Women are more likely than men to start businesses to achieve a work-family balance [20]. In addition, Shane et al [21, P. 438] found that women are more likely than men start their own business to «achieve something and get recognition for it». It can be assumed that the rate of female entrepreneurial activity will be higher in the largest and the smallest settlements (although due to diametrically different factors). However, calculations don't confirm this assumption.

As it's shown in Table 2, the rate of men among early-stage entrepreneurs is higher than the rate of women (55,5% against 44,5% in the whole sample). Such conclusion is true for all types of settlements except middle-sized towns. The biggest gap between male and female entrepreneurial activity is observed in small towns, where the share of men among early entrepreneurs is almost 60%.

**Table 2** Gender Educational and Age structure of early-stage entrepreneurs in Russia by settlement types, 2006-2011

Type of settlement	Gender structure		Educational structure			Age structure				
	Men	Women	Low	Intermediate	High	18-24	25-34	35-44	45-54	55-64
<b>Megapolises</b>	% 54,84	45,16	10	34,44	55,56	20,65	35,87	16,3	23,91	3,26
<b>Cities</b>	% 54,17	45,83	7,95	42,05	50	15,63	31,25	29,17	18,75	5,21
<b>Medium-sized towns</b>	% 48,21	51,79	10,91	40	49,09	15,93	37,17	24,78	16,81	5,31
<b>Small towns</b>	% 59,84	40,16	10,74	58,68	30,58	12,5	34,38	31,25	17,97	3,91
<b>Rural areas</b>	% 59,06	40,94	23,20	44	32,80	13,39	38,58	21,26	21,26	5,51
<b>Total</b>	% 55,5	44,5	13,11	44,57	42,32	15,29	35,61	24,82	19,6	4,68
<b>5% significance level</b>	0,391		0,046			0,709				

Educational structure reflects the existence of human (and partly as an indicator of social capital) which an early entrepreneur possesses. So, measures for improving the education level, especially through realization of special programs and courses to prepare for entrepreneurial activity, will significantly influence the readiness to engage in entrepreneurial

activity and should match with the current education structure of population (including entrepreneurs) in various settlements.

It was found, that almost half of entrepreneurs have higher education. This is typical for all settlements besides small towns and rural areas (there are 59% and 44% of early-stage entrepreneurs that have high education, respectively). There is a tendency towards the rate of people with higher education among entrepreneurs decreasing along with the settlement size decreasing (from megapolises to rural areas). Although most of entrepreneurs have high level of education, there are significant differences in education structure of early-stage entrepreneurs among different settlement types. That is why it is possible to conclude that in some types of settlement getting higher education has greater impact on the motivation of a person to start a new business than in other types.

Education level of early-stage entrepreneurs' analysis allows us to identify the necessity in different types of educational programs required in one or another settlement types. The finding suggests that as a step towards supporting and developing small and medium-sized businesses through such programs as MBA and leadership training have possibilities for realization in cities and megalopolises while in small towns and rural areas it would be better to create courses, forming just basic entrepreneurial skills (accounting, financial planning, etc.).

Next step in investigation of early-stage entrepreneurship is age structure. On the one hand, depending on the age, the adult representatives have a completely different set of conditions and resources for entrepreneurial activity, first of all, different levels of social capital and professional skills. On the other hand, younger aged people have higher creative abilities and degree of openness to anything new.

Analysis of age distribution shows that almost third of early-stage entrepreneurs are 25-34 years old in every types of settlement. Also, it was found that the group of young people (18-24) forms a significant part of early-stage entrepreneurial activity in megapolises (they represent the fifth of all early-stage entrepreneurs in megapolises). It can be explained by the fact that in megapolises (as well in cities) young people have access to specific business education and therefore they can gain specific knowledge to start a new venture. In small towns and rural areas young people have much less opportunities to obtain necessary education.

To check whether there are significant differences in the age structure of early-stage entrepreneurs among types of settlements Z-test has been used. As a result, the hypothesis (H0) of no difference in age structures cannot be rejected and there are no significant differences in the age structure. It means that it isn't possible to prove whether in one type of settlements people start their business earlier or later than in another type.

So, in general, the analysis in this section shows that hypothesis No. 2 about the difference between socio-demographic characteristics of early-stage entrepreneurs across settlement types in Russian Federation cannot be rejected.

#### ***4.3 Opportunity perception by early-stage entrepreneurs in the context of settlement types in Russia***

It was found, that on average, about 39% of the early-stage entrepreneurs in Russia positively estimate conditions for start-ups in the district of residence (see Tab. 3). In short term the most «optimistic» early entrepreneurs are those who live in medium-sized towns (42%) and megapolises (39%). Contrary, the least optimistic about the prospects of starting new business in the area of residence are early-stage entrepreneurs from small towns.

**Table 3** Opportunity perception by early-stage entrepreneurs in Russia in the context of settlement types, 2006-2011

Type of settlement		Personally familiarity with someone who had started a business in the two years	The fear of failure and lack of abilities as a barrier for starting a new business	Positive evaluation of conditions for starting a new business in the area of residence	Positive evaluation of knowledge, skills and experience required to start a new business
<b>Megapolises</b>	%	73,12	33,33	39,13	83,70
<b>Cities</b>	%	78,95	23,96	35,42	76,04
<b>Medium-sized towns</b>	%	69,91	25,66	41,59	80,53
<b>Small towns</b>	%	77,95	19,05	28,91	72,66
<b>Rural areas</b>	%	70,63	23,62	37,01	74,22
<b>Total</b>	%	74,01	24,68	36,15	77,02
<b>5% significance level</b>		0,067	0,057	0,094	0,237

Lack of optimism among entrepreneurs can be explained by low self-appraisal of their own abilities for business dealing. Therefore, assessment of knowledge, skills and experience of the early entrepreneurs required to start-ups have been analyzed in various types of settlement. It became clear that approximately 78% of early-stage entrepreneurs believe that their knowledge and skills were sufficient for new firm formation. This indicator has a minimum value (73%) in small towns, varying up to 83% - in the big cities. However, these differences are not statistically significant.

Whether early entrepreneur achieves success in creating new business, in the given external conditions, depends not only on his own competence, but also on the fear of failure and uncertainty about his abilities. On average, about 26% of early-stage entrepreneurs across Russia feel that the fear of failure and the lack entrepreneurial abilities can interfere in their own businesses (see Tab. 3). The least fear of failure has early entrepreneurs residing in small towns (19%), and the most influenced by fear the residents of megapolises (33%). These differences are not statistically significant.

To increase confidence in one's abilities is possible through measures aimed at improving of entrepreneurial skills, that are various trainings, master-classes of experts in various areas and entrepreneurs - owners of a successful and profitable business, etc., as well as promoting of success cases through mass media.

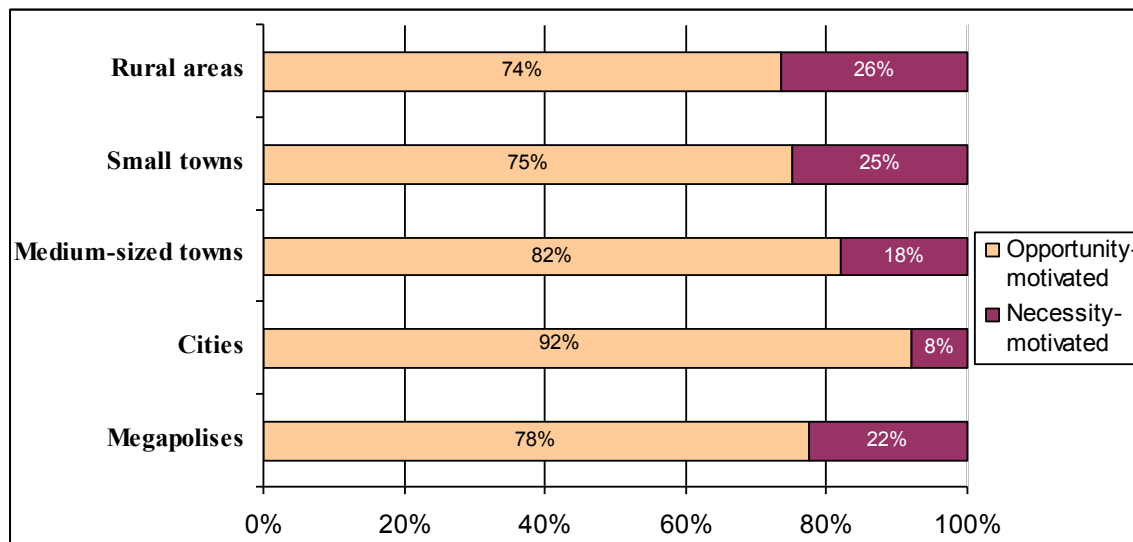
Widely known that one of the main factors influencing the successful business development is the entrepreneurs' involvement in social networks [12]. Within the GEM project, this effect can be estimated on the basis of social networks indicators which are calculated as the share of early entrepreneurs who are personally familiar with the entrepreneur who opened his own business during last two years. The analysis of this indicator shows that in general about 73% of early entrepreneurs are familiar with an entrepreneur.

Thus, the analysis of the opportunity perception for starting business, as well as the levels of the involvement in social networks and self-efficacy of early-stage entrepreneurs indicates that the 3-rd hypotheses in the context of settlement types in Russian Federation can be rejected.

#### ***4.4 Motivation structure of early-stage entrepreneurs in the context of settlement types in Russia***



The last point of present investigation is motivation structure of early-stage entrepreneurs. People launch businesses for a variety of reasons. They may be led into entrepreneurship the necessity stimulus: the pursuit of self-employment when there are no better options for work. In contrast, their efforts may be powered by the desire to maintain or improve their income, or to increase their independence. GEM methodology allows us to assess the motives of entrepreneurs.



**Figure 1** Motivation structure of early-stage entrepreneurs in Russia by settlement types, 2006-2011

Chi-square test shows the absence of significant differences in motivational structure of early entrepreneurs by types of settlement (Sign = 0,105).

Figure 1 shows that in all types of settlement more than 72 % of early-stage entrepreneurs have begun their business because they see opportunities, and have particular attitudes and beliefs to inspire them. Moreover, in cities the rate of opportunity-motivated entrepreneurs equals 92 %. Also it is noticeable that the rate of persons, who are involved in entrepreneurship to increase income because of no better choices for work (necessity-driven entrepreneurs) has increased from 8% in cities till 26% in rural areas. The share of necessity-driven entrepreneurial activity in megapolises (22%) is much more considerable than in cities. This can be explained by the density of labor market in megapolises that comprises highly-qualified workers and, consequently, implies high competition among the employees for a better place. Thus, the fourth hypothesis is supported partially, because there is no significant difference (5% significance level) in motivation structure of early-stage entrepreneurs by settlement types in Russia.

## 5. Conclusions

The level of early-stage entrepreneurial activity in Russia is very low during the whole observation period. It can be explained by extremely uneven distribution of population and resources across the country as well as between different types of settlement which are characterized by different levels of socio-economic development. The present study has established the features and the differences in the development of Russian early-stage entrepreneurs in different settlements in frameworks of the international project «Global Entrepreneurship Monitor». Thus, testing the basic hypotheses of research the following results have been received:

Firstly, the dynamic analysis of early-stage entrepreneurial activity through six recent years in different types of settlement has showed that, in general, the rate of early entrepreneurs

among total adult Russian population is increased in all settlements. Moreover, the highest rate of early entrepreneurs in almost all years was revealed in cities.

The study of various aspects of early entrepreneurship as a phenomenon, and also factors influencing on a tendency of adult population to the start-ups are considered especially important for Russia. So, secondly, socio-demographic characteristics of the early businesses in basically the same in different types of settlement: early entrepreneur is man aged from 25 to 34 years with a rather high level of education. There are substantial differences in educational structure of early-stage entrepreneurs in the context of settlement types, and the share of high-educated entrepreneurs reduces with decreasing the size of settlement (from metropolis to rural area).

Thirdly, the least optimistic about the prospects of starting a business in the area of residence are early entrepreneurs in small towns. At the same time, they are afraid of failure less than the early entrepreneurs in other types of settlement. Perhaps, it can be explained by one of the highest degrees of involvement in social networks of entrepreneurs from small towns. By the way, most of the early-stage entrepreneurs in all settlements involved in social networks.

Finally, this study shows that in most settlement types the motivational structure of Russian early entrepreneurship can be estimated as quite favorable in terms of opportunity-motivated and necessity-motivated entrepreneurship. Today even rural areas are not the sphere of concentration of necessity-driven entrepreneurship but the rate of necessity-driven entrepreneurship here is still higher than in all other types of settlement.

Thus, practical outcomes of our research relate with the determining of the factors stimulating or obstructing early-stage entrepreneurial activity for every type of settlements that can be used to specify the policy on entrepreneurship development in transition economies.

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# European Monetary Union as a Regional Integration – Whether Enter or Not?

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After successfully overcame the global economic crisis in 2008th European Monetary Union is facing a new challenge – how to consolidate public finances and help reducing the public debt in some Member States. Several factors led to this situation which some are fundamental by nature. Any monetary integration has one main goal, which is to be as close as possible to what is called the optimum currency area in order to achieve mutual benefits for both monetary union and the member states. This goal is not easily achievable because each currency union must meet several criteria in order to be described as optimal. If these criteria are not met then its creation is largely the result of political reasons, that later may create serious problems because economic laws do not recognize political settlement. The main objective of this paper is an empirical analysis and identification of major economic causes that led to current situation in the European Monetary Union. One such reason is inability of nominal adjustment through depreciation of the national currency countries that joined the EMU. Because of that, they can not regain their competitiveness on the global market and boost the growth of national income through export. Such disadvantage forces the government to increase its budget spending in order to partially offset the fall in national income, which for many years creates deficits and accumulate debt. Analyzing this problem, we can assess whether for some country is good or bad to join the monetary union. EMU is now facing unenviable task - to find the best solution for overcoming the crisis that will be on mutual behalf of it and its members. There are some suggestions but no one can say definitely whether it is the right way or eventually it must be applied more radical strategies such exclusion of some problematic countries.

## Keywords

European Monetary Union, key factors for entering currency area

## 1. Is EMU Optimal Currency Area?

The main goal of any monetary integration is to be as familiar to state known as optimal currency area. In this chapter we will first consider whether the EMU is near these qualifications or not, which in part gives us an insight into why some of its members now face a crisis. Any currency area carries some advantages and disadvantages, so potential members, and currency union itself should assess whether joining of new member state would bring closer or alienate integration to the ideal, which is called the optimum currency area. Otherwise, it may eventually lead to the certain problems that can accumulate over the years and eventually jeopardize the entire creation. Therefore certain conditions must be fulfilled in order to such integration can be functional in its existence. Generally, when considering the criteria then they can be observed through the key question: whether

member states may well enough adjust to asymmetric shocks when they enter the Union, or otherwise whether the fact that they are members of the monetary union may contribute to their faster recovery or not. From the viewpoint of the Union that means if member's states can better adjust to asymmetric shocks when they are in the union than union is closer to the optimal currency area and vice versa. In theory of international finance, there are a number of conditions that currency area should meet in order to gain qualification optimal. It can be sad that most frequent are the four criteria among many authors:

- Volume of trade between the countries in the currency area,
- The mobility of production factors, especially the labor mobility,
- The similarity of production structures, and
- Fiscal transfers.

1) The volume of trade between the countries in the currency area – when we considering this criterion assumption is that the creation of currency union will led to increase in the volume of trade among countries of currency area. This may play an important role when comes to more easily accommodation to asymmetric shocks. Generally, the essence is derived from the fact that if shock happens than it will not affect all countries simultaneously and with the same intensity so high level of trade between countries could mitigate the adjustment of the countries that are affected by it. Because of the acceptance of one currency, member states have knowingly waived their capabilities to mitigate the recession with expansionary monetary policy and therefore must find other alternative ways of getting out. High trade between currency area members can make it happen because the occurrence of recession and the decline in domestic demand could be partially offset by higher exports to other member countries that are at that point in the phase of prosperity. Fall in GDP in one country may cause a mild deflationary adjustment, however even a small decrease in price can run a huge trade upsurge if exist high level of integration. In this way, the lack of domestic demand would be compensated by increased inter-regional demand in other member states. As a result, occurrence of asymmetric shocks can be overcome without major internal shocks in a short period.

Now we have to see if the EMU have increased cross-border trade after its creation and after adoption of the euro. The findings of some researchers offer conflicting answers. For example, Andrew Rose from the University of Berkeley found that a currency union might increase the volume of trade among member countries in the extent of 10% to 100%.<sup>82</sup> The other conclusions are not so encouraging. In fact, Richard Baldwin points out that after the introduction of the euro Member States increased their trade for about 9%, but at the same time United Kingdom, Denmark and Sweden, which have not adopted the euro, recorded a growth of trade by 7%.<sup>83</sup> From this, we cannot definitely conclude whether the EMU is closer or further from the optimum currency area.

2) The production factors mobility – this criterion is often seen as crucial when we analyzing the level of integration of some currency area. Namely, among the mobility of production factors there are mostly considered mobility of labor because most important question is how much labor from a country that is affected by the recession can find a job in another country that growing. If mobility is weak, the affected country will have to be adjusted internally by deflationary mechanism that involves the high cost of increasing unemployment and long-term negative or stagnating growth. On the other hand, if workers can move out and get a job in another currency area state that record growth rates of unemployment will be much lower in the country affected by recession. In that way, entire currency area will benefit.

From the point of EMU, labor mobility is viewed as a major drawback. There are some reasons: different language among Member States, cultural differences, the costs of moving

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<sup>82</sup> Susan Schadler, Charting a Course Toward Successful Euro Adoption, IMF, finance & development, june 2004, p. 30

<sup>83</sup> Paul R. Krugman, Maurice Obstfeld, International economics, Addison-Wesley, 2009, p. 584

from one country to another, as well as some administrative requirements in obtaining social support, etc. For example, Krugman and Obsfeld stated percentage of the population in some countries that has changed residence because of work during the '90s: Germany 1.1%, Italy 0.5%, U.S. 3.1%. Nowadays the percentages are similar. Generally, European countries have low labor mobility mostly because different language and heterogeneous culture which in great deal hinder EMU ability to adopt asymmetric shocks. Thus, in terms of labor mobility and in comparison with some other federations, which is similar to currency union (e.g. the U.S.<sup>84</sup>) EMU cannot be called an optimal.

3) The similarity of production structures – under this criterion, it is recognized how much countries in currency area have similar industry or in other words how similar they go through economic cycles - expansion and recession. If most of the currency area countries in the same time pass through periods of expansion or recession, then the central monetary institution has much easier task to adjust its monetary policy to combat the current problems. So conceived policy (expansive or restrictive) will suit most of the countries, which will have a positive effect on the recovery of the whole currency zone. On the other hand, if the member states differ significantly in the industrial structure and thus by the vulnerability to external shocks then one unison monetary policy cannot suit all member countries. While countries in the expansion correspond to a restrictive monetary policy with high interest rates to combat inflation, countries in recession suits expansionary policy corresponds with the low interest rates. In these conditions, the central monetary institution cannot define a policy that would fit all countries because a certain policy is always to the detriment of some countries. The following table contains the growth rate of GDP of some member of the EMU in order to see how similar they are going through economic cycles.

**Table 1** Growth rate of GDP of some countries in the EMU

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Spain</b>	4.7	5.0	3.6	2.7	3.1	3.3	3.6	4.0	3.6	0.9	-3.7	-0.1
<b>Nedherland</b>	4.7	3.9	1.9	0.1	0.3	2.2	2.0	3.4	3.9	1.9	-3.9	1.7
<b>Finland</b>	3.9	5.3	2.3	1.8	2.0	4.1	2.9	4.4	5.3	0.9	-8.2	3.1
<b>Greece</b>	3.4	4.5	4.2	3.4	5.9	4.4	2.3	5.2	4.3	1.0	-2.0	-4.5
<b>Portugal</b>	4.1	3.9	2.0	0.7	-0.9	1.6	0.8	1.4	2.4	0.0	-2.5	1.4
<b>Italy</b>	1.5	3.7	1.8	0.5	1.6	0.0	1.5	0.7	2.0	1.5	-1.3	-5.2
<b>Germany</b>	2.0	3.2	1.2	0.0	-0.2	0.7	0.9	3.6	2.8	0.7	-4.7	3.5
<b>France</b>	3.3	3.7	1.8	0.9	1.1	2.3	2.0	2.4	2.3	0.1	-2.5	1.5

Source: [epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsieb020](http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsieb020)

Looking at the Table, we can see that economic growth of countries in the EMU until crisis in the year 2008 are more or less uniform, and because of that European Central Bank did not have big problems to determine the appropriate monetary policy that would suit all countries. In addition, we can see that in year 2010 some countries recorded growth, while others decline. This is due to the current crisis affecting some countries in the EMU, which will be addressed in detail later.

4) Fiscal transfers – the possibility of the fiscal transfer's existence is one of the most important criterions when it comes to the efficient functioning of the currency union. As stated previously, in the currency union member states cannot combat shocks with monetary policy because monetary sovereignty was transferred to centralized institution. What remains is the use of anti-recession fiscal policy. However, excessive usage of fiscal policy could lead to fiscal deficits and large public debt, which now face some of the EMU countries. Fiscal risk

<sup>84</sup> Although the U.S. is federation with 51-member state, it also could be viewed as a currency union.

than cause high interest rate on government bonds, which more and more lead to ever-higher public debt. Because of that, it would be much better to some central fund exist and than from that level assist to countries in peril. Therefore, it is much more optimal for the whole monetary union if there is a centralized fund from which funds would be transferred to vulnerable countries and which would be filled by contribution of all members. This condition is very difficult to achieve in non-federal organization such as the EMU. This is because the existence of such fund must include fiscal unification of all members. In other words, free use of expansionary fiscal policy would be limited and controlled by a centralized body. It addresses the very essence of a sovereign state that many are not ready to give up. In addition to questions of public expenditure and the size of the allowable deficit fiscal union also would have to unify public revenues in order to prevent capital movement to another states only because of the different fiscal arrangements which thereby contributed to the emergence of asymmetric shocks.

Compared with the U.S.A. federation the federal state receive substantial financial assistance from the federal budget in case of recession, which not the case for EMU. Specifically, the current European Union budget is centralized, but the amount of funds at its disposal are very modest - little more than 1% of EU GDP, which is not sufficient to assist recession economies. After all, for this fund it is not a primary purpose but to spent most on the Common Agriculture Policy, the Structural and Cohesion Funds. Thus, EMU does not have the very important instrument that helps its members and allow much easier going through periods of recession and therefore this criterion in the case of EMU is not met. Knowing all of these problems EMU has formed a temporary stabilization fund (EFSF) amounting 750 billion euros, which should become a permanent fund in year 2012. In some sense, that would solve the long-term issue of centralized financial aid. However, this solution opens up a host of other political issues: whether to change the Maastricht Treaty, will be adopted in New Stability and Growth Pact, what measures will be in return required from the state that used by means of the fund, on which interest will approve funding and so on.

If we now summarize how many criteria EMU meets in order to be the optimum currency area, then we can see that the third and the first criterions are only partly fulfilled. The second and the fourth condition, that among others are the key conditions are not met. Mobility of work factors is very difficult to meet in case of EMU because of the diversity of the people, but the lack of a centralized fund plays a key role in form of helping countries who face recession problems.

However, absence of optimal currency area conditions isn't the only reason why now some countries are facing a crisis of public debt. Many problems are actually inherited because of inconsistent application of the Maastricht criteria when the EMU has been established at 1999. For example, from 11<sup>85</sup> countries that joined the EMU even six countries have not met the criterion of maximum 60% public debt/GDP. Nevertheless, two countries (Italy and Belgium) had a public debt of over 113% of GDP. In addition, the global financial crisis in year 2008 has forced many governments to use anti-cyclical fiscal policy that pushed upward public debt in almost all EMU countries. If crisis did not occurred in 2008th, the current problems in the EMU would probably be postponed for 5 to 10 years. The following table presents the dynamics of public debt in the EMU countries since 1999.

**Table 2** The public debt/GDP of some EMU countries

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<sup>85</sup> These 11 countries are: Austria, Belgium, Finland, France, Germany, Ireland, Italy, Portugal, Luxembourg, the Netherlands and Spain.

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Austria</b>	67.3	66.5	67.3	66.7	65.8	65.2	64.6	62.8	60.7	63.8	69.6	72.3
<b>Belgium</b>	113.7	107.9	106.6	103.5	98.5	94.2	92.1	88.1	84.2	89.6	96.2	96.8
<b>Finland</b>	45.7	43.8	42.5	41.5	44.5	44.4	41.7	39.7	35.2	34.1	43.8	48.4
<b>France</b>	58.9	57.3	56.9	58.8	62.9	64.9	66.4	63.7	63.9	67.7	78.3	81.7
<b>Greece</b>	94.0	103.4	103.7	101.7	97.4	98.6	100.0	106.1	105.4	110.7	127.1	142.8
<b>Germany</b>	60.9	59.7	58.8	60.4	63.9	65.8	68.0	67.6	64.9	66.3	73.5	83.2
<b>Ireland</b>	48.5	37.8	35.5	32.1	30.9	29.6	27.4	24.8	25.0	44.4	65.6	96.2
<b>Italy</b>	113.7	109.2	108.8	105.7	104.4	103.9	105.9	106.6	103.6	106.3	116.1	119.0
<b>Cyprus</b>	58.9	58.8	60.7	64.6	68.9	70.2	69.1	64.6	58.3	48.3	58.0	60.8
<b>Luxemburg</b>	6.4	6.2	6.3	6.3	6.1	6.3	6.1	6.7	6.7	13.6	14.6	18.4
<b>Malta</b>	57.1	55.9	62.1	60.1	69.3	72.4	69.6	64.2	62.0	61.5	67.6	68.0
<b>Netherlands</b>	61.1	53.8	50.7	50.5	52.0	52.4	51.8	47.4	45.3	58.2	60.8	62.7
<b>Portugal</b>	49.6	48.5	51.2	53.8	55.9	57.6	62.8	63.9	68.3	71.6	83.0	93.0
<b>Slovakia</b>	47.9	50.3	48.9	43.4	42.4	41.5	34.2	30.5	29.6	27.8	35.4	41.0

Source: [epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=teina225&plugin=1](http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=teina225&plugin=1)

Therefore, these are three main reasons that led to the current crisis. However, it should add a fourth factor, which is inability of nominal adjustment because of currency anchor - called the Euro. In the next chapter we will see how this factor contributed to the crisis and how it preventing its resolution.

## 2. Nominal Anchor – a Solution or an Obstacle

In this section, we will try to answer the question: whether a country would be better to enter the EMU, or whether it would be far better to get out of it, and why. In fact, as noted earlier common currency area has its advantages, but has one significant drawback, which is reflected in the fact that member states do not allow nominal adjustment through currency depreciation. A serious problem in the area of currency occurs if the member states in their national economies record different rates of inflation. It means that countries with higher rates of inflation are losing competitiveness of its products in relation to member states that have lower inflation because their products become more expensive. These problems can accumulate over time because the same products in countries with higher inflation are each year more and more expensive, and cannot be annulled through depreciation because they all have one common currency. In this way, it reduces export income of countries with high inflation rates and deteriorates its current account. The lower export demand on one hand implies a lower economic activity on the other hand that increases unemployment and reduces tax revenues. The state then partially solves the problem employing more people in the public sector and spending more which result in creation of budget deficit. This is not the only reason for budget deficit appearance, but may contribute to its occurrence or increase the existing deficit.

Now we will see if something like this happened to PIIGS (Portugal, Italy, Ireland, Greece, Spain) countries that have problems with high public debt and is there way out? Specifically, these countries compared to the most countries in the EMU cannot praise traditionally with low rates of inflation. Their rates are low comparing with inflation rates of some developing countries, but largely stay behind the other members of the EMU zone. In the table below, we can see the inflation rate of some countries of the EMU.

**Table 3** Inflation rates in some countries of the EMU



	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Germany</b>	0.6	1.4	1.9	1.4	1.0	1.8	1.9	1.8	2.3	2.8	0.2	1.9
<b>Austria</b>	0.5	2.0	2.3	1.7	1.3	2.0	2.1	1.7	2.2	3.2	0.4	1.7
<b>France</b>	0.6	1.8	1.8	1.9	2.2	2.3	1.9	1.9	1.6	3.2	0.1	1.7
<b>Netherlands</b>	2.0	2.3	5.1	3.9	2.2	1.4	1.5	1.7	1.6	2.2	1.0	0.9
<b>Finland</b>	1.3	2.9	2.7	2.0	1.3	0.1	0.8	1.3	1.6	3.9	1.6	1.7
<b>Greece</b>	2.1	2.9	3.7	3.9	3.4	3.0	3.5	3.3	3.0	4.2	1.3	4.7
<b>Portugal</b>	2.2	2.8	4.4	3.7	3.3	2.5	2.1	3.0	2.4	2.7	-0.9	1.4
<b>Italy</b>	1.7	2.6	2.3	2.6	2.8	2.3	2.2	2.2	2.0	3.5	0.8	1.6
<b>Ireland</b>	2.3	5.3	4.0	4.7	4.0	2.3	2.2	2.7	2.9	3.1	-1.7	-1.6
<b>Spain</b>	2.2	3.5	2.8	3.6	3.1	3.1	3.4	3.6	2.8	4.1	-0.3	2.0

Source: [epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=tsieb060&tableSelection=1&footnotes=yes&labeling=labels&plugin=1](http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=tsieb060&tableSelection=1&footnotes=yes&labeling=labels&plugin=1)

If we compare inflation rates per years of PIIGS countries with other EMU countries than we can see that there is not much discrepancy but observing cumulatively than it leads to significant differences. In fact, from 1999th to 2010th cumulative inflation rate in Germany is 19%, in Austria 21,1%, and in France 21%, while in the PIIGS are significantly higher - in Greece 39%, in Portugal 29,6%, Italy 26,6%, 30,2% in Ireland and in Spain 33,9 %. Thus, because of cumulative inflation these countries have in relation to their trading partners in EMU significantly lower competitiveness. It means that same product in Greece in 2010th was more expensive than the same product in Germany by 20%, or the same product in Ireland was 9,1% more expensive than in France, and so on. This apparent decline in competitiveness negatively affected their balance of payments, and considering the fact that the mutual trade within the EU in 2008th was up to 69,8%<sup>86</sup> of its total trade, then the loss of competitiveness makes it very relevant. The main problem is that they cannot regain it through depreciation of currencies simply because they are related to an anchor currency (euro). The only option is that adjustment must come through a deflationary process that carries with it a number of other problems (increased unemployment, negative growth, etc.).

In theory, it is viewing through the so-called real exchange rate<sup>87</sup>. In these countries, the real exchange rate appreciated due to inflation, or goes below 1 (or below 100 if speak in index). Real exchange rate through time tends to return to its optimum (1 or 100) because of nominal depreciation in a flexible exchange rate system, which is due to deficits in the current balance. However, in the currency union it cannot happen because there is only one currency for all countries. For this reason, the real exchange rate countries with higher inflation, more and more appreciate, which than leading to a decline of competitiveness and the growing current deficits. Thus speaking, the only solution for these countries (often considered extreme) is the abandonment of the currency union, reintroducing a national currency that will floating freely with the currency of the monetary union and depreciated if current deficit deterioration occurs. This is far less painful way in relation to the deflationary adjustment, in which a country can regain competitiveness that lost due to higher inflation.

Let us see if this story can be verified empirically on the PIIGS countries. The following table presents the current account of these countries since 1997th or two years before the irreversible binding of their currencies to the euro. We note that in these countries from the time they joined the euro area they recorded a constant current account deficits which grew over time (which is consistent with previous theoretical statement), while some countries before accepting euros even recorded a surplus in current transactions.

<sup>86</sup> WTO, International Trade Statistics, 2009, Geneva, p.9

<sup>87</sup> The real exchange rate is equal to:  $e = E \times P^* / P$ , where  $e$  - real exchange rate,  $E$  - nominal exchange rate,  $P^*$  - inflation abroad and  $P$  - domestic inflation. The inability of the nominal adjustment through depreciation of  $E$  pushes  $e$  below 1, which negatively affects the current account.

**Table 4** Current account balance expressed as a percentage of GDP for countries PIIGS

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Italy</b>	2.8	1.7	0.7	-0.5	-0.1	-0.6	-1.5	-1.5	-1.3	-2.6	-2.4	-2.9	-2.1	-3.5
<b>Greece<sup>88</sup></b>	-4.0	-3.0	-3.8	-6.9	-6.6	-7.2	-6.2	-5.9	-7.4	-	-	-	-	-
<b>Ireland</b>	3.1	1.1	0.6	-0.1	-0.6	-1.3	-1.4	-1.5	-1.7	-3.6	-5.3	-5.6	-3.0	-0.7
<b>Spain</b>	0.5	-0.5	-2.3	-3.4	-2.8	-2.4	-2.8	-5.0	-7.4	-9.0	-	-	-	-
<b>Portugal</b>	-5.7	-6.9	-8.5	-	-	-	-	-	-	-	-	-	-	-
				10.4	-9.5	-7.3	-6.5	-8.4	10.4	10.7	10.1	12.6	10.9	-9.9

Source: World Economic Outlook, april 2011. p. 199.

We do not have concrete data on the volume of trade between the EMU countries, but it is logical that significant worsening of the PIIGS countries current account has been made in trade with other countries of the EMU. Some would say that it is naive to look for a link between realized inflation and the trade balance deficit because the currencies before the euro was related to the ERM (exchange rate mechanism) agreement. Yes, they were, but since August 1993, there was the possibility of fluctuations in the zone of  $\pm 15\%$  in order to prevent speculative attacks that led to the crisis in the EMS. That is practically equal to a flexible exchange rate. Therefore, it was a significant possibility of nominal adjustment, and ultimately the country could leave the ERM in case of significant trade imbalances. For this reason, we argue that the countries that joined the EMU lost a substantial share of their competitiveness binding its currencies to the euro.

Now we can use this story to give hypothetical solution to the crisis in PIIGS countries and the EMU, and to explain way it solution was not attempted yet. Specifically, we are currently witnessing quite radical measures taken by some countries in their economies, which include reducing the budget deficit, raising taxes, unemployment, entry into a new recession and so on. This is called a real adjustment that should improve the situation, but with a very painful process for the whole society and economy. However, the problem is uncertainty - how much time should pass before economies start to recover and achieve the ultimate goal - the reduction of public debt. Debts are only being returned by newly created value, but how will countries create new value when they entering a new wave of crisis? Objectively speaking, real adjustment that generates a new recession on the medium and even long term cannot be solution. Economy cannot recover because the country faces, in addition to the constant demands for debt repayment, a new problem - how to get out of recession. Europe is trying to help by providing financial assistance, but it cannot last indefinitely because in the end that help must be returned, so the countries must thinking of another way out. Providing financial aid to the country size as Greece for now seems feasible, but what if similar problems occur in larger country as Italy or Spain. In this case it would have to try with some other solution.

One possibility could be nominal adjustment. The current measures which countries now applying to bring down its budget deficits would be a good starting point because it would thus consolidate public finances and brought them into line. Although these measures affect the reduction of real products and increase unemployment, they would be applied only in the short term until the economy stabilizes its public finance. The second step, which is not foreseen for now but it is possible, would be exiting the country from the EMU, euro abandonment and return to the domestic currency. Return of the national currency would allow PIIGS countries far more needed and less painful adjustment through the depreciation of nominal exchange rate.

However, nominal depreciation is double-edged sword. Such a scenario on the other side opens a host of other problems and concerns. Depreciation overnight increased debt

<sup>88</sup> Please note that Greece joined the EMU at 2001.

denominated in domestic currency. It seems that this is the main concern of European officials because country then could sink deeper into crisis. Besides, what if depreciation does not meet expectations, or if it bring more harm than good. Namely, depreciation could increase inflation and thus quickly neutralized previously acquired competitive advantage. Then, due to "overshooting effect", imported products don't have to become more expensive because foreign exporters can reduce prices of its products at the expense of profits and eventually it will not improve the balance of payments. Finally, the question of import and export demand elasticity, and fulfillment of Marshall-Lerner theorem. If the sum of the import and export elasticity is slightly larger than one, depreciation does not lead to stabilization of the balance of payments and foreign exchange markets, but just the opposite it can cause even more instability. Everything said so far makes this solution very uncertain and possibly much worse than originally conceived decision on financial support from the EMU. Therefore, the official thinking about the possible exclusion of problematic countries is still far away.

Nevertheless, after the euro introduction at the beginning it seemed as effective solution for the growth of mutual trade in Euro-zone. Now it appears to be a major obstacle to further functioning of EMU. What appears to stand-out as the main problem is lack of competition that occurs in some EMU countries that adopt euro. The point is that countries with higher inflation than average suffer decline in national production over time because of export decrease. Then governments partially compensated lower foreign consumption with higher public spending and as a result public debt growth. This problem will be very difficult to solve in EMU because the solution is not in larger control of budget deficit. Those countries have become accustomed to higher public spending and therefore balance budget only brought very low or negative growth. Bailout or public debt forgiveness to some countries in the long period is also not a solution because the same problem will be appeared again sometimes in the future. It is necessary to find another, more permanent solution.

Thus, the crucial problem is how to achieve approximately the same competitiveness among all members of the EMU. The solution should be sought in larger fiscal transfers to the less developed regions, which would be similar to the present arrangement in the United States. The funds must be far greater than current resources devoted to the common agricultural policy, structural and cohesion funds. Probably something similar will be achieved in the future. The funds are currently allocated for assistance in repayment of public debt but in the future, they should be directed towards structural reforms to improve competitiveness of some countries. Most developed countries in the EMU area, led by Germany will most contribute to the fund, but ultimately they have the most benefit from the introduction of a common currency.

In addition, any future potential member of the EMU zone has to think twice before joining the currency integration. Essentially a question that they need to answer to themselves is whether our economy is competitive enough compared with other economies of the EMU zone. It is essential because otherwise in the future they will need adjustment in the form of nominal depreciation of the currency which than not be possible. A good starting point is pegging national currencies to the euro a few years before joining EMU. In this way, each potential candidate will need to check if it is ready for membership, or need to wait more. Overall, after this crisis the main goal of the EMU will be to accept only those members who will contribute to its development, not problematic countries that will need help in the future.

### **3. Conclusion**

Although the EMU was a good idea, it seems to have failed to meet expectations that have been placed in front of it. In fact, EMU is not an optimal currency area and because of its imperfections indirectly creates problems for its members. The absence of greater labor mobility and the lack of centralized fiscal transfers are the two biggest problems that EMU must begin to deal with or otherwise it will disappear. Objectively, for a short time, it is not possible to achieve greater mobility of labor, but it is possible with political will of all members

of organized fiscal unity. By creating a centralized large enough fund, it could partly correct the mistake that was made at the beginning of its establishment. At the beginning, not enough attention was paid to if countries could join and function effectively in a common currency area. Because of that, the EMU is not an elite club of European countries, but only club of European countries. Lack of fiscal discipline of some countries and fall in competitiveness due to higher rates of inflation are the two main economic reasons for a current crisis of public debt. Although the crisis in 2008 contributed significantly to rise of public debts in most of European countries, this factor should not be given significant attention because the crisis eventually would appear due to some fundamental flaws in euro zone.

For the euro area current problems represents a great experience. EMU will not make the same mistake twice. Serious analysis and calculations must be made in any subsequent decision who will become a member. This is the first important prerequisite for efficient functioning of EMU in the future. The second is to achieve fiscal unity, which will include questions about the unique way of public revenues and the introduction of stricter controls over public expenditure. If they want a single currency, most developed countries led by Germany will have to submit a maximum cost of establishing a centralized fund. With this move, the euro zone will get an important instrument that would aid the economic development of less developed countries and encourage their competitiveness, which should act as preventive in the emergence of new public debt crisis. In this way, it would not be need for some countries to borrow in financial markets in order to finance their spending, with the goal of economic development. The excessive borrowing to finance public spending is the main reason for the crisis of public debt of some countries in Southern Europe. We should wait and see. The tasks set before EMU are not easy, but the solution must be found because the creation of the euro zone is too expensive project to be allowed to fail.

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# Authors Index

## A

Afrim Loku, 485  
Ahmet Gayretli, 315  
Akinleye Afolabi Ogungbemi, 619  
Albena Antonova, 81, 88  
Aleksander Aristovnik, 105  
Alexander Tsigkas, 141  
Alexandru Chichernea, 149  
Ana Ljubotenska, 183  
Anastasios Vasiliadis, 886  
Andor Pajrok, 624  
André Spithoven, 788  
Andrea Kulakov, 191  
Angelina Taneva-Veshoska, 662, 896  
Anna Matras-Bolibok, 116  
Anneli Manninen, 527  
Antti Saurama, 509  
Atanas Manafov, 517  
Aysen Altun Ada, 36, 161  
Aysenem Tuyliyeva, 878

## B

Bahar Çelik, 36  
Bahrija Umihanić, 95  
Besim V. Abdullai, 16  
Besnik A. Krasniqi, 447  
Betim Cico, 363  
Bjørn Willy Åmo, 54  
Bojan R. Jovanovski, 646  
Borut Likar, 273  
Boyan Bontchev, 197

## C

Chih-Cheng Lin, 634  
Christian Carstensen, 124  
Christos Chatzopoulos, 141  
Christos Georgiou, 298  
Christos Keramydas, 342  
Cipriano Forza, 830  
Cosic Ilija, 864  
Cristina Serbanica, 755  
Cvetelina Stoyanova, 287

## D

Dajana Ercegovac, 244, 405  
Dalibor Miletić, 580  
Danijela Gračanin, 141  
Dashmir Istrefi, 363  
Dejan Đorđević, 206  
Dejan Živkov, 943  
Diana Kopeva, 437  
Dimitar Birov, 287  
Dimitar Blagoev, 437  
Dimitar Dimitrov, 197

Dimitar Nikoloski, 611  
Dimitrios Vlachos, 342  
Dimitris Skalkos, 718  
Djuro Kutlaca, 924  
Dolores Jovanović, 281  
Domagoj Račić, 670  
Dragan Čočkalo, 206  
Dragan Cvetković, 808  
Dragan Kukolj, 855  
Dragana Ikonić, 572  
Dragana Radevic, 587  
Dusica Janevska, 383  
Dusko Lukac, 501

## E

Eleftherios Iakovou, 342  
Elena Sefertzi, 298  
Elena Stojanovska, 815  
Elissaveta Gourouva, 872  
Elpida Samara, 718  
Emilia Nesheva, 170, 176  
Evangelos Angeletopoulos, 68  
Evangelos Ergen, 254

## F

Fatmir Stublla, 824  
Florin Chichernea, 149  
Fluturim Saliu, 46, 749

## G

G.T.Wasantha Sriyani, 54  
Gautam Raj Muktan, 319  
Georgi Pavlov, 517  
Gligor Stojkov, 383  
Goran Andjelic, 60  
Goran Pechijareski, 611  
Gordana Ćorić, 475  
Gordana Radić, 808

## H

Hamit Aliu, 46  
Harri Jalonen, 370  
Helena Dudycz, 228  
Henk J. Schout, 734  
Humberto López Rizzo, 696

## I

Iliyana Vladeva, 287  
Ingrida Geciene, 886  
Ioana-Carmen Popescu, 391  
Ioannis Bakouros, 718  
Ioannis F. Ververidis, 417  
Irena Miljković Krečar, 475  
Irena Pavlova, 517

Irina-Eugenia IAMANDI, 353  
Ivica Veža, 141

## J

Jadranka Švarc, 838  
Jelena Demko Rihter, 281  
Jelena Simic, 765  
Jose Antonio Gonzalez- Elipe, 886  
Jovana Đuričić, 213  
József Simon, 773  
Jukka Laitinen, 527

## K

Konstantinos Styliaras, 298  
Kostadin Solakov, 554, 781  
Kostadinka Toteva, 872

## L

Leif Henriksen, 315  
Lindita Mehmeti, 485  
Ljubica Micanovski, 725  
Ljubisa Nikolic, 855  
Ljubomir Drakulevski, 896  
Ljupcho Pechijareski, 611  
Ljupco Davcev, 183, 191  
Lukan Puka, 686

## M

Magnus Bjorkstrom, 886  
Mahfouz E. Tadros, 845  
Maja Pokric, 855  
Majda Mujanović, 95  
Maria Ganeva, 287  
Maria Mikela Chatzimichailidou, 133  
Marija Stevanović, 580  
Marija Topuzovska, 656  
Marija Zarezankova-Potevska, 662  
Mariluz Maté, 560  
Marina Milic, 587  
Marko Milošević, 943  
Miftar Ramosacaj, 686  
Miglena Molhova, 595  
Mihailo Ratkinic, 678  
Mila Mihajlović, 765  
Milana Vitas, 855  
Miodrag Hadzistevec, 864  
Mirela Arifović, 95  
Mirela Momcilovic, 602  
Mirela Momčilović, 244  
Mirjana Borota Popovska, 656  
Miroljub Hadžić, 307  
Miroslava Drazic, 855  
Miroslava Markovic, 678  
Mohammad Hoque, 319  
Mokter Hossain, 319, 326

## N

Nada Milenković, 572  
Nafi Pollozhani, 749

Naoum Tsolakis, 342  
Nenad Đokić, 213  
Nick Williams, 904  
Nicos Komninos, 298  
Nikola Suzic, 830  
Nikolai Neshev, 170, 176  
Nikolay Shterev, 437  
Nikos Zaharis, 298  
Nilüfer Dalkılıç, 161  
Nuhi Sela, 46, 749

## O

Olga Lopatina, 491

## P

Palmarudi Mappigau, 538  
Panayiotis H. Ketikidis, 417  
Paraskevi Giourka, 718  
Pepijn van Willigenburg, 734  
Petar Pavlović, 307  
Petar Vrgović, 88  
Peter Fatur, 273  
Peter Rodgers, 904  
Petros Kefalas, 417  
Plamen Dankov, 170, 176

## R

Radmil Polenakovik, 646  
Radoslav Rajkovic, 678  
Radu Jecu, 391  
Raisa Halonen, 319  
René Wintjes, 924  
Ridwansyah Yusuf Achmad, 27  
Riste Marevski, 554, 781  
Robert Freund, 281  
Rozita Talevska Hristovska, 333

## S

Sanja Vlaovic Begovic, 602  
Santiago DelaFuente, 560  
Silvana Ilić, 580  
Slavejko Sasajkovski, 725  
Slobodanka Jovin, 405, 602  
Snežana Milošević, 572  
Snezana Rajkovic, 678  
Søren Jensen, 124  
Søren Pedersen, 634  
Stefanos Katsavounis, 133  
Stoyan Tanev, 124, 634  
Suzana Kolar, 943  
Suzana Trajkovska Kocankovska, 333

## T

Tarja Merist, 527  
Tatiana Zabelova, 933  
Teemu Makkonen, 509  
Thomas Tserayi Domboka, 221  
Tim Vorley, 904  
Tina Orfanidou, 886

Todor Cekerovski, 398  
Tomasz Kijek, 430  
Trajce Velkovski, 646  
Tuomas Ritola, 319

## **U**

Ugo Rizzo, 705

## **V**

Vasil Popovsk, 656  
Velimir Manafov, 517  
Verica A. Jovanovska, 398  
Vesna Kočić Vugdelija, 213

Vladimir Djakovic, 60  
Vlatko Jovanovski, 398

## **Z**

Zeljko Stanković, 808  
Zeljko Tekic, 855, 864  
Zheng Ma, 634  
Zijad Džafić, 236  
Živorad Vasić, 206  
Zlatina Karova, 413  
Zoran Anisic, 281, 830  
Zvonko Sajfert, 206

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