ACTA TECHNICA CORVINIENSIS

BULLETIN OF ENGINEERING

fascicule 4
[October - December]
TOME III
[2010]
ACTA Technica CORVINIENSIS
BULLETIN OF ENGINEERING

ISSN: 2067-3809

ACTA TECHNICA CORVINIENSIS
– Bulletin of Engineering

FACULTY OF ENGINEERING HUNEDOARA
5, REVOLUTIEI
331128 – HUNEDOARA
ROMANIA
http://acta.fih.upt.ro

Scientific supplement of
ANNALS of FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL JOURNAL of ENGINEERING
ISSN: 1584-2665 [print]
ISSN: 1584-2673 [CD-Rom]

FACULTY OF ENGINEERING HUNEDOARA
5, REVOLUTIEI
331128 – HUNEDOARA
ROMANIA
http://annals.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

EDITORIAL BOARD

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

SCIENTIFIC COMMITTEE

MEMBERS FROM SLOVAKIA

STEFAN NIZNIK
Technical University of KOSICE, Faculty of Metallurgy, Department of Materials Science – KOSICE
KAROL VELISEK
Slovak University of Technology in BRATISLAVA, Faculty of Materials Science and Technology – TRNAVA
VLADIMIR MODRAK
Technical University of KOSICE, Faculty of Manufacturing Technologies – PRESOV
JOZEF NOVAK-MARCINCIN
Technical University of KOSICE, Faculty of Manufacturing Technologies – PRESOV
IMRICH KISS
Institute of Economic &Environmental Security, University of Security Management – KOŠICE
STANISLAV FABIAN
Technical University of KOŠICE, Faculty of Manufacturing Technologies – PREŠOV
JURAJ SPALEK
University of ZILINA, Faculty of Electrical Engineering – ZILINA
MICHAL HAVRILA
Technical University of KOSICE, Faculty of Manufacturing Technologies – PRESOV
TIBOR KVAČKAJ
Technical University KOŠICE, Faculty of Metallurgy – KOŠICE
L'UDOVÍT KOLLÁTH
Slovak University of Technology in BRATISLAVA, Institute of Manufacturing Systems – BRATISLAVA
MIROSLAV BADIDA
Technical University of KOŠICE, Faculty of Mechanical Engineering – KOŠICE
MIROSLAV RIMÁR
Technical University of KOŠICE, Faculty of Manufacturing Technologies – PREŠOV

MEMBERS FROM HUNGARY

BÉLA ILLÉS
University of MISKOLC, Faculty of Mechanical Engineering and Information Science – MISKOLC
IMRE J. RUDAS
BUDAPEST University of Technology and Economics, Department of Structural Engineering – BUDAPEST
TAMÁS KISS
University of SZEGED, Department of Inorganic and Analytical Chemistry – SZEGED
IMRE DEKÁNY
University of SZEGED, Department of Colloid Chemistry – SZEGED
TAMÁS ENDRŐDY
Department of Technical &Process Engineering, University of SZEGED, Faculty of Engineering – SZEGED
CECILIA HODUR
University of SZEGED, College Faculty of Food Engineering – SZEGED
FERENCZ ARPAD
College of KECSKEMÉT, Faculty of Horticulture, Department of Economics – KECSKEMÉT
ANDRÁS BAKÓ
Széchenyi István University – GYŐR , Department of Logistics & Forwarding – GYŐR
IMRE TIMAR
University of VESZPREM, Department of Silicate and Materials Engineering – VESZPREM
KRISTOF KOVACS
University of VESZPREM, Department of Silicate and Materials Engineering – VESZPREM

MEMBERS FROM POLAND

LESZEK A. DOBRZANSKI
Silesian University of Technology – GLIWICE Institute of Engineering Materials and Biomaterials
STANISŁAW LEGUTKO
Institute of Mechanical Technology, Polytechnic University – POZNAN
ANDRZEJ WYCISLIK
Silesian University of Technology in KATOWICE, Faculty of Materials Science and Metallurgy – KATOWICE

MEMBERS FROM PORTUGAL

JOÃO PAULO DAVIM
University of AVEIRO Department of Mechanical Engineering – AVEIRO

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

CONTENT

ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING.
FASCICULE 4 [OCTOBER – DECEMBER]. TOME III. 2010

Abstract:
A value network is a complex set of social and technical resources. Value networks work together via relationships to create social goods (public goods) or economic value. This value takes the form of knowledge and other intangibles and/or financial value. Value networks exhibit interdependence. They account for the overall worth of products and services. Companies have both internal and external value networks.
The network value system: integrated demand and multi-layered supply chains. They have attempted to meet all the changes identified within the new economy. Network value system management has focused on moving products and services downstream towards the customer.

Abstract:
Development of employees in modern companies is an activity that helps employees in its future development, change and creation of certain skills and behaviors that they require for daily achievement of clearly defined goals. A large number of companies in today's time believed that the basic cause of acquiring, maintaining and creating competitive advantage in the market development of employees through the development of intellectual capital.
This includes the development the applicable knowledge - in the first place to know what to do, and develop skills that will help them to know how to do it. In addition, it is necessary and understanding the whole process and a certain dose of creativity to the employees know why it works in a certain way. Basic focus development of employees in manufacturing enterprises related to learning and skills, their changes directly influence the creation of conditions that employees understand the connection and the reasons why something works and why. In this entire process is very important motivation for innovative thinking and continuous quality improvement. It is important to emphasize that during the crisis development of employees is crucial for the survival and further growth of the company.

Abstract:
This paper focuses on the theoretical approach to innovation and innovation strategies. It focuses on the importance of innovation strategies as well as their contribution to competitiveness strategies. Theoretically approach to the connection between innovation strategies and competitiveness were applied. In order to examine the importance of the innovation strategies, analysis and synthetic methods were used. Also induction and deduction were used to examine theoretically relevant aspects of innovation strategies and their contribution to competitiveness. Theoretically relevance and connection between innovation and competitiveness were analyzed. After analyzing the theory concerning innovation strategies and competitiveness strategies, it was founded that innovation is one of the key factors for achieving a sustainable competitive advantage. Innovation strategies were found one of the most important strategic factors which lead companies to achieve results and gain success. Innovation strategies and competitiveness strategies were found strongly connected between themselves. Based on analyzed theory, it should be visible that innovation and innovation strategies are very important in today's modern way of doing business. Innovation strategies are in a positive relationship with competitiveness strategies and innovation has the key role. Innovation strategies should be observed as one of the major factors in obtaining and achieving competitiveness. Today, in front of the world globalization process, enterprises should gain their competitive advantage by using innovation strategies and by seeking creative solutions for their businesses.

Abstract:
Innovation and regional development are two topics that were (separately) very much discussed by scholars and in recent literature there have been attempts to examine how the former is connected to the latter. At the same time, different types of regional agglomeration systems have been developed and discussed such as: clusters, hubs, innovation systems and their roles in regional development. However, there is a significant gap in literature particularly concerning Innovation Zones. Thus, there is a need to look into this concept and examine the benefits that Innovation Zones can provide to the region to which they are affiliated. An essential element that all the agglomeration systems should exploit is knowledge. As current literature indicates, the fundamental drivers for regional development consist of: knowledge agglomeration, appropriation and innovative use of knowledge. Innovation Zones are agglomerations of universities, businesses, research institutes and governmental organizations that cluster together, utilize knowledge, and exploit opportunities in order to generate valuable assets to the involved parties and the region to which they belong. Location, infrastructure and legislations play a very important role in the efficiency and effectiveness of the Innovation Zones. Thus, it is necessary to examine who are the main actors of an Innovation Zone, if the efficiency and the effectiveness of the Innovation Zone conditioned by location and the prerequisites for a successful Innovation Zone.

Abstract:
By 2012 the Earth population is expecting to reach 7 Bln people, and this number is expecting to grow to 9 Bln till 2050. Many recent reports discover the problems of resource scarcity and climate change. Some scenarios anticipate total resources extraction of around 200% of 1980 equivalent by 2020, necessary just to sustain the world-wide economic growth [10]. In order to cope with these challenges on global scale, people need to develop new social behavior and vision for production and consumption. The present paper aims to overview some emerging innovative practices, leading to social, economic and ecologic development. Largely will be discussed the role of the regions, the concepts of Living labs, regional role for sustainable innovation processes. Finally there will be presented some examples and models, aiming to support and improve the innovation activity.

Abstract:
The importance of knowledge and innovation in modern economies justifies the increase interest by researchers in Knowledge Intensive Business Service (KIBS). The role played by innovation KIBS is stated above all because of not having a single performance in innovative activity, as would be to simply meet the wishes of demand and more specifically to the wishes of its customers, but by creating knowledge bridges or innovation bridges between business and science. We aim to identify the nature of KIBS in Portugal based on dichotomy rural KIBS (r-KiBS) and urban KIBS (u-KiBS), and the typology professionals KIBS (p-KiBS) and technology KIBS (t-KiBS).

Abstract:
Macedonian managers are scared that the crisis will continue in 2010, giving new and much stronger economic socks. Most of them will be price oriented, coming from outside. People from the government are scared too, but they do not like to admit it. From one side this is good because they are the last which should show pessimism. They should be optimists because only then they will canalize and direct the economics ahead, which means that they will do all the necessary steps to help the real sector. But if this optimism is not real, than is not serious and detrimental. It is not allowing them to accept the fact that the economic crisis in Macedonia is not finished yet. Some numbers are predicting more complex period with higher budget deficit, lower consumption, bigger unemployment rate and significantly higher trade deficit. The beginning of 2010 is showing that company's profitability will be significantly low. It is obvious that the government anti-crisis actions do not gave the necessary results and there is an immediate need for completely new steps. There are some steps that immediately should be taken for better business climate in Macedonia. They should be oriented toward improvement of the company's liquidity and promoting investment activities with the same conditions for the domestic and international entities.

Abstract:
This article is structured in the following way. The first part describes the idea of reflexive modernization as espoused by Beck and suggests some broad areas where the theory may illuminate

activities in the economy. The second part describes complexity and uncertainty as main aspects of the new modernity. The third section offers some thoughts, how organizations can make business in such environment. This article is structured in the following way. The first part describes the idea of reflexive modernization as espoused by Beck and suggests some broad areas where the theory may illuminate activities in the economy. The second part describes complexity and uncertainty as main aspects of the new modernity. The third section offers some thoughts, how organizations can make business in such environment.

Abstract:
Regional Innovation System (RIS) model of economic growth, seeks to promote increased interaction across the government, business and academia. The importance of RIS stems from the increasing interaction of regional actors on the outcome of the innovation process. This paper proposes a framework of regional innovation system for the Kharkiv region in the Eastern Ukraine. A thorough theoretical analysis was conducted to apply the most appropriate scientific approach to the study. Qualitative research approach was applied to cover the purpose of the study and answer the research questions raised. Interviews and documentation review were carried out using research questions based on previous studies. It is concluded that the main components of the regional innovation system in the investigated region are knowledge application and exploitation subsystem, knowledge generation and diffusion subsystem. The major stakeholders of regional innovation system (academic universities; research institutes; public organizations; regional state administration; non-governmental agencies and private firms) and specific component of regional innovation system (knowledge support and promotion subsystem) are identified in the Kharkiv region. The specific paper contributes to the knowledge in region by providing a proposed framework for the Kharkiv region.

Abstract:
The purpose of the paper is to describe how the network of the innovative companies, government bodies and universities can provide a best solution for implementation of innovations under current turbulent business environment.
Using a sample of different Russian and European innovative companies preconditions and methods of building of successful networking were examined in order to make a comparative analysis and to analyze differences in implementation of innovations and to analyze the causes of these differences. It was found that the differences in implementation Russian and European companies were engendered by the complex of the specific economic, politic and cultural (human) reasons. This research helps to better explain the ways to create a successful networking between different parties to provide better opportunities for implementation of innovations in current economic situation. The current research has the practical implication that it is important to understand the results of this research when deciding how to find a better way/network for the implementation of innovations. This study examines different situations in several countries using samples of different Russian and European companies.

Abstract:
Purpose of this research is the identification and analysis of the key process indicators which significantly contribute to the benefits of the business processes exploitation in the Luka Koper, d.d., and, to display the importance of the systematic process approach. With this case study we attempted to get deeper understanding, and to clarify and evaluate the enablers and results in the frame of the implemented EFQM business excellence model. Medium framed qualitative and quantitative analyses indicate the benefit of the identificated key processes (performance) indicators or Balanced Scorecard (BSC) and their influence on the strategic directions.

Abstract:
Bulgarian industry has lost many of its positions since of the beginning of 1990s. Structural reform during transition period resulted in markets' lost; lack of innovations, low product quality, inefficient organizational and production structure. This has changed after the end of the economic crisis of 1996. Industry growth in Bulgaria has been driven by two factors: 1) the increase in the effectiveness of use of the existing capital and labor resources, resulting from the financial stabilization, privatization, liberalization and institutional reforms, and 2) the gradual recovery of the physical

capital lost during the transition period through a pick-up in domestic and foreign investment. The paper analyses basic determinants of industrial growth such as innovation behavior on sectorial and micro level, deregulation and investments, education, competitiveness, and the overall impact of macroeconomic environment respectively – fiscal policy, inflation, international trade, financial system. This problem is not deeply studied and only a few economists do a research on it after Bulgarian accession to the EU. The analysis reveals the level of impact of each factor on Bulgarian industrial growth before and after accession to the European Union.

Abstract:
In various perceptions of transition, in countries which have found themselves in this process, whether to authors who examine this process with liking or authors who have opposite attitudes there are certainly a few among them who would deny the need that entrepreneurship and entrepreneurial spirit has to take a special place in that process. Entrepreneurship does not have to be necessarily considered the same as small and medium enterprises, although the setting up and development of small and medium businesses can be considered as one of the most significant elements in the change of transitional economies structure, but can also be related to building entrepreneurial business within the existing corporation, that is, „intrapreneuring"(internal entrepreneurship). Expressing itself through the readiness and will to introduce novelty by experimenting and creative processes directed toward the development of new products and services, as well as new processes, innovativeness imposes itself as infallible element of the enterprise behavior. When the application of marketing concept in small and medium enterprises is in question, certain authors placed in the centre of their interest the question of possibility whether the full spectrum of what conventional marketing involved can be included in these enterprises. This had implications on understanding the innovativeness of marketing in these companies. However, in light of the fact that the modern tendencies in the development of marketing have brought a number of new marketing paradigms, some of which are particularly suitable for the application in small and medium enterprises, the emphasis can be placed precisely on the display of such new opportunities. One of them, called bottom-up marketing, based on the appreciation of corporate strategy from the aspects of their tactical feasibility and ability to prevent competition in threatening company's tactic, is the central theme of this paper.

Abstract:
In the current work are discussed the shop floor control problems in the Bulgarian small and average enterprises in the context of the Supply Chain Management. The researched small and average enterprises are units in the European Supply Chains which implement strategies for mass customization. The empirical research aims to evaluate the degree of effectiveness of the shop floor control systems in terms of parameters like: operational planning, dispatching, operational quality control, production system status monitoring etc. Objects of research are the small and average enterprises of lighting and furniture industries.

Abstract:
It is very important for modern business to consider the system of management of human resources in different environments, their similarities and differences, especially the relationships that are developing in the United States, European developed countries and some countries and economies in transition. It is important to know how different countries manage people, how to find a balance between the needs of workers and employees in order to be competitive in the global market, whether to develop specific human resources management systems tailored to local labor markets and the like. Today, in modern business conditions, the successful management of business systems means respecting the environment. How the development of business activities spread out within single country managers who work in a multicultural environment should approach the study and understanding of intercultural management, to know to analyze business problems in the global business context. The success business management systems required by managers and the development of cultural awareness, knowledge and new competencies. It is necessary to ensure that managers develop new skills in managing human resources in global business systems. On the other hand, due to rapid changes in the environment, modern enterprise organizations are trying to find new organizational forms, new structural solutions, flexible enough and necessarily adaptive. The transformation is visible in all elements of an organization, its objectives, resources, human resources, information systems. The new organization has deep and significant implications for the practice of human resource management and causes major changes- the emphasis is on people, motivating employees and managing their potentials.

Abstract:
Multidivisional company consists of several divisions or business segments, usually in the form of profit or investment centers. Business segments are not independent legal entities, but have their own revenues, expenditures, financial result, and if it comes to investment centers decisions on the amount of investment are made. Something useful to a business segment or division may not be optimal from the aspect of the company as a whole. Business segments are also competitors. In those business segments managers have information that is not fully available to management at the highest level. Divisional managers, as agents are motivated to achieve better results in business segments that are delegated to them, and compensation schemes and bonuses can be so set that short-term financial interests of the segment dominate in relation to long-term interest of the owner - increasing the company value.

Abstract:
The increasing interest in international entrepreneurship calls for conceptual frameworks to better understand firm internationalization. This paper explores an entrepreneur-firm-opportunity framework and advances an opportunity-based approach to international entrepreneurship. The role of the entrepreneur in the formation of international opportunities and the subjective dimensions of entrepreneurial creativity and a new construct of 'prospectively' are examined. The firm – through its capabilities – is located as the vehicle for internationalization and opportunity exploitation. The 'opportunity' construct is re-examined and the notion of the 'entrepreneurial opportunity' clarified. The paper shows how the entrepreneur orchestrates the dynamic interplay between firm capabilities and market opportunities to form entrepreneurial opportunities, leading to dimensions of opportunity formation processes and a Typology of Entrepreneurial Opportunity Processes (opportunity discovery, development, construction, and creation). Finally, the paper outlines how conceptualizing internationalization as the formation and exploitation of international entrepreneurial opportunities, and applying the opportunity-based approach to international entrepreneurship, can lead to a better understanding of the phenomenon of firm internationalization.

Abstract:
Regions belong to basic component of European Union's economics. The Union spends on enhancement of socio-economic level of regions a lot of financial resources. About one third of Union's budget is determined for the regional policy. For implementation of the regional policy the regions on the level NUTS 2 are important. There are 271 NUTS 2 regions in all 27 member countries of the EU. The article is focused on evaluating of the present position of European NUTS 2 regions in the relation to dynamism of their development. For the purpose of this analysis the authors chose several indicators which are focused especially on such socio-economic characteristics considered to be the key indicators of qualitative development and competitiveness of regions. On the basis of the created synthesis it is possible to accept conclusions relevant to position and development of European regions in general as well as to development of individual NUTS 2 regions.

Abstract:
The small and medium enterprises, employing almost 70% of the total number of employees which clearly shows the great importance of small and medium enterprises, in Bosnia and Herzegovina small and medium enterprises should be the backbone of development or out of economic crisis, and the generator of new employment and development of the country.
However, the rate of the newly bankrupt companies is extremely high, and in terms of the global economic crisis it is even more pronounced. According to the results of the conducted research in the United States as a fundamental reason for the bankruptcy highlights the lack of knowledge of entrepreneurs and management.
Entrepreneurs and enterprises in Herzegovina, where they are confronted with certain problems often do not seek appropriate help because they do not have the financial resources to pay for this help or think that it is too expensive. Also in business there is a certain distrust of professionals and companies who offer different types consulting and professional services, without having to have to be specially trained and certified. Based on analysis that showed the current situation in the consulting market and the needs of SMEs for consultations and certain types of training and the

need for a unique database of consultants Regional Economic Development Association for Herzegovina (REDAH) has developed a system that includes consultants as accredited provider in the region of Herzegovina. REDAH provides support to small and medium-sized enterprises through the provision of subsidies to entrepreneurs for counseling by trained and accredited consultants. In addition to consulting, REDAH also provides other support to existing and future entrepreneurs - through information, training and managing the implementation of business ideas. The research, which will be presented in this paper will show is it and to what extent the voucher system of training and consultancy services help companies in addressing and overcoming their poroblems, ie. survival and development of small and medium enterprises and whether this system has helped in building the confidence of entrepreneurs in the consultants and companies that deal with training and consulting services.

Abstract:
Slovenia has begun with its national cluster policy in 2001. Industrial clusters have been a prevalent element of Slovenian competitiveness policy for next four years. More than thirty cluster initiatives were born in Slovenia in that period. The authors of this paper have followed the birth, organization and performance of industrial clusters in Slovenia for the period of three years. Based on several in-depth case studies in Slovenia and Austria we have built a cluster development and organization model applicable to smaller (transitional) countries. We have identified factors that have an impact on cluster development and organization at the level of general business environment. At the same time we have identified a government role in fostering clusters. But external factors are not the only factors influencing clusters. There are also internal factors that are in the hands of the cluster actors. These are factors that directly influence cluster development and organization process. We have classified them in four areas and they will be also presented in this paper. We have also identified four stages of cluster birth, organization and growth. The model is highly applicable as it combines research results with best practices based on several case studies.

ACTA TECHNICA CORVINIENSIS – Bulletin of Engineering, Fascicule 4 [October-December] *is a volume dedicated to* ***THE 3RD International Conference for Entrepreneurship, Innovation and Regional Development (ICEIRD) 2010 – Entrepreneurship beyond crisis – channeling changes to advantage,*** *organized in Novi Sad, SERBIA.*
Fascicule 4 [October-December] *includes papers presented in the Conference's sections.*

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

SLOBODAN MORACA[1], MIODRAG HADZISTEVIC[1], DRAGOLJUB ŠEVIĆ[1]

VALUE CREATION IN BUSINESS NETWORKS

Abstract:
A value network is a complex set of social and technical resources. Value networks work together via relationships to create social goods (public goods) or economic value. This value takes the form of knowledge and other intangibles and/or financial value. Value networks exhibit interdependence. They account for the overall worth of products and services. Companies have both internal and external value networks.
The network value system: integrated demand and multi-layered supply chains. They have attempted to meet all the changes identified within the new economy. Network value system management has focused on moving products and services downstream towards the customer.

Keywords:
Industrial clusters, organization, supply chains, business network

INTRODUCTION

Successful clusters are made up of companies that are constantly seeking innovation. Innovative companies not only seek to develop new products, but also are looking for all types of innovation in process improvement. This innovative capacity is a combination of innovation and imitation. Continuous innovation is the ability of the cluster to generate key innovations in products, processes, designs, marketing, logistics, and management. Almost all the clusters we visited have significant innovative capacity and place a priority on continuous innovation. This characteristic is particularly important when placing low and moderate income residents into jobs. It provides a work environment where different approaches and new ideas are valued often allowing a lower level employee to make a significant contribution.
In competitive environment success of an organization is a function of industry attractiveness, its relative position in the industry, and the activities (strategy) it undertakes to remain ahead of others ([7] and [9]). Mintzberg explained that strategy is evolutionary, organic process and is unpredictable; [15] explained that core competence gives an organization competitive capability and remains central to its strategy planning process. Small and medium organizations (SME) encounter different kinds of problems such as resource limitations (especially human and financial resources), and market information [16], they face competition within and between large organizations [4].
Quality improvement in a firm's must encompass much more than just machinery or technology improvement. Technology is a much more complex bundle of knowledge, with much of it embodied in a wide range of different artifacts, people, procedures and organizational arrangements. These embodiments of knowledge include at least: product specifications and designs; materials and component specifications and properties; machinery and its range of operating characteristics; together with the various kinds of know-how, operating procedure and

organizational arrangement needed to integrate these elements in an enormously variable range of different production systems. Moreover, as these elements of technology are highly interconnected, improvement in something as "simple" as product quality may require changes to be made across several linked elements of the bundle, e.g., in machine hardware or operating procedures, the organization of production flows, or the specification and treatment of materials.

Second, there is no sharp distinction between innovation and diffusion. Very few components of production technology are simply acquired "ready-made" and then brought into use according to standard "recipes" which are identical to, and replicated from, previous applications. Even in cases where the introduction of some element of new technology involves a fairly close approximation to such noncreative technology "adoption," the interactions with other elements of technology in the production system typically requires creative problem-solving and innovative re-configuration of at least some elements in the overall production system. Furthermore, firms do not acquire the capabilities to generate these creative changes spontaneously merely from the experience of doing production, as implied by notions of learning curves. Indeed, studies of infant industries have demonstrated that the performance of production systems may not increase at all over time, and can easily stagnate or decline over the long-run.

Third, external sources of technology are not limited to machinery suppliers. Customers, for instance, may be much more important sources of technology, providing not just knowledge about product specifications but also a wide range of other elements (e.g., operating procedures and know-how, or knowledge about materials properties).

It is clear we need new lenses and tools to succeed in this current economic environment — understanding of how people, process and technology really work together to create both social and economic value.

Tools used in the past to analyze business value creation, such as value chain and process models, are simply too slow, inadequate, or inappropriate to address this new level of business complexity. Instead of that, company has to find way to create quality management system in a multi-layered supply chain.

Strong value creating relationships support breakthrough innovation, quality management and organizational resilience. The value network approach helps individuals and work groups better manage their interactions and address operational issues, such as balancing workflows or improving quality of the process or product. It also scales up to the business level to help forge stronger value-creating linkages with strategic partners and improve stakeholder relationships.

A value network is a complex set of social and technical resources. Value networks work together via relationships to create social goods (public goods) or economic value. This value takes the form of knowledge and other intangibles and/or financial value. Value networks exhibit interdependence. They account for the overall worth of products and services. Companies have both internal and external value networks.

The network value system: integrated demand and multi-layered supply chains. They have attempted to meet all the changes identified within the new economy. Network value system management has focused on moving products and services downstream towards the customer. Typically the multi-layered supply chain is coordinated by manufacturing companies or dominant resellers who use in-house manufacturing and distribution facilities to achieve market-based objectives such as market share volumes and customer penetration.

Demand chain management changes the emphasis towards "customization", responding to product and service opportunities offered by specific customers or customer groups sharing particular characteristics. It is crucial to segment customers intelligently in order to offer more targeted and personalized products and services. The preference is to outsource rather than own the functions and processes that facilitate and deliver value. Focus is on asset leverage and communication through distributed assets and outsourcing.

CHALLENGES FOR BUSINESS NETWORK

At a first glance, the establishment of value networks seems to provide a promising future for relationship marketing concepts [1]. As companies reduce their degree of vertical

integration and begin to rely on a network of specialized companies for supporting operations, they tend to contract with suppliers who are able to cooperate in a relationship context [2]. Understanding customers' processes and value propositions is therefore vital for suppliers, as is a climate of shared relational norms and mutual trust. Academic research, however, also cautions against the naive application of relationship concepts, which proved valuable in the context of rather stable buyer–seller relationships, to be applied to a dynamic value network context.

In his study of value networks in the hard disk drive industry, Christensen [3] showed how network dynamics destroyed the value propositions of established relationships. The establishment of new product architectures, for example, the introduction of the personal computer, led to the establishment of new organizational architectures in value networks. Each new architecture bred a new dominant supplier of hard disk drives, who drove the then incumbent out of the market. The surprising conclusion shown by Christensen's work is that the suppliers were driven out of the market mainly because they actively listened to their most important customers and implemented a standard textbook approach to buyer–seller relationships. Furthermore, the incumbents had all of the technologies in their R&D pipelines, which shortly after materialized in the competing value networks, but which they themselves were not able to apply due to the implied restrictions of their existing relationship context. Seemingly, their rather narrow relationship approach was what eventually drove them out of the market. The notion that being customer-driven is no equivalent to being market-driven is neither new to traditional nor to relationship marketing concepts ([5] and [6]).

In contrast to early visionaries who saw an uninterrupted growth of relationship concepts induced by the increasing significance of value networks, management and academic research face the following challenges:

- *Gaining a clear understanding of the essence and the scope of relationship management and a clear definition of the concepts used: In a value network, the interaction leaves the stage of the dyad, giving way to multiple relationships with different and sometimes conflicting goals and a growing range of roles performed by participating companies, including multiple tiers of connected suppliers, resellers, and influencers. In such a complex context, the growing interest in concepts like relationship marketing and CRM somehow adds to the confusion rather than providing a clear understanding of problems, tasks, and concepts for how to manage in this complex network context.*
- *Adapting relationship strategy to network contexts: Traditional buyer–seller concepts focus narrowly on the value created in a dyadic buyer–seller interaction. As corporate actors are likely to multiply in a network context, each strategy has to take into account the structure and dynamics of value networks. Customer portfolios have not only to reflect the lifetime value of the set of relationships a company is engaged in, but also to account for its position in the overall network. Furthermore, as competition is always present within networks, a dominant goal is to reach a formidable value position within the network.*
- *Adapting the customer interface to the growing complexity of marketing channels: As the touch points to customers and partners involved in the marketing process multiply, the customer interface has to enable the company to interact through different sets of marketing channels with different partners. While the technical means of reaching a customer have multiplied, the integration of these contact points in the framework of a coherent strategy has become more complex.*
- *Develop core competencies for reaching a unique selling proposition in the value network: Whereas functional integration was the main focus in the context of buyer–seller relationships, value networks call for the dynamic evolution of a company's capabilities. As network competition forces companies to focus on activities that they can perform in the most effective and efficient way, the identification and cultivation of core competencies become the central tasks of management.*

CLUSTERS AND VALUE CHAINS

The distinctive contribution of global value chain analysis, as developed initially by Gereffi [7] and developed further by a group of researchers who met together in Bellagio in

September 2000 [8], lies in three main points. Firstly, it analyses how these dispersed production and distribution systems are co-ordinated. In particular, it suggests that in addition to co-ordination through market mechanisms and through vertical integration (the firm), global markets are increasingly coordinated through the formation of networks of firms. This sometimes involves complex co-ordination of activities (product design, process specifications and timing) between firms with no ownership links. The development of divisions of labour within these networks means that firms are frequently neither "complete" nor producing finish products. Secondly, global value chain analysis recognizes and emphasizes the role played by non-manufacturing companies — designers, retailers and branders — in the construction of globally-dispersed production and distribution systems. It distinguishes between different types of value chain governance and examines their consequences for knowledge flows, access to developed country markets and upgrading opportunities. Thirdly, the analysis considers the different ways in which firms within global value chains can upgrade. However, it is important to recognize that global value chains display a variety of different "governance structures" (or forms of co-ordination). In fact, the way in which the activities at different points in the chain are co-ordinated varies considerably, not only between chains but also at different points in the same chain. What linkages might exist between local firms and the global economy? The Italian industrial district literature emphasizes two main linkages: arm's-length market relationships and vertical integration. Arm's-length market relationships occur when products are standardized, or easily customized to particular buyer requirements, or designed by the producer without co-ordination with specific buyers. The purchasers of such products are "design takers": the design of the product is in the hands of the producer. In the case of finished products destined for consumers, the agents buying these products from clusters are most likely to be wholesalers, traders selling to a variety of customers and retailers (particularly small retailers or consortia of small retailers). By contrast, vertical integration involves direct co-ordination of activities within the firm. The most obvious form of this is through foreign direct investment into clusters. However, firms in developing countries may invest into developed country clusters, either in order to guarantee their position in these markets or in order to gain access to the knowledge base of other clusters. For example, some companies in the Sialkot surgical instruments cluster have established trading firms in the Tuttlingen cluster in order to facilitate access to German and global markets [10]. However, trade is also co-ordinated through networks of legally independent firms using a variety of transactional relationships. Thirty years ago, Richardson [11] referred to this as "the dense network of co-operation and affiliation by which firms are inter-related". Global value chain research suggests that such relationships can increasingly be found in international trade. It is possible to distinguish two particular forms of such relationships. On the one hand, network relationships involve greater interaction between buyers and sellers, usually based on the sharing of competences, which allows a product to be manufactured which neither company alone would have the ability to design and/or make. In this case, cluster firms will tend to have long-term, complex relationships with the network partner.

Arm's-length market relationships: describes a relationship where there are potentially many buyers and sellers for equivalent products, even though particular buyers and sellers may engage in repeat transactions. This implies that the producer either makes a standard product or designs the product without reference to the needs of any particular customer. The customer is a "design taker". It also implies that there is no transaction-specific investment required by either party to the transaction.

Network relationships: occur when the supplier and buyer combine complementary competences. They may jointly design the product, using their different competences, and transaction-specific investment will be made. This type of relationship is particularly evident when both buyer and supplier are innovators, close to the technology or market frontiers, but it also arises when firms focus on their core competences and outsource important activities to suppliers.

Quasi-hierarchical relationships: occur when one party to the transaction (usually the buyer) exercises a high degree of control over the other.

This often includes specifying the design (or the general specification) of what is to be produced and also process parameters such as quality systems, materials, etc. The introduction of monitoring and control procedures and the transmission of product design features requires transaction-specific investment.

Hierarchical relationships: occur, firstly, when the buyer takes ownership of the producers in the cluster or establishes its own companies within the cluster, or when firms in the cluster integrate forwards, establishing production or distribution facilities in other countries..

But why would companies want to develop quasi-hierarchical relationships? Such relationships are costly, requiring asset-specific investments in relationships with particular suppliers. Such investment also increases the rigidity of supply chains by raising the costs of switching suppliers. Nevertheless, many instances of such chain governance are evident. Humphrey and Schmitz [12] argue that buyer specification of product design is most likely to arise when the buyer has a better understanding of the demands of the market than the supplier. This requires explicit co-ordination of the value chain if the response to these.

CONCLUSION

All firms have either explicit or implicit strategies, and the economic development of a region depends on the soundness and execution of the many strategies of the firms that make up the region's driver industries. Those establishments succeed or fail based on a mixture of production prices that reflect input costs, products that reflect development and innovation, and management practices. At question is the length of time the virtuous circle of industry birth, cluster economies, innovation, and rents lasts. How long before rents are competed away in the product market by cheaper substitute products and in the labor and land markets by places that offer lower factor costs? How do the industrial, institutional, and social structures of regional economies influence innovation? Where in the product cycle does the firm begin to internalize cluster economies? This is where strategy plays its hand. It also is where cluster economies either spur economic development or deter it if the industrial and social structures of the region ossify, innovation and development are thwarted, and the existing competitive advantage of the region is whittled away by more innovative regional economies.

Cluster enables high-performance production, and provides optimal use of capacities and great flexibility of the entire system. Such systems enable the production in small series with very low costs. Since there is a large number of small and medium-sized enterprises, any changes in processing, shaping or any changes of material are solved within a few enterprises either by replacement or purchase of a small number of machines or by including in the cluster some companies with required developed technology, and by doing so we achieve a very fast reaction to any disorder or any changes. It means that the processes of development are carried out simultaneously, because each company gets the task to develop a part of a product for which they are specialized, and doing so we achieve the development of shorter duration, and increased number of different combinations available for utilization.

REFERENCES

[1.] *Morgan, R., and S. Hunt. "The Commitment-Trust Theory of Relationship Marketing." Journal of Marketing 58 (1994): 20-38.*

[2.] *Anderson, J.C., Hakansson, H. and Johanson, J., 1994. Dyadic business relationships within a network context. Journal of Marketing 58, pp. 1–15.*

[3.] *Christensen, C.M., 1993. The rigid disk drive industry: A history of commercial and technological turbulence. Business History Review 67, pp. 531–588.*

[4.] *Besant, 2001 R. Besant, Nature of competition, firm behaviour, and performance. In: S. Morris, R. Besant, K. Das, K. Ramachandran and A. Koshy, Editors, The Growth and Transformation of Small Firms in India, Oxford University Press, New Delhi (2001).*

[5.] *Slater, S.F. and Narver, J.C., 1998. Customer led and market oriented: Let's not confuse the two. Strategic Management Journal 19, pp. 1001–1006.*

[6.] *Tuominen, M., Rajala, A. and Möller, K., 2004. Market driving versus market driven: Divergent roles of market orientation in*

business relationships. Industrial Marketing Management 33, pp. 207–217.

[7.] Gereffi, G., 1994, 'The Organisation of Buyer-Driven Global Commodity Chains: How U.S. Retailers Shape Overseas Production Networks', in G. Gereffi and M. Korzeniewicz (eds.), Commodity Chains and Global Capitalism, Westport, Praeger:95-122..

[8.] A set of papers produced by this group of global value chain researchers was published in July 2001 (Gereffi and Kaplinsky 2001)..

[9.] Porter, 1991 M.E. Porter, Towards a dynamic theory of strategy, Strategic Management Journal 12 (1991), pp. 95–117.

[10.] Nadvi, K., and Halder, G., 2001, 'The Dynamics of Inter-Linked Clusters: The Surgical Instruments Sector of Sialkot, Pakistan and Tuttlingen, Germany', mimeo, Brighton, Institute of Development Studies.

[11.] Richardson, G., 1972, 'The Organization of Industry', The Economic Journal, Vol. 82:883-896.

[12.] Humphrey, J., and Schmitz, H., 2000, 'Governance and Upgrading: Linking Industrial Cluster and Global Value Chain Research', IDS Working Paper 120, Brighton, Institute of Development Studies, University of Sussex.

[13.] Rosenthal, S.S., Strange, W.C., 2004. Evidence on the nature and sources of agglomeration economies. In: Henderson,

[14.] J.V., Thisse, J.-F. (Eds.), Handbook of Regional and Urban Economics, vol. 4.

[15.] Hamel and Prahalad, 2002 G. Hamel and C.K. Prahalad, Competing for the Future, Tata McGraw-Hill Publishing Company Limited, New Delhi (2002).

[16.] Van Kirk and Noonan, 1982 J.E. Van Kirk and K. Noonan, Key factors in strategic planning, Journal of Small Business Management (1982), pp. 1–7 (July).

AUTHORS & AFFILIATION

SLOBODAN MORACA[1],
MIODRAG HADZISTEVIC[1],
DRAGOLJUB ŠEVIĆ[1]

[1, 2, 3] FACULTY OF TECHNICAL SCIENCES, NOVI SAD, SERBIA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

FACULTY OF ENGINEERING HUNEDOARA
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

DEJAN JEČMENICA[1], LIDIJA BARJAKTAROVIĆ[2]

DEVELOPMENT OF EMPLOYEES IN MODERN COMPANIES

Abstract:
Development of employees in modern companies is an activity that helps employees in its future development, change and creation of certain skills and behaviors that they require for daily achievement of clearly defined goals. A large number of companies in today's time believed that the basic cause of acquiring, maintaining and creating competitive advantage in the market development of employees through the development of intellectual capital.
This includes the development the applicable knowledge - in the first place to know what to do, and develop skills that will help them to know how to do it. In addition, it is necessary and understanding the whole process and a certain dose of creativity to the employees know why it works in a certain way. Basic focus development of employees in manufacturing enterprises related to learning and skills, their changes directly influence the creation of conditions that employees understand the connection and the reasons why something works and why. In this entire process is very important motivation for innovative thinking and continuous quality improvement. It is important to emphasize that during the crisis development of employees is crucial for the survival and further growth of the company.

Keywords:
employees, knowledge, motivation, skills, innovation

INTRODUCTION

The adaption of the company to the constant changes and trends in the environment, means a constant change of the employed in the same conditions and processes. In today's real conditions of business the life cycle of products is shorter and shorter, the technological changes are accelerated, also is the growing of competition on the global level, and on the other hand, the present knowledge becomes old. The answer to such problems can not be given by formal school education, which by its nature has a certain stability and cycle. For these reasons, we can say that the school system is only one pillar and base for further upgrades and expansion of other educational activities during life and worktime, which aims at adaptation of existing knowledge and skills to new work requirements. For these reasons, the development of employees is the basis of the flexibility of companies and a key lever in long-term development of enterprises. The management of the enterprise increasingly thinks that the development of employees is one of the most effective ways to achieve competitive advantage, the basic assumption of entering the competition and compete with competitors for the affection and confidence of consumers. This becomes not only a necessary condition, but also a prerequisite for any further development of enterprises and survival. So when we talk about the development primarily we think of activities that aim at expansion of the overall knowledge, development of the potential and the change of the values and culture. It is considered that the development is primarily aimed at long-term plans, i.e., the

acquisition of certain skills and knowledge necessary to overcome specific business tasks, and indicates the time dimension of the future.

THE GOALS OF EMPLOYEES DEVELOPMENT IN MODERN ENTERPRISES

Development Goals define precisely what we want to achieve with that process, including preparation or changes arising after the whole process of development, and relate to better and more qualitative job performance of employees. A large number of enterprises in our country and in the world believes that the crucial importance of the competitive advantage is knowledge. Therefore, all these companies are investing huge funds and resources for the development of intellectual capital, they invest in knowledge. A large number of various researches shows that such companies invest annually from 1.5% to 3% of the total annual budget revenues, and even if you add the indirect costs of training, then the total amount of expenses exceeds 10% of total earnings. The answer to the question of why to invest is so very simple, if you want to be competitive in a constant course of events, it is necessary to invest in knowledge. These investments directly affect the creation of successful and unsuccessful companies.

The development of employees is very often confused with the concept of employees training. The development of employees refers to the creation of learning opportunities in order to help employees in their personal development. When we talk about development, access is very wide, because it does not apply to their work places where they carry out everyday work activities, but the mere way of approach and development of employees has far-reaching and future requirements of the job or career development. [1]

Realizing the special importance of developing employees for modern enterprises, in reality, today's companies give out more and more funds for this activity with the belief that it is an investment which very quickly returns. It is estimated that companies which want to keep pace with changes should ensure that employees get of 2% of the total annual fund of work hours for development. The reasons for investing so much in the development of the modern organization are numerous:

- *The accelerated development of technologies which causes rapid obsolescence of knowledge*
- *Increasing of the demands of consumers, who seek new solutions and new knowledge;*
- *Increasing of the competition on the global market stipulates the need for higher level skills of employees in order to make company survive;*
- *New technology and new way of doing business increase the complexity of work and require new skills (interpersonal, communicational, conflict management, team work, etc..)*
- *A growing gap between theory and practice, and the inability to provide the appropriate skills and knowledge on the labor market.*

THE CONCEPT AND DEFINITION OF THE EMPLOYEES DEVELOPMENT IN MODERN ENTERPRISES

The development of employees can be defined as a clear program plan of the company to influence the improvement of the performance of employees in the course of performing their work assignments. Under development we can clearly define, that it is a set of activities that directly affect the change of the knowledge of employees, their skills, abilities, attitudes, opinions, working process, attitude to work, mode, etc.

Development of employees is a good tool that allows employees to acquire specific skills and behaviors that are crucial and very important to them in doing business with a standard level of performance.

The development of employees is an activity that helps employees in their daily work, change and creation of certain skills and behaviors that they require for daily achievement of clearly defined goals. A large number of companies in today's time believe that the basic cause of acquiring, maintaining and creating competitive advantage in the market is the development of employees through the development of intellectual capital. This includes the development of cognitive knowledge – in the first place to know what to do, and improve skills that will help them to know how to do it. In addition, it is necessary to

[1] Bogićević.B., Human Resource Management, Faculty of Economics, 2003, Belgrade, pg.153.

understand the whole process and a certain dose of creativity so that the employees know why is that done in a certain way. Fundamental focus of development of employees in manufacturing companies relates to the acquisition of knowledge and skills, their changes which directly influence the creation of conditions that employees understand the connection and the reasons why something works and why. In this entire process motivation is very important for innovative thinking and continuous quality improvement. Many companies today believe that the development gives competitive advantage in the market development of intellectual capital, which includes cognitive knowledge (to know what to do), how, and skills they need to improve creativity and motivation to understand the importance of the whole project. [2]

Here are some obvious possibilities of employees development application at work:

- *Motivating of employees;*
- *Delegation;*
- *Troubleshooting:*
- *The creation of teams;*
- *Evaluation and assessment of employees;*
- *Planning and critical review;*
- *Work in a team;*
- *Development of employees;*
- *Planning;*
- *Management;*
- *Monitoring of performance;*
- *Efficiency.*

The development process helps employees in the company to focus on acquiring knowledge and skill development, as well as the creation of such changes and conditions for employees in the company to understand the connections and the reasons why something works and to be motivated for innovation and constant improvement of the business.

The approach to the development of employees in manufacturing companies has experienced a significant transformation and correlates with changes in how to manage the enterprise. The first period, which presents Taylor`s understanding of the company, features training for making capable of performing divided and simple work operations and directing to gaining speed and working skills. During this period the environment is stable and school system largely satisfied the need for higher levels of knowledge. In the second phase of the development of company, the development of employees focuses on problem solving and transfer of lessons learned into practice, there is a more systematic confirmation of development needs, development of more complex contents, which do not only include a working operation, but also social competence, and the establishment of developmental functions as an important function in company. The modern approach to the development of employees in the company is based on the activation of the very employees and managers in the realisation of the development process, and the contents are directed to a system of values, teamwork, communication and conceptual thinking. At the same time interactive methods are introduced and learning in various forms is becoming a normal and daily practice and commitment of every employee. Today companies, under the influence of high technology and competitive relationships on a global scale, have a changed attitude toward work processes, costs and resources, so that knowledge becomes a key resource, a training mode and survival.

The development of employees in manufacturing enterprises is determined by the following factors:

- *The market principle of business enterprise requires constant adjustment to new conditions and flows, which means not only technological changes but also changes in the company, changes in product assortment and behavior. All these imply a high level of flexibility, that flexibility also means people who work in market-oriented company. The development in that way becomes a factor of adaptation and necessity, without which there is no change.*
- *Under the pressure of competition and the fussiness of customers, a market-oriented company is constantly faced with the problem of costs and problems of innovation. In order to solve these problems the knowledge becomes a key factor. Therefore, specific knowledge gains increasing importance in the direction of innovation and expansion of knowledge through flexible development programs during the job or related to the job.*
- *Development of functions in the company takes into account the objectives in terms of*

[2] Quinn., JB, Andersen, P., Finkelstein, 1996., Leveragining intellect, Academy of Management Executive, pg. 39

overcoming the deficit of knowledge, developing of skills needed to perform certain tasks and solve specific business problems and working.

- *With development, working methods change. At a time when money and time become very important limiting factors, one can not gamble with activities that are not needed for companies, or which do not achieve specific goals. Understanding the role of participant development is also changing. These are no longer passive recipients of information but active participants in the process of exchange and creating new knowledge. To such conditions methodical concepts must be adapted, and also spatial conditions, which should encourage communication between participants and team work. For these reasons, development contents change. Navigation process in modern enterprises increases the complexity of business requirements, and development is not aimed at gaining additional knowledge and skills for specific job position, but the methodical entrepreneurial competence to solve problems. Autonomy, ability to work and professional expertise can be achieved only if the methods of knowledge development, skills and behavior are integrated into a single concept of team and project oriented development of employees in the company.*

THE IMPORTANCE OF EMPLOYEES DEVELOPMENT PROCESSES IN COMPANIES

Development of employees is becoming a very important element of the modern companies' success, both on global and domestic market. Today business conditions require the stronger need for leadership, knowledge, better employees, who are talented and highly educated. The companies with their ads and offers want to attract better workers, in order to have their focus on better quality and rapid change. Companies worldwide invest millions of euros, yens and dollars in various development programs to achieve competitive advantage in the market. The mere growth of investment in various developments shows us that companies are becoming aware that knowledge is a factor that creates the difference between successful and unsuccessful companies, whether it is about companies or employees within a company.

Development of employees in each company, regardless of size becomes very important activity in the function of human resource management, due to globalization, competitiveness, strengthening the need for leadership, growing knowledge, and attracting talented individuals.The whole world is investing digits in millions in development employees, only for reasons of domination in their markets.
Effective development must have clearly defined objectives, to be compliant with the identified needs, to plan and to ensure the implementation of experience and lessons learned. The best situation is when the development satisfies the needs of companies and employees.
The main goal of development is that to eliminate in the short term any elements that can affect the performance of employees.
The main results achieved by development in the company are the acquisition of new knowledge, new skills and developing abilities of employees.
When we speak of knowledge we have in mind the entire content of an object or phenomenon, and their provisions based on the truth. Knowledge is in direct conjunction with science, and it is often taken as its synonym. The aim of science is, with various theoretical and empirical research, to obtain objective and real truth.
As for skills, they refer to the long process of learning, while the capabilities and tendencies to somethihng, form and are learned in the processes of education, and moral and cultural maturity of self-affirmation of the whole personality come from education and self-education.
Skills are personality traits of which depends the difference in the successful performance of certain tasks. The first group consists of more intellectual or mental abilities, while the second group consists of psychomotor skills, the third of sensory abilities.
When evaluating performance of employees we are directly related to the function of human resources. Scores of employees get, create a clear picture of whether they accomplish a certain standard and in what levels. Based on these results we can see very clearly that there is a change of behavior, attitudes and skills improvement. This method can be very good at checking the quality of development. In addition to all the important benefits of development

employees, this factor in the development of employees is in direct function of the progress of employees.Through specific results after development, we get information that help us in the process of deciding on the transfer and promotion in the company, and at the same time the whole process affects the wage system. In addition to the above-mentioned advantages of development, we can say that development has an important role in changing the culture of the company.

CONCLUSION

Development of employees in modern enterprises is becoming a very important element of success, both at the global and the domestic market. Conditions today require increasingly strong need for leadership, knowledge, better employees, who are talented and highly educated. Companies with their ads, and good offers want to attract better workers, in order to have focus on better quality and rapid change. Companies around the world are investing millions of euros, yens and dollars in various development programs to achieve competitive advantage in the market. The mere growth of investment in various development and training processes tells us that companies are becoming aware that knowledge is a factor that creates the difference between successful and unsuccesful companies, whether talking about companies or employees within a company.

Development of employees in any enterprise regardless of size becomes very important activity in the function of human resource management, because of the globalization, competitiveness, strengthening the need for leadership, the growing knowledge and attraction of the talented individuals. The whole world is investing millions of figures in the development of employees, only for reasons of domination in their markets.

REFERENCES

[1.] BOGIĆEVIĆ, B., Human Resource Management, Faculty of Economics, 2003, Belgrade,

[2.] ŠIBER FIKRETA, B.: Mangement ljudskih potencijala, Golden Marketing, Zagreb, 1999.

[3.] ULRICH, DAVE, HOPE GREENFIELD, The Transormation of Training and Development to Development and Learning, American Journal of Management Development 1, no.2 (1995);11

[4.] QUINN., JB, ANDERSEN, P., FINKELSTEIN, 1996., Leveragining intellect, Academy of Management Executive

AUTHORS & AFFILIATION

DEJAN JEČMENICA[1.]
LIDIJA BARJAKTAROVIĆ[2]

[1] WIENER STADTISCHE OSIGURANJE, BELGRADE, SERBIA
[2] UNIVERZITET SINGIDUNUM, BELGRADE, SERBIA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ANNALS
of
FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL
JOURNAL of ENGINEERING
ISSN: 1584-2665 [print, online]
ISSN: 1584-2673 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://annals.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

MARIJAN CINGULA[1], ROZANA VESELICA[2]

CONTRIBUTION OF INNOVATION STRATEGIES TO ENTREPRENEURIAL COMPETITIVENESS

Abstract:
This paper focuses on the theoretical approach to innovation and innovation strategies. It focuses on the importance of innovation strategies as well as their contribution to competitiveness strategies. Theoretically approach to the connection between innovation strategies and competitiveness were applied.
In order to examine the importance of the innovation strategies, analysis and synthetic methods were used. Also induction and deduction were used to examine theoretically relevant aspects of innovation strategies and their contribution to competitiveness. Theoretically relevance and connection between innovation and competitiveness were analyzed. After analyzing the theory concerning innovation strategies and competitiveness strategies, it was founded that innovation is one of the key factors for achieving a sustainable competitive advantage. Innovation strategies were found one of the most important strategic factors which lead companies to achieve results and gain success. Innovation strategies and competitiveness strategies were found strongly connected between themselves.
Based on analyzed theory, it should be visible that innovation and innovation strategies are very important in today's modern way of doing business. Innovation strategies are in a positive relationship with competitiveness strategies and innovation has the key role. Innovation strategies should be observed as one of the major factors in obtaining and achieving competitiveness. Today, in front of the world globalization process, enterprises should gain their competitive advantage by using innovation strategies and by seeking creative solutions for their businesses.

Keywords:
innovation strategies, competitiveness, sustainable competitive advantage

INTRODUCTION

In the first part of article will be explained the definition of innovation and different approach to it. Innovation cannot be separated from creativity as it is an important part of the process of innovating. There will be further explained the four p's of creativity and innovation and its relationship among each other. Innovation strategy types will be listed and explained also.
The second part will be about innovation strategy and its different types. Firm can choose among different ways to innovate their selves and choose between innovation strategy which is more appropriate to them. Innovation strategies will be shown and explained each. In the third part of this article will investigate about competitive advantage and how innovation strategies can help to keep sustainable competitive advantage. Will be shown that we cannot separate innovation from competitiveness and firm strategy. Also will be shown different types of innovation strategies which help firm to maintain the profit from innovation activities. The block, run and team up strategy will be explained further.
At the conclusion the impact innovation strategies have to competitive advantage will be described. Innovation strategies are one of the

key success factors for sustainable competitive advantage. Innovation cannot be divided from strategy and competitiveness.

INNOVATION STRATEGY

Innovation is the process of generating something new that has a significant value to an individual, a group, an organization, and industry, or a society. The result of the innovation process is an innovation – a creation that has significant value. There are many creative ideas and concepts that have value but may not have significant value in their application. Thus, they may not be innovations. [1]

Innovation is the use of new knowledge to offer a new product or service that customers want. It is invention plus commercialization. It is according to Porter, a new way of doing things that is commercialized. The process of innovation cannot be separated from firm's strategic and competitive context. [2] Figure 1. show how new products, low cost, improved attributes and new attributes depend on competence and firm assets. New technological knowledge and new market knowledge also, depend on each other but each separately interferes with firm assets and competences. New knowledge technological and market, contribute to firm competences and their assets.

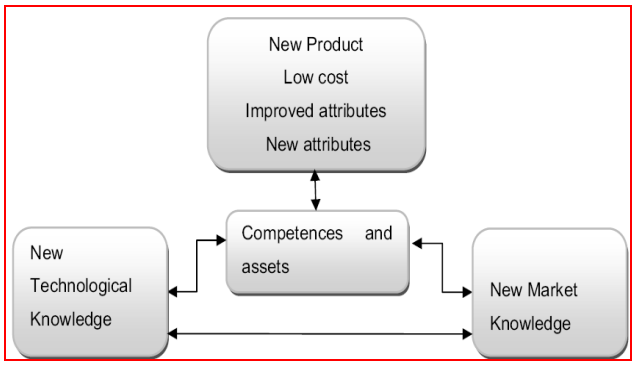


Figure 1. Innovation overview

Firm competence and asset determine the innovation of new products, gaining low cost products, contribute to improve attributes but also to create new attributes which will help firm in competitiveness.[2]

Innovation cannot be separated from creativity. Creativity is the process of originating something new that has value.[3] There are many original ideas but as they do not have any value, they can't be considered as creative. For being innovative firms need to go more beyond creative and learn how to turn good ideas and change into innovation. Firms need to struggle in high competitive environment and face with many challenges if they aim to survive in business market. [2]

It is important to understand the four p's of creativity and innovation: product, possibilities, process, personal creativity.[4] The product should have significant value to be innovative.

"The result of the creation / innovation process; can be a physical product or service or an enchantment to either a process improvement or a marketing or management improvement".

The possibilities of innovation according to J.M. Higgins do not exist. The organization culture does not encourage or require creativity so neither the innovation process can't be realized.

The four p's are important to understand innovation creativity and process to gain it in firm.

Creativity, process and personal creativity are one of the most important attributes in the firms. The innovation process need organizational culture but also possibilities to grow. Innovation is strictly related to each of them and they are strictly related to innovation. The process is used to improve creativity and individuality. Personal creativity is freeing yourself from the restrains on creativity that are the result of early socialization.[3]

The four p's relationship to each other is shown in Figure 2.[3]

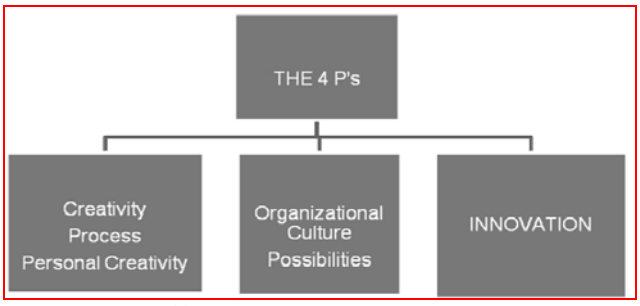


Figure 2. The Four P's relate to each other

The prices of creativity can be increased by learning the processes and improving personal creativity in order to do that firm needs to have possibilities and the result of it is innovation.

There are four types of innovation: product, process, marketing and management.

- *Product innovation is a result of new product or services or enhancements to old product or services;*

- *Process innovation is result of improved process in the organization;*
- *Marketing innovation is related into marketing functions and promotion, pricing, distribution as well as product development;*
- *Management innovation improves the management of the organization.*

As a conclusion it is possible to say that innovation in managing the organizational economic functions – marketing, operations, finance, human resources, R&D and management is what separates successful companies form the others.[5]

INNOVATION STRATEGY TYPES

Management innovation is innovation that improves the organization's management. Innovation strategy is the way organizations react to the market challenges. They have many choices respect their innovation strategy:

- *to innovate or imitate;*
- *to pursue R&D or search development;*
- *to focus on product or process innovation;*
- *to invest in old or the new;*
- *to use "big bang" or continuous innovation;*
- *to be driven by market forces or by technology;*
- *to have selected or total commitment;*
- *to do basic research or applied research;*
- *to use speed strategies. [4]*

Innovate or Imitate Strategy

Companies can choose between innovate or imitate others. By simply imitating else's products without any improvement will not result in a competitive advantage. In case imitation leads to low production costs it can be a possible strategy. If firm chooses innovation as their strategy it is more visible and possible the can gain and sustain competitive advantage. But by choosing product innovation alone it will not sustain competitive advantage. [6] Product and process innovation will both lead to a sustainable competitive advantage which organizations aim to achieve.

R&D or S&D

Firms need to achieve innovation and they need to decide how they will do it. S&D leads to the acquisition of firms for the purpose of obtaining their products or services. It may lead to joint ventures or to the licensing of other firms product and services. The major focus of R&D based firms is how much should they spend measured in percentage of sales.

Product or Process Innovation

Product R&D funding has long been understood to contribute competitive advantage. Research show that both process and product innovation are necessary to obtain long term competitive advantage. As it was mentioned before, innovation alone can difficult create a competitive advantage. Sufficient fund should be transferred in R&D departments.

Invest in the Old or the New

Innovation is the attacker's advantage. Recognize that they must be close to ruthless in cannibalizing their products and processes just when they are most lucrative, and begin to search again, over and over."[7] The S curve shows that at the beginning, at the bottom of curve, there must be a large investment before performance. After the breakthrough happen, technological progress is great and investment is relatively small in the middle of the curve.

The cost of achieving more progress increases again but the rate of progress decreases. At the top of the curve firms must decide when to stop investing or not. So they need to choose to invest in new or old. Today one of the main issues on which firms are fronted is the fast changing product and competitive world market growing rapidly.

R. Foster observe that products and processes follow a S-curve as relationship between effort and performance as shown in Figure 3.[3,835]

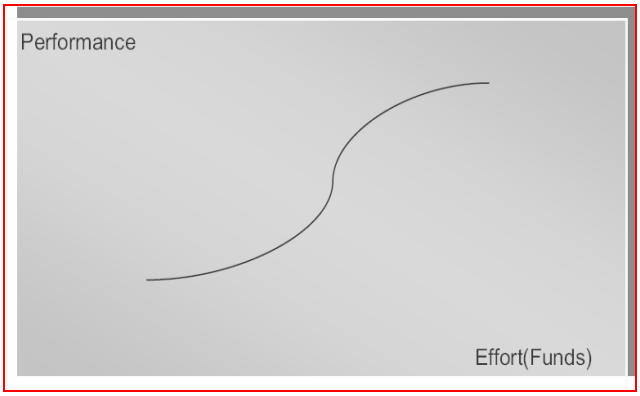


Figure 3. The S Curve

Big Bang or Continuous Improvement

Big Bang is the major innovation on which new products and processed are based. Such innovations are introduced periodically every three or four year. It is consisted into improving existing products and combining them product improvements with process improvement – but it needs to be continuously.

Market Driven Vs Technology Driven Strategy

Firm must be driven by both market and technology strategy. In order to obtain a competitive advantage firm must be active and proactive and always be aware of market forces.

Selected Vs Total Commitment

Firm that obtains a sustainable competitive advantage involves everyone in the firm in improving processes and products. They can choose to depend on R&D or they can involve everyone. For instance, in a single year Toyota submitted 860,000 suggestions and implemented the 96 % of them. In Japan about 66 % of employees regularly submit suggestions which are compared to 8 % in the United States, a significant indicator of innovation attitude. [3]

Basic Research Vs Applied Research

Firm needs to pursue on both, basic and applied research. It is the only way to gain for sustainable competitive advantage and improve products constantly.

Speed Strategies

Speed and being proactive is becoming more and more important and crucial in gaining competitive advantage. The major focus is on speed. Firms adopted product covering as an instant imitation of other firms product. Product churning is rushing new product to market without conducting market research.

COMPETITIVE ADVANTAGE AND INNOVATION STRATEGIES

Competitive strategy focuses on what firm wants to achieve on the market and its basic options to it. Competitive advantage addresses the issue of how it carries out those options.[8] After firm faced with globalization and worldwide market but also competition, gain a sustainable competitive advantage become critical for success. To be competitive firm needs to obtain many goals but one of it is securely innovation.

Increasing the world market by globalization process firm must take a global perspective and find their advantage among global competition. As it was mentioned at the beginning of this article, the process of innovation cannot be separated from firm strategic and competitive context. If a firm wants to be competitive it needs to be proactive and to innovate themselves.

There are two kind of innovation impact on firm, incremental and radical. Radical innovation is the technological knowledge which is very different from the existing one, while incremental innovation is knowledge required to offer a product builds on existing knowledge.

To be innovative, firm needs to have sufficient funds to finance new products or new processes. They profit from using new knowledge to offer products at lower cost than competitors.

It can be difficult for firms to recognize the potential of innovation. Even if they do recognize their potential there is always a possibility other firs recognized the same and are trying to profit from it too. Firms front other co-opetitors who are also interested into being the first on the market and gain the competitive advantage. Co-opetitors can be suppliers, customers, competitors and complementary innovators who also firm must collaborate to succeed. [9] It is important firm knows who their co-opetitors are. Once firm gain competitive advantage by innovation they need to know how to maintain it. There are three strategies to maintain the profit from innovation. By maintaining the profit the advantage should be maintained also.

The strategies are shown on the following Figure 4. [2]

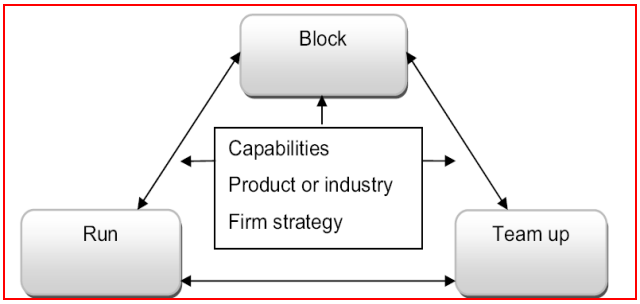


Figure 4. Combination of different strategies to profit from innovation

In the figure is shown how firm can protect its profit from a combination different strategies.

The block strategy is how firm prevent entry by others like by protection intellectual property, brand name or distribution channels. In run up strategy firma act proactive and offer its own products. The team up strategy firms invites entry by licensing, copyrights, trademarks or similar cooperating. The combination of all strategies allow the firm to act as any phase of its evolution need better. In the global environment firm aim to keep its competitive advantage by innovating itself and being ahead of the competitors. [2]

Block strategy

Competitive firms need to maintain their position on the market and it is possible by prevent the entry of other competitors. In the value chain each stage is unique and inimitable so firm can limit the access to them by keeping out the competitors. Firms are all equal to perform those same activities and incumbents may still be able to prevent entry by giving post entry price. Block strategy works in equal and inimitable industries.

Run strategy

Innovators must run for their innovation and profit from it. They must always be ahead of the competitors and innovative enough's to built new capabilities and introduce new products more rapidly than others. The environment is changing fast and firm must adapt to is as better as it can. Running can give a firm advantage in product and process which is the most important in competitiveness among entrepreneurship.

Team up strategy

When firm decide to use team up strategy to continue profiting from innovation, they cooperate with others. It can be as strategic alliances, venture capital, and acquisition.

Strategic alliances can be joint ventures, licensing, agreements, distribution, co-marketing agreements, technology agreements, design agreements, or other agreements to cooperate in adding value in firm's value creating activities. Firm needs to be useful to each others to team up together. They need to get something one form the other and vice versa, to enter in cooperation and profit from innovation together.

Usually are used all three strategies to maintain profitability. First fast technological changes may suggest to use bloc strategy to prevent entry of competition. But firm may also need to run to innovate to keep their market position and along with it, competitive advantage.

Sometimes for firm may be better to team up in order to exploit technology and market unavailable to the firm, and in gain competitive advantage. In order to gain and keep competitive advantage firm need to combine innovation strategies in different phases to maintain its advantage and profit from innovating.

CONCLUSION

Competitive advantage is hard to achieve. Firms are faced with global market and global competition. Each of them try to find its own way to be competitive but in today's changing market, they need to be fast. The major goal to achieve is be better and more ahead than competition. Innovation in product but also innovating in the process has a key role in achieving competitive advantage.

By innovating product and process firm is always ahead of its competition. In global competitive environment it is become crucial to be innovative. Firms adopt their own innovation strategy and try to maintain their profits from innovating. Once firm obtain competitive advantage, innovation strategies can help to gain a sustainable competitive advantage. It is possible to decide to use block, run or team up strategy but it is always important to be proactive and one step ahead towards competition. Innovation and innovation strategies are crucial in the attempt to sustain the competitive advantage. Firms who don't innovate themselves can't be competitive on global market as the ones which innovate. If a firm wouldn't do any innovation in business or its process wouldn't be much competitive among others which do innovate. Firm can innovate, imitate, research, innovate product or process, use speed strategies or continuously improve itself but they need to have innovation strategy incorporated into their management plans in order to maintain competitive advantage or gain it.

"Entrepreneurship is an activity that involves discovery, evaluation and exploitation of opportunities to introduce new goods and services, ways of organizing, markets, processes, and raw materials through organizing efforts that previously had not existed" [10] so we can say that without innovation there is no competitive advantage in entrepreneurship. In order to accept that innovation has today increasingly important role in firm's growth and survival, it becomes crucial to identify the sources from which innovative ideas origins. [11] Innovation and creativity but above all innovation strategies become one of the crucial factors in gaining competitive advantage in new entrepreneurial changing environment.

"Innovation distinguishes between a leader and a follower." Steve Jobs

REFERENCES

[1.] J. M. HIGGINS, (1994), The management challenge, 2nd edition, Macmillan College publishing company 1994, pp. 828;

[2.] A. AFUAH, (2003), Innovation management, Oxford University Press;

[3.] J. M. HIGGINS, (1994) The management challenge, 2nd edition, Macmillan College publishing company, pp. 829;

[4.] J. M. HIGGINS, (1993), 101 Creative problem solving, The handbook of New Ideas, The New Management Publishing Company, Chapter1;

[5.] R. STATTA, Organizational Learning – the Key to Management Innovation, Sloan Management Review (Spring 1989), pp.63 – 74; Micheal Porter, Competitve Strategy, New York : Free Press, 1980), pp.177 – 178;

[6.] K. KRAFT, (1990), Are Product and Process Innovation Indipendent of Each Other, Applied Economics, pp. 1029 – 1038.;

[7.] R. N. FOSTER, (1986), Innovation:The attacker's Advantage, New York: Summit Books, MyKinsley and Co.;

[8.] M. PORTER, Competitive advantage, Free Press, New York, 1985

[9.] A. AFUAH, (2000), Do your co-opetitors capabilities matter in the face of the technological change?, Strategic Management Journal 21 (3), 387 – 404.;

[10.] S. SHANE, (2003), A General Theory of Entrepreneurship. The Individual-Opportunity Nexus. Cheltenham: Edward Elgar;

[11.] J. OKSANEN, N. RILLA, (Dec 2009), Innovation and entrepreneurship: new innovations as source for competitiveness in Finnish SMEs, International Journal of Entrepreneurship.

AUTHORS & AFFILIATION

MARIJAN CINGULA[1],
ROZANA VESELICA[2]

[1] UNIVERSITY OF ZAGREB, FACULTY OF ECONOMICS AND BUSINESS, ZAGREB, CROATIA,
[2] UNIVERSITY JURAJ DOBRILA, DEPARTMENT OF ECONOMICS AND TOURISM "MIJO MIRKOVIC", PULA, CROATIA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

FACULTY OF ENGINEERING HUNEDOARA
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

[1.] ELENI MIKROGLOU

THE ROLE OF INNOVATION ZONES IN REGIONAL DEVELOPMENT

Abstract:
Innovation and regional development are two topics that were (separately) very much discussed by scholars and in recent literature there have been attempts to examine how the former is connected to the latter. At the same time, different types of regional agglomeration systems have been developed and discussed such as: clusters, hubs, innovation systems and their roles in regional development. However, there is a significant gap in literature particularly concerning Innovation Zones. Thus, there is a need to look into this concept and examine the benefits that Innovation Zones can provide to the region to which they are affiliated. An essential element that all the agglomeration systems should exploit is knowledge. As current literature indicates, the fundamental drivers for regional development consist of: knowledge agglomeration, appropriation and innovative use of knowledge. Innovation Zones are agglomerations of universities, businesses, research institutes and governmental organisations that cluster together, utilise knowledge, and exploit opportunities in order to generate valuable assets to the involved parties and the region to which they belong. Location, infrastructure and legislations play a very important role in the efficiency and effectiveness of the Innovation Zones. Thus, it is necessary to examine who are the main actors of an Innovation Zone, if the efficiency and the effectiveness of the Innovation Zone conditioned by location and the prerequisites for a successful Innovation Zone.

Keywords:
Innovation, Innovation Zones, Knowledge, Regional Development

INTRODUCTION

Innovation and regional development are two realms that (separately) are very much at the centre of scholarly attention. At present, many authors tent to associate innovation to regional development and examine its role in developing specific regions. Porter [18] wrote that "in advanced nations, future prosperity will increasingly hinge on innovation – successfully developing and commercializing new technologies, new products and new processes". Innovation "is an ubiquitous phenomenon in the modern economy. In practically all parts of the economy, and at all times, we expect to find on-going processes of learning, searching and exploring, which results in new products, new techniques, new forms of organization and new markets" [7] and it "involve[s] continuous interactivity between suppliers, clients, universities, productivity centers, standard setting bodies, banks and other critical social and economic actors" [7].

According to Drucker [4] innovation is the act that endows resources with a new capacity to create wealth. Innovation leads to competitive advantage, consequently bringing greater profitability [19]. Knowledge is the key source of innovation and at the same time is an essential driver for economic development [18]. Different types of agglomeration systems such as clusters, hubs, innovation systems, knowledge zones etc.

are characterized by high level of knowledge creation and transfer and significant innovation capabilities. Common knowledge groups or clusters are formed by an organized and geographical mixture of firms having similarity in highly harmonizing capabilities for common research and development [15]. The importance of the innovation systems in regional development lies in the fact that the governments, at least in the advanced nations, are supporting regional innovation as a way to boost national competitiveness [2].

There has been a tendency among countries to prepare a plan at national and regional level for development to allocate the national economy at regional stage [8]. Since 1980, the concept of clusters and network has been a central idea for the increase of competitiveness and economic growth. The creation and formation of the clusters brought a new way in doing business in traditional local and regional level. The concept of Innovation Zones (IZ) came from the development of clusters. The difference between the two is that clusters are strongly connected to private incentives, whilst on the other side the creation of the IZs derives from governmental initiatives [13]. Engaging firms and other actors in playing a role in the regional development is a complicated task. This requires a constructive environment for research and development and drive for innovation and learning. IZs are agglomeration systems of innovation and major models for creating a supportive technology based advancements, innovation, learning, and knowledge-based regional development.

METHOD AND PURPOSE OF THE STUDY

IZ is an agglomeration concept that is not so much discussed by scholars. As a result during this research, significant difficulties were encountered in obtaining information related to this matter. Also, it proved challenging to find information and statistical data for the IZs case studies that were used (such as employment rate of the IZ, number of business creation especially in comparison to previous years, or any statistical information specifically on innovation zones). Therefore, in this study official and academic documents and interviews were used. The interviewees are people from the academic world that deal with regional development issues and people that are employed in science parks. The interview questions aim at defining the concept of IZs and obtain information on the role of IZs in the development of the regions they belong. Also, these questions attempted clarify the difference between similar agglomeration concepts such as clusters, innovation systems and IZs in order to orientate the research towards the correct sources. Also, due to the nature of the questions (from the interviews), and particularly the answers, direct quotations by the interviewees shall not be used. Instead this paper includes the suggestions, leads and resources made available to the author through talking to the interviewers.

Consequently, the resources used in the course of this study, as well as the structure and certain views have been significantly shaped by the outcomes of these interviews. This research is a part of a larger study examining the Newark IZ in New Jersey, USA and the under construction IZ in Thessaloniki, Greece. The present paper refer to the case study of Thessaloniki IZ since the latter is not operating properly yet and it is not related to the purpose of this study which is to analyze the role of IZs in regional development and define the possible benefits that they offer to the regions to which they are affiliated through the use of theories and case studies.

REGIONAL DEVELOPMENT

Regional development deals with the analysis of a particular region in order to formulate a planned structure of development approach for that specific area. The theoretical literature of regional development encompasses a large number of theories for the development of the regions. According to regional development literature, diminishing the regional inequalities and gaps will result in economic development. Higgins and Savoie, (through the theory of Cumulative Causation) explain that the countries where regional gaps were large, they were increasing further and where regional gaps were small they were diminishing [8]. Further, Myrdal noted that the more advanced countries are more likely to introduce an effective welfare state, introducing the measures to reduce regional inequalities, and thus keeping the upward cumulative movement going [8]. He justifies his argument by saying "The more effectively a national state becomes a welfare state the stronger will be both the urge and the capacity to counteract the blind market forces which tend to result in regional inequalities; and

this, again, will spur economic development in the country, and so on and so on, in circular causation" [8].

But this circular effect should be seconded by the appropriate infrastructure and acts towards accumulation of diverse players in the region. According to endogenous growth theory the economic development comes from inside of a system. "The endogenous growth models and analyses stress that agglomeration and localization phenomena generate positive external effects that outweigh the negative effects, especially if these phenomena are accompanied by appropriate regional infrastructure investments" [11]. This theory points out the importance of investing in new knowledge creation in order to sustain the growth [3]. The main point of this theory is that knowledge brings growth. Bringing growth to a specific regional can control and manage the different economic activities of the region.

The location of economic activities can be determined on the regional level or narrowly on some kind of specific zones. Several writers have explained the theory of location through utilisation of theories of prices, production, employment and distribution [8]. Hoover [9] explained the personal preferences of managers, scientists and engineers as vital. In this theory as he explains in his book, "Everyone has some preference as to consumer location, i.e., where he would like to live and spend his income. For all but an envied minority there is also the question of producer location, i.e., the best place to earn an income… Most people come to prefer the kind of environment in which they have been living rather than some other social, racial or institutional atmosphere; unfamiliar climate and landscape, or change from urban to rural living or vice versa" [9]. Mobility in regional economics is important, as noted in Higgins and Savoie book, since many enterprises like to work where they were born and stay. "Personal factors such as proximity to home and family location preferences features prominently in the result of location surveys" [8]. These factors of governing mobility are of prime importance in the theory at hand from the perspective of regional development.

THE ROLE OF KNOWLEDGE AND INFRASTRUCTURE

According to Munnich, Schrock and Cook, [17] knowledge is clustering geographically not only because it is complex nature, but also because it is embedded in individuals and it is difficult to be transferred across space, be it tacit or explicit. Thus, it is necessary for this knowledge to be obtained through actual interaction with the environment in a specific time and place [6] and have the people collaborate with one other.

Knowledge infrastructure, knowledge generation and protection, knowledge agglomeration and appropriation and innovative use of knowledge are the fundamental drivers for regional development [10]. Knowledge can deliver growing profits to scale and it can be used again with almost no marginal cost [3]. Cortright [3] mentioned that in order to achieve continuous growth, it is important to reach increasing knowledge, rather than increase of capital or labour. Although the new information technology has enabled world-wide transfer of explicit knowledge, the mobility of tacit knowledge – which is important source of regional development - is not easy and the present of face-to-face interaction is essential [16].

INFRASTRUCTURE & KNOWLEDGE BASED INFRASTRUCTURE

In order for the IZs to function and survive the possible challenges, it is essential that infrastructure and especially technology infrastructure exist in the region. Technology and innovation are two very close meanings. Consequently, technology infrastructure is a characteristic a region should demonstrate in order to host an IZ. George Tassey said: "The technology infrastructure consists of science, engineering and technological knowledge available to private industry. Such knowledge can be embodied in human, institutional or facility forms. More specifically, technology infrastructure includes generic technologies, infra-technologies, technical information and research, and test facilities as well as less technically-explicit areas including information relevant for strategic planning and market development, forums for joint industry government planning and collaboration, and assignment of intellectual property rights" [5]. Considering infrastructure as generic, multiuser and indivisible enabling activity can lead us to understand the existence of 'knowledge' infrastructure [5]. The infrastructure has great significance for the economics of a country, as

the industrial production is dependent on the knowledge transfer and utilization. Such knowledge can either be formal or tacit [5]. Thus, the presence of universities, research centres and any knowledge transfer or creation vehicle is necessary.

INNOVATION ZONES

When firms; highly skilled labour; and knowledge institutions (typically universities and research facilities) cluster together [14] can generate valuable assets to the involved enterprises and their customers. Also, they can produce strong networks inside this system, and lead the region in which they operate to high level of growth. This shows that interaction between universities, companies and research institutes can have a positive effect on a region, and the industries in this region can benefit from this. In that way, the regions can produce regional innovation systems in order to accumulate innovation activities and networking and exchange tacit knowledge [12]. Innovation Zone is a kind of agglomeration systems that is characterised by high level of interaction between its actors. Unfortunately, research on European and International level showed that there is no official and specific definition for the IZs. The definition of IZ varies according to the initiatives that are created in national and regional level. The definitions of IZ that are found are known as Keystone IZs (USA compilation) or Knowledge IZs (international compilation) [13]. An IZ is a geographical area that is located close to universities and hospitals and the enterprises that belong to the IZ will be given support, financial benefits and specialized supportive consulting services [13]. "It is a geographic defined area, with specific geographic borders leading to the formation of an island of land with entry and exit points. This land can also become unique and privileged and through the institution of a special legislative framework applicable only to the Zone area" [1]. The purpose of IZ is the fast transfer of the knowledge and ideas from the laboratories to the market, in order to introduce new opportunities for economic development and creation of new employment opportunities [13].
The stages that are followed in order to form an IZ and implement such ventures are the following:

- *Discussions and analysis of the competitive issues of this venture before the start of the project.*
- *Initiation of the venture by specialising the section of the different activities; the promotion of the venture through exhibitions and presentation of it to the interested parties.*
- *The implementation of this idea in order to attract more prospective interested parties*
- *The venture gets a more official & stable form*

The actors of the IZ are categorised in the main groups of Academic (universities), Businesses (Incubators, enterprises), Government (governmental organizations) and Research (Research Institutes). The idea of the IZ is a governmental initiative and most of the actors in the IZ receive financial benefits from governmental sources and enjoy special legislations that ease their economic and business activity in the IZ.
IZs such as those in New Jersey (IZ of Newark, Camden and Brunswick) or in Pennsylvania offer a variety of benefits for the people and the businesses that belong to the zones. The companies that are located in these zones can enjoy benefits such as opportunities that are highly related with partnerships and are coordinated by the state. Some examples are:

- *The provision of a funded incubator for small firms and start-ups that can enjoy a big number of services in a technology and business related environment.*
- *The zones enable the relationships between the universities and the high-tech businesses and the industry researchers have the opportunity to access university labs and the students can be placed in industrial labs.*
- *Provision of technical assistance to the start-up, and the collaborative research facilities provide strategic cooperation.*

Figure 1 Newark Innovation Zone

For example the Newark IZ is located in the centre of the city of Newark, which gives it the advantage of being very close to vital infrastructure. It is also close to commercial and industrial centres and it includes governmental, education and medical facilities.

There are some critical factors for success or failure of an IZ that are enlisted as follows:

- *Existence of one or more well defined economic activities*
- *Existence of infrastructure of knowledge creation and provision of technological services (Universities, research institutes, laboratories, etc)*
- *The research activity is oriented towards the technological development and diffusion*
- *Existence of entrepreneurship that is oriented towards specific sectors of interest of innovation*
- *Strong linkages and networks (common research, exchange of personnel, common patents, relationships between customer-supplier) among the different enterprises and between them, universities and institutes*
- *Existence of Media infrastructure*
- *Existence of entrepreneurial, innovative and collaborative culture in the enterprises, universities and institutes*
- *Existence of investment capital and innovative funding methods*
- *Commitment of the government and existence of a common vision and plan of the development of the venture [13].*

IZs are located in places with strategic location and essential infrastructure that plays a very important role in the development of the zones. Due to these assets that their locations have, the IZ can attract easier business activities and develop further their operation and consequently create job opportunities and sustain their population. According to location theory, the people and the firms prefer to live and work in places that are familiar with and where they have been born. Thus, IZs can maintain they population by keeping their residents in their cities. The location in which the IZ belongs plays an important role in the efficiency and effectiveness of the latter especially if this location contains the appropriate infrastructure and knowledge infrastructure to support agglomeration systems such as IZs.

IZs attract a large number of businesses and economic activities. These activities maintain their interactive nature by the innovative use of knowledge. In the zone that creation and transfer of tacit or explicit knowledge is essential for the growth and development of the involved parties in the zones. The agglomeration of the above mentioned phenomena creates a general positive effect. At this point it is essential to refer to the importance of the government's role in the development of the innovation zone lies mainly, on the need of financial support. Innovation zone is a large range project that needs a consistent financial commitment in order to sustain the support of new businesses and development of the zone. Finally, another important part of the government's role is the flexibility that it can perform in terms of legislations and taxes.

CONCLUSION

IZ is a geographical area that is located close to universities and hospitals and the enterprises that belong to the IZ will be given support, financial benefits and specialised supportive consulting services. "It is a geographic defined area, with specific geographic borders leading to the formation of an island of land with entry and exit points. This land can also become unique and privileged and through the institution of a special legislative framework applicable only to the Zone area". The purpose of IZ is the fast transfer of the knowledge and ideas from the laboratories to the market, in order to introduce new opportunities for economic development and creation of new employment opportunities.

IZs attract a large number of businesses and economic activities. These activities maintain their interactive nature by the innovative use of knowledge. In the zone that creation and transfer of tacit or explicit knowledge is essential for the growth and development of the involved parties in the zones. Based on the reviewed literature and the different regional development theories, IZs are in a position to deliver regional development by bringing together academics, businesses institutes and foster innovation and business creation. What helps them to develop and grow is not only the high level of collaboration, but also the appropriate regional infrastructure and knowledge infrastructure that is surrounding them and the privileged location in where the IZ

is situated, that plays an important role in the efficiency and effectiveness of the latter especially if this location.
Finally, considering that Innovation Zones are governmental incentives, the government's commitment to its legislative support and the consistent financial reinforcement to the zone is essential driver for development not only of the innovation zones but also for the whole region in which they belong.

FURTHER RESEARCH

Quantitative analyses of the innovation zones that could bring numerical results and statistics on the direct contribution of the zones to the development of the regions they belong could prove essential not only for the identification of the real involvement of the innovation zone in regional development but it might help in improving the performances of the innovation zones. For instance, the number of the businesses that the innovation zones create and at the same time the job opportunities that are generated in the zone can show how the innovation zones are involved in the reduction of the unemployment by presenting statistical data and make a comparison to previous years. Also, a continuous quantitative research the comparison of the performance of an innovation zone over the years will actually show that if the innovation zones can bring a sustainable growth to the regions they belong.

REFERENCES

[1.] ARZIMANOGLOU I. THESSALONIKI IZ: Work in Progress. Second International Conference on Entrepreneurship, Innovation & Regional Development. City College Thessaloniki 2009
[2.] COOK P. Strategies for Regional Innovation Systems: Learning Transfer and Applications. United Nations Industrial Development Organization 2003
[3.] CORTRIGHT J. New Growth Theory, Technology and Learning: a Practitioner's Guide. Reviews of Economic Development Literature and Practice 2001
[4.] DRUCKER P. Innovation and Entrepreneurship: Practice and Principles. Elsevier 2007
[5.] EDQUIST C. Systems of Innovation: Technologies, Institutions, and Organizations. Routledge 1997
[6.] FALLAH H, IBRAHIM S. Knowledge Spillover and Innovation in Technological Clusters. IAMOT 2004
[7.] FEINSON S. National Innovation Systems Overview and Country Cases. In Knowledge Flows and Knowledge Collectives: Understanding the Role of Science and Technology Policies in Development, Volume 1: Knowledge Flows, Innovation, and Learning in Developing Countries. CSPO. http://www.cspo.org/products/rocky/Rock-Vol1-1.PDF 2004
[8.] HIGGINS B, SAVOIE D. Regional Development Theories & Their Applications. Transaction Publishers 1997
[9.] HOOVER E. The Location of Economic Activity. McGraw-Hill New York. http://www.archive.org/details/locationofeconom029874mbp 1948
[10.] KARLSSON C, JOHANSSON B. Knowledge, Creativity and Regional Development. The Royal Institute of Technology 2008
[11.] KARLSSON C, JOHANSSON B, Stough R. Theories of Endogenous Regional Growth: Lesson for Regional Policies. Springer 2000
[12.] KOSCHATZKY K. Knowledge-based Regional Development – Governance Concepts at the Interface between Global Challenges and Regional Innovation Potentials. Systems of Innovation and Research 2004
[13.] Logotech Innovation & Development. Εκπόνηση Μελέτης Εξειδίκευσης της Δράσης για την Ζώνη Καινοτομίας στην Ανατολική Θεσσαλονίκη [Design of the Specialization Study for the Activity and Development of the IZ in the East Thessaloniki: report. Ministry of Development Special Service of Administration [Υπουργείο Ανάπτυξης Ειδική Υπηρεσία Διαχείρησης ΕΠΑΝ] 2005
[14.] LORENZEN M, MAHNKE V. MNC Entry in Regional Knowledge Clusters: Acquisition or Greenfield Investment? Scandinavian Journal of Management 2000
[15.] MASKELL P, LORENZEN M. The Clusters as Market Organization Danish Research Unit for Industrial Dynamics. DRUID 2003
[16.] MASKELL P, MALMBERG A. Localized Learning and Industrial Competitiveness. Camb. J. Econ 1999
[17.] MUNNICH LEE W, SCHROCK G, COOK K. Rural Knowledge Clusters: The Challenge of Rural Economic Prosperity. U.S. Department of Commerce Economic Development Administration 2002
[18.] SIMMIE J. Innovation and Urban Regions as National and International Nodes for the Transfer and Sharing of Knowledge. Regional Studies 2003; 610
[19.] THORNHILL S. Knowledge, Innovation and Firm Performance in High-and-Low Technology Regimes. Journal of Business Venturing 2006

AUTHORS & AFFILIATION

[1.] ELENI MIKROGLOU

[1.] INNOVATION AND BUSINESS CREATION (ENTREPRENEURSHIP), THESSALONIKI, GREECE

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

ALBENA ANTONOVA[1], ROUMEN NIKOLOV[2]

SUSTAINABLE INNOVATIONS AS SCENARIO FOR REGIONAL DEVELOPMENT

Abstract:
By 2012 the Earth population is expecting to reach 7 Bln people, and this number is expecting to grow to 9 Bln till 2050. Many recent reports discover the problems of resource scarcity and climate change. Some scenarios anticipate total resources extraction of around 200% of 1980 equivalent by 2020, necessary just to sustain the world-wide economic growth [10]. In order to cope with these challenges on global scale, people need to develop new social behavior and vision for production and consumption.
The present paper aims to overview some emerging innovative practices, leading to social, economic and ecologic development. Largely will be discussed the role of the regions, the concepts of Living labs, regional role for sustainable innovation processes. Finally there will be presented some examples and models, aiming to support and improve the innovation activity.

Keywords:
Living labs, Regional development, Sustainable Innovations

INTRODUCTION

Regions become increasingly important in the context of globalization. On one hand, regions represent specific ecological, economic and cultural environment, and on the other hand they propose unique combination of natural resources and human activity. Regions designate geographic area centered within a conglomerate of complex inter-dependent economic and cultural relationships. Regions are focal point in the innovation process, as they form natural geographic borders for transfer of tacit knowledge [1]. In a global multi-cultural and multi-ethnic world, where geographic distance has become obsolete because of intensive air-traffic and information flow, some authors [2] anticipate even bigger role for regions for developing flourishing research and innovations eco-system. Regions represent administrative, political, economic, natural and cultural centers that form local communities, physical places where people live, work and communicate. The present research investigates how regions can facilitate and promote the process of sustainable innovations.
Sustainability is extending the concept of ecology, including three main components - sustainable environment, sustainable society and sustainable economy [3]. Thus sustainability has to be understood as sound economic term, designating a path for long-term development. Finding appropriate models for further sustainability will provide long-term success and prosperity for next generations. According to recent projections, the dominating economic models can not match with present demographic growth. This means that in the next 40 years human will need the resources of another 5 planets as the Earth, in order to cope with resource scarcity and increased needs of the expected 9 billions people. Beside resource scarcity, some urgent issues as well are the increasing effect of climate changes on natural

and biological eco-systems. Sustainable innovations can propose a path for transformation of companies, consumers and regions to more stable and coherent models for long-term survival. So the present research proposes an overview of factors, leading to development and adoption of sustainable innovations and the role of the regions.

THEORETICAL BACKGROUND AND RESEARCH METHODOLOGY

Overview of concepts behind Sustainable innovations

One of the main problems with development of sustainable innovations is the lack of common understanding of the term [4]. Sustainable development is defined as political concept in Brundtland Report [5], describing it as "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs"(UN 1987). Sustainability goes beyond the ecological aspects and scarcity of natural resources, as it includes as well social and economic stability [6]. Another important term is the eco-innovation defined by [7], stating that eco-innovation is the "creation of novel and competitively priced goods, processes, systems, services and procedures designed to satisfy human needs and provide better quality of life for everyone, with a whole-life-cycle minimal use of natural resources (materials including energy and surface area) per unit output, and a minimal release of toxic substances". [3] Highlights that sustainable innovation is innovation aiming to generate benefits that are collective in terms of the environment, society and economy and reflecting a new out of the box approach often challenging traditional systems. [6] Claims that sustainable innovations is an umbrella term, designating ecologically sustainable development; participatory innovation (including customers, employees, users and the general public); continuous innovation (the ability to continuously regenerate and break boundaries); global innovation (innovation in global cooperation using knowledge distributed everywhere); innovative management (or management encouraging innovation in organizations and society).

Thus many scholars understand sustainable innovations as form of disruptive innovations, changing and threatening existing economic and social models. This explains why it is extremely difficult for companies and politicians to accept and work for this fundamental change, and why they often prefer to substitute it with eco-efficiency, dematerialization and ecology-friendly production [4]. [8] as well discusses the need for revolutionary change in the innovation system, emphasizing that the old dominant conceptual model for innovations is outdated and has to be replaced by a new one.

Vision for sustainable innovations should reflect the substantial change in individual behavior and in business models. Sustainable innovation is conceptual model of thinking, assessing individual and business choices for achievement of continuous systems and processes. The accent of sustainable innovation has to be put on the daily individual and business choices, leading to informed and responsible for the future decision making. Innovations should not be limited only to business initiatives, because individuals can adopt conceptual models for sustainable development being employees, experts, citizens, customers, parents, members of community, neighbors, etc. Thus sustainable innovation concern the people's way of thinking, living and working, and involve everybody and every decision made in professional or private life.

Research methodology

The present research aims to discuss the role of regions in the emerging sustainable innovations paradigm. In the centre of our debate is put the innovation process as general approach for coping with global challenges ahead and enabling achievement of sustainability in regional aspect. There will be discussed critical factors and challenges for sustainable innovations, discovering the role of regions as focal point of innovations, transforming from low-cost manufacturers to centres of value-creation, leading to increased well-being and quality of life.

MAIN FACTORS FOR SUSTAINABLE INNOVATIONS

Innovation paradigm

In order to discuss the regional role for the process of sustainable innovations, an overview is made on the main economic principles and challenges today. In [9] there are analyzed in details the state-of-the-art of the innovation landscape, including recent trends in company innovations, university and research

infrastructure development, demographic and social factors and emerging concepts and innovation paradigms.

Today innovations become part of the every day severe competition in a global scale. Adoption of new technologies, improved products and process functionalities, optimized production and cost-efficiency and improved supply-chain processes become factors for differentiation and often result in shorter product life-cycle and accelerate market dynamics. Innovations are among the key functions of any company. In the knowledge-based economy knowledge become main factor for competitive advantage. So innovations are the measure of new knowledge that company can implement in its products and services and can sell on the market. Thus innovations designate the end-goal of any knowledge-intensive activity.

However in a global plan there are more than 3 bln people living with less than 2 USD per day. On the other hand, developed countries increasingly will suffer from worsening demographic structure because of aging, meaning worse productivity, rising demand for public and health care services, and more pressure on social systems. EU is one of the larger importers of resources in a global scale. Thus competitive advantage of European countries has to be focused on improved resource use, providing more value with less products, exporting more intangible than tangible products and services.

To be or to have

The concept of sustainable innovations relies on the philosophy of Eric Fromm "To be or to have". While the economic growth following development of new technologies and fast globalization is due on the fact that more people "have" more products and services, sustainable innovations put the focus on the first part - "to be". The main question for companies should not be centered on how to use the concept of sustainability, eco-innovations and eco-efficiency to sell more, but how to increase the value of limited resources. Increasing knowledge and services within products and using wiser resources means delivering more value for customers and allowing customers to spend wiser resources on their turn. Globally natural resources - oil, minerals, metals, fresh water and others, are expected to become more and more difficult to obtain [10] provide deep analyzes] and this will increase its prices. However, the factors of sustainability are strongly interrelated and can not be examined or anticipated in isolation, focusing only on resource scarcity, climate change and demographics change. One example of this complex eco-system is the recent food crises of 2007-2008, that led to sharp price increase of basic foods and caused political and economical instability and social unrest in both poor and developed nations (Wikipedia). The average world prices for rice rose by 217%, wheat by 136%, maize by 125% and soybeans by 107%. There were identified several groups of factors as climate change - bad weather conditions in main producing regions and natural disasters due to increased ozone effect. However, this crisis situation was severely fuelled by economic factors - as increased demand and production of biofuels, increased consumption in Asia, redistribution of working land, and change in agriculture prices subsidies in developed nations. Finally the prices were influenced as well by large market speculations for commodities on the global stock exchanges, mass declining world food stockpiles and historically imposed trade quotas on countries as Japan, prohibiting it to sell rice on the world market. The complexity of the factors and relationships and its direct influence on the global economy can not be easily forecasted and anticipated. The global financial crisis afterward (2008-2009) was another challenge to the world economy and the recovery is not yet stable.

Rising role of regional knowledge eco-systems

The raising importance of regions for speeding-up innovations and knowledge transfer is largely discussed in literature. The focus on regional knowledge ecosystem framework is due on increased dynamics of interactions within region, including emerging networks and tacit knowledge flows. Holistic approach of the regional innovation ecosystem, represent one coherent understanding and sustainable management of knowledge processes and not just providing tools and services. Recently, it has been recognized that innovations are localized. Innovations are result of ongoing and prolonged collaboration and interaction between firms and a variety of actors around them within what has

been termed regional innovation systems [11]. This is due on the fact that non-codified, tacit knowledge transfer which play increasingly role in the innovation process largely depends from face-to-face contacts and frequency of interaction among individuals. So geographic distribution explains knowledge production and innovation, but still remain unclear how knowledge spillover matter on the formation of clusters and agglomerations [12]. The regional knowledge ecosystem can foster not only regional balance, but can adopt effective mechanisms to bring local innovations on a global scale. Regions are in the best position to promote new culture and perceptions of sustainable innovation among citizens and local business. Local community is a micro-reflection of the global world - this is what we see daily around us, and this is what makes sense to us. Local authorities can better promote sustainable innovation as it can better assess and evaluate resources, it can better understand citizens, local business, local research institutions and universities, mechanisms of transfer of goods and knowledge inside and outside region.

CHALLENGES FOR SUSTAINABLE INNOVATIONS - PERSPECTIVES FOR REGIONS

Role and place of regions to support sustainable innovations

Sustainable innovation should be adopted and promoted as public policy, because this new approach fundamentally oppose on the market logic for company development. Instead of producing and selling more new products and gaining bigger market share, companies have to fundamentally change their focus - to produce less material products, to improve production processes, to improve efficiency of resource use, to improve quality and life-cycle of products and services, to limit resources waste. Presently the price is the main base for competition. Thus in order to change the concepts of resource extraction and use, companies will need additional support to redefine production processes, business models and value-creation mechanisms.

Discussing the emerging role of regions, there can be identified the following initiatives and approaches, promoting the concepts of sustainable innovations among companies, citizens, customers and end-users.

- *Raise public awareness for sustainable innovation in the framework of local development. Regions can promote companies and provide local examples and practices for adoption of sustainable policy. Attention should be paid on private companies, but as well on public institutions, producing and selling high-quality products with extended life-cycle, improving service for clients and after-sale policy, developing innovative approaches for limiting resource use and promoting resource efficiency.*
- *Evaluate sustainable eco-systems. Sustainable innovations stays for innovations, oriented toward ecological balance, better exploitation of resources, better responding on users needs, exploitation of global knowledge. Sustainable innovations can be defined as managerial approach rather then scientific as it stays not for better technologies, but for better managerial practices to incorporate more value in products. Thus innovative business models become increasingly important for any business and for any customer, designating what the offer is and the value for money. Innovative business models can create new sources of competition, changing the model of value creation.*
- *Changing social models. Contrary on any marketing campaign, in the framework of sustainable innovations, people have to learn to consume less, to taking care for products and resource longer and more efficient use and thinking about any practices and approaches enabling better sustainability in long-term.*

OECD has identified several approaches to motivate industry to apply sustainable methods [13]. One factor will be the increased demand for green and fair products, which is function of social demand - through increased education and public awareness campaigns. Another incentive is better information for customers, including communicating low-impact product use, explaining how to reduce the use-phase impact on what customers purchase, decrease energy use, requiring labeling standards and information about resource consumption and energy efficiency status and others. Innovative after-sale services will allow prolonging product life, durability of products and services, and development of take-back regional policy. Regions can foster companies to implement product and service innovations and service-oriented business models, emphasisng the fact

that the value-adding process highly involves customer services. Leadership for social change and socially responsible business have to be reinforced and highly estimated in the society.

Table 1 Regional role for promoting sustainable innovations

Challenge	Regional Incentives
Creating demand for green and fair products	Raise regional awareness and knowledge about sustainability and foster demand for green and sustainable products
Communicating for low impact product use	Foster companies to improve information about products extended and efficient use.
Innovative after-sale services	Promote product quality, business models and after-sale support, increasing product life;
Product and service innovations	Improve quality of products and services provided in community
Service-oriented business models	Increase value for clients while providing additional services.
Leadership for social change and socially responsible business	Promote local leaders; raise social recognition for adopting sustainable innovations.

Regional support for sustainable innovations within main business processes

- *Innovation process - Regions can foster intensive knowledge transfer processes, fostering cooperation and public initiatives for local eco-system, involving internal and external experts in networks. The role of regions can be to enhance companies and to involve customers, end-clients, experts and administration, in order to increase value for money, proposed in the community. Working with companies, regions can raise questions for longer product life-cycle, improved quality, after-sale service and pay-back policy. Living labs and open innovation framework propose new model for cooperation. Matching supply and demand improve planning, production, storage and logistics and increase productivity and efficiency.*
- *Production process - Companies increasingly focus to outsource standard production processes and to specialize in specific tasks. However, many examples prove that sustainable innovations and expert knowledge, applied in the production process can enable companies to discover many new sources for cost optimization, eco-efficiency and increasing value. Regional support can facilitate companies to improve production processes in a whole, supporting explicitly better quality products, resource efficiency, use of efficient working practices as tele-work, mobile and flexible work, minimizing rented physical spaces, minimizing transport costs. Regions can describe specific business models appropriate for local context.*
- *Distribution process - Logistics process is extremely severe problem because of the traffic, oil-dependences and metal use. Thus optimized distribution processes in the region can enable regions to increase safety, to optimize road use, to optimize distribution of products. Shortening production and distribution cycle will mean shorten needs for working capital. Adopting regional supply chains and transportation chains, optimizing packaging, decreasing waste and damages in the logistic process can contribute to local sustainability.*
- *Sales - Regions have to raise awareness and motivate users to understand sustainable innovations paradigm - using wiser resources, calculating overall resources consumption, obtaining better value and well being limiting its consumption.*
- *After-sale process - Regions have to develop explicit procedures and mechanisms to help users and companies to recycle and buy-back products and resources; Thus companies have to keep closer contacts and relationships with customers.*

Some practices of sustainable innovations

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" [14].

Benefits of LL can be discussed from various perspectives. Users, citizens and members of the community can be empowered to influence the development of services and products which serve their real needs, and thus jointly contribute to savings and improved processes through active participation in the R&D and innovation lifecycle. SMEs and micro-entrepreneurs can act as providers, developing, validating and integrating new ideas and rapidly scaling-up

local services and products to other markets. Larger company can improve the innovation process, by partnering with other companies and end-users. Researchers, economy and society gain stimulating business-citizens government partnerships and improved technology innovation ecosystems; integrating technological and social innovation in an innovative 'beta culture'; increasing returns on investments in R&D and innovation. Living labs contribute to the reduction of market risk [15].The authors studied in details 4 cases in LL and summarized that LL reduced uncertainty and risk on personal and team level, increase entrepreneurial role, create experimentation arena and finally develop initial demand.
Several examples for sustainable innovations are provided by [16] describing the models how different companies and institutions can promote regional sustainable innovation eco-system. Wal-Mart requires for example from its suppliers to respond on specific environment standards, and thus raise awareness and directly support regional sustainability. Triodos Bank has raised attention on the sustainability niche, focused to finance only companies and projects, delivering social or environmental benefits. Further, authors propose the metaphor of "Bikini model", designating the trend to "sell less but make more". This is the model of DuPont, changing the focus of sale - from selling final material goods, often customers prefer getting specific service. This can enable companies to optimize production processes, delivering more value for products, saving resources, improving waste etc. Another example is the model of dematerialization, describing development and transfer of digital resources, creating more value with less resource as model of Apple Ipod and Amazon reader.

CONCLUSION

The present research focuses on regional role for emerging complex knowledge eco-system, enabling knowledge transfer and flow of information. Regions have to increasingly promote sustainability among it citizens and companies as companies can not alone promote sustainable innovations. Regions are in the best position to foster local processes, because they can increase information for sustainable innovation on different levels, involving everybody in the process. Regions can successfully influence knowledge flows, networking and cooperation in practices and forms of Living labs and other examples, raising awareness and better motivating and public recognizing efforts for attaining long-term sustainability. Further research can give more references for emerging business models, fostering sustainability on local level.

REFERENCES

[1.] AUDRETSCH, D., & FELDMAN, M. (2003). Knowledge Spillovers and the Geography of Innovation. In Handbook of Urban and Regional Economics (p. Volume 4).
[2.] TOWNSEND, A., SOOJUNG, A., PANG, K., & WEDDLE, R. (2009). Future Knowledge Ecosystems,The Next Twenty Years of Technology-Led Economic Development. IFTF Report.
[3.] MAXWELL D., SHEATE W., VAN DER VORST R., (2003) Sustainable Innovation in Product and Service Development, Conference proceedings, Toward sustainable product design, Sweden, 2003
[4.] CHARTER M., 2004, Sustainable Innovations, Conference proceedings, BCSD Taiwan, September 2004.
[5.] UN (1987) Our Common Future, Report of the World commission on environment and development. Retrieved January 2009, from http://www.un-documents.net/wced-ocf.htm
[6.] HARMAAKORPI, V. (2009). Sustainable innovation - what is it? Baltic Rim Economies .
[7.] REID, A., & MIEDZINSKI, M. (2008). Eco-Innovation, Final report for sectoral innovation watch. www.technolopolis-group.com
[8.] ARVIDSSON, N., & MANNERVIK, U. (2009). The Innovation Platform - Enabling balance between growth and renewal. VINNOVA.
[9.] ANTONOVA A., NIKOLOV R., 2010, Sustainable innovation process in micro-perspective, in the proceeding of KMO 2010, accepted for publication May 2010
[10.] BLEISCHWITZ, R., GILJUM, S., KUHNDT, M., & SCHMIDT-BLEEK, F. (2009). Eco-innovation- Putting the EU on the path to a resource and energy efficient economy. Wupertal
[11.] ANDERSSON, M., & KARLSSON, C. (2004). Regional Innovation Systems in Small Medium-Sized Regions. In Johansson, Karlsson, & Stough, The Emerging Digital Economy: Entrepreneurship,Clusters and Policy. Berlin: Springer-Verlag
[12.] AUDRETSCH, D.,FELDMAN, M. (2003). Knowledge Spillovers and the Geography of Innovation. In Handbook of Urban and Regional Economics (p. Volume 4)
[13.] ROSTED, J., KJELDSEN, C., BISGAARD, T., & NAPIER, G. (2009). New nature of innovation. Copenhagen: OECD
[14.] FOELSTAD, A. (2008). Towards a Living Lab For Development of Online Community Services. Electronic Journal of Virtual Organisations 10 , 47-58
[15.] ALMIRALL, E., & WAREHAM, J. (2009). Contributions of Living Labs in reducing market based risk
[16.] OSGOOD D., 2009, Sustainable Business Models: Time for Innovation, in BSR Insight: November 3, 2009

AUTHORS & AFFILIATION

ALBENA ANTONOVA[1],
ROUMEN NIKOLOV[2]

[1]FACULTY OF ECONOMICS AND BUSINESS ADMINISTRATION, SOFIA UNIVERSITY, BULGARIA,
[2]SVUBIT, BULGARIA

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

[1.] CRISTINA FERNANDES, [2.] JOÃO J. FERREIRA

KNOWLEDGE INTENSIVE BUSINESS SERVICES: WHAT ARE THEY AND WHERE ARE LOCATED? SOME PORTUGUESE EVIDENCES

Abstract:
The importance of knowledge and innovation in modern economies justifies the increase interest by researchers in Knowledge Intensive Business Service (KIBS).
The role played by innovation KIBS is stated above all because of not having a single performance in innovative activity, as would be to simply meet the wishes of demand and more specifically to the wishes of its customers, but by creating knowledge bridges or innovation bridges between business and science. We aim to identify the nature of KIBS in Portugal based on dichotomy rural KIBS (r-KiBS) and urban KIBS (u-KiBS), and the typology professionals KIBS (p-KiBS) and technology KIBS (t-KiBS).

Keywords:
Intensive Knowledge; KIBS; location theories; Rural and Urban regions

INTRODUCTION

Despite growing awareness that innovation is not confined to sheer technical processes and products, some recent research on innovative activities has focused its attention only on technical innovation and, in particular, on the transforming industries sector (eg. [1],[2], [3], [4]). The importance of the services industry has only been acknowledged recently (eg. [5]; [6]). According to Tether et al. [7] innovation in the service industry companies is perceived as something that occurs very slowly. Services are perceived as being incapable of innovation, ending up adopting innovation generated by transforming industry firms. Alongside Tether et al. [8], Pavitt [9] also believes that smaller services firms are less likely to develop R&D roles, thus becoming recipients of technology and innovation produced in other sectors. Within the services industries, the rapid growth of Knowledge Intensive Business Service (KIBS) has exposed their major role in innovation processes (eg. [10], [11], [12], [13]). The role played by KIBS in innovation process is affirmed, above else, by the fact that they do not have a simple performing role in the innovating activity, such as meeting demand and, more specifically, their clients' wishes. Rather, they act as builders of "knowledge bridges", or "innovation bridges", between firms and science ([14],[15]). Nevertheless, few studies have been made on the innovative activity carried out by this sector of services (eg. [16]). In the opinion of Howells ([17]), the fact that very few studies on innovation in the sector of services exist lies, basically, in the fact that this sector in particular is very heterogeneous in its origin, which disheartens many researchers. However, and according to Howells ([18]) there has been a constant rise in the number of firms operating in the sector of services. Particularly with regard small KIBS, their place as dynamic and core players in the "new" knowledge-based economies has been acknowledged. This

position has been achieved thanks to their innovative creations, in their own benefit, which means that they have ceased to be perceived as mere adopters or users of new technologies developed by others. This recognition has fostered recent research on this sector of services – KIBS ([19]). Furthermore, some KIBS are strongly technology-oriented, while others are much more concerned with knowledge of administrative and regulatory affairs. In this sense, this research aims to fill the gap in the literature concerning to nature of KIBS and their location. For these reasons, we decided to carry out a study about what are KIBS and where they are located in Portugal based on dichotomy rural KIBS (r-KIBS) and urban KIBS (u-KIBS) and professional KIBS (p-KIBS) and technology KIBS (t-KIBS).

The paper is structured as follows: next to this introduction, comes a theoretical framework of the characteristics, nature, and location of KIBS. In the third section, a brief characterization of KIBS distribution of KIBS in Portugal are developed, and the research conceptual model are proposed. In the end, the final considerations and future lines of research are addressed.

FRAMEWORK OF KIBS: CHARACTERISTICS, NATURE, AND LOCATION

Although the debate on the growth of KIBS swirls around their new specializations and the rise of the tertiary sector in general, it is becoming increasingly obvious that both the new manufacturing processes and the new services and innovations in general find their origin more and more on KIBS ([20]; [21]). Miles et al. ([22]) distinguish three fundamental characteristics in KIBS: (i) these firms pay a lot of attention to professional knowledge; (ii) these firms wish to be, in their own right, primary information and knowledge resources, or use their knowledge to produce services that act as intermediaries between themselves, clients and their production processes; (iii) the services that KIBS offer firms are extremely important to the latter, in terms of competition and competitiveness. Frell ([23]) concluded that technological KIBS[1] employ higher qualified people, and that this relates to their level of innovation. In the case of professional KIBS, the author noticed that the relationship between them, suppliers and clients fosters innovation. As for the transforming industries, as it is not in their interest to invest in R&D, their level of innovation is extremely low ([24]). According to Amara et al. ([25]), KIBS arise out of knowledge-based services. In this type of industry, transactions take place at the level of knowledge, and outputs are often intangible. In most cases, innovations are the product of new knowledge combinations, instead of new combinations of physical artifacts.

Distinct authors have mentioned the role of KIBS in regional innovation systems, especially as support activities in the transforming industries and SMEs in general ([26]; [27]). Some progress has been made regarding recognizing services, including KIBS, as contributors to the increase in technology and innovation ([28]; [29]; [30]; [31]). According to Miles ([32]), nowadays KIBS are acknowledged as playing a key role as intermediaries in the innovation of systems. The relationship of KIBS with firms from different sectors has a visible positive influence on the latter ([33]). According to this author, this relationship increases resorting to R&D, enhances the performance of staff, and encourages cooperation relationships, thus increasing the ratio of innovation. In the viewpoint of Sheamur and Doloreaux ([34]), there are two perspectives that indicate how KIBS contribute towards regional development: (i) the way KIBS interact with other local players with the aim of producing innovation and subsequent regional development. Thus, this first perspective suggests that KIBS should be involved in the development of regions as long as synergy effects occur in the very same regions; (ii) on the other hand, KIBS may be involved in regional development, but instead of being in the regions, they may be located elsewhere in the country, and so be involved at a distance. From the two perspectives supported by Sheamur and Doloreaux ([35]), we are inevitably led to the question of location of KIBS. The location of these firms and their contribution to local economies have been analysed by several researchers ([36]; [37]; [38]). Their localization in the urban system, their sensitivity to the economies' general agglomeration ([39]; [40]; [41]) and their tendency to set up around spatial clusters ([42];

[1] The difference between technological and professional KIBS will be explained in methodology section.

[43]), have been documented through several tools and methodologies. A large part of these studies has been motivated by interest in researching the dynamics of local economies, regional development and the reason why some regions grow faster and more than others ([44]). According to Malecki, et al. ([45]), KIBS are essentially located in cities, as the latter are the optimum places for corporate innovation, as well as for networks leading to innovation. Sheamur and Doloreaux ([46]) present a distinct viewpoint, based on their study in Canada, whereby the sample was selected from Censuses carried out in 1991 and 2001. They selected KIBS from 152 urban agglomerations and KIBS from 230 rural areas. The authors then noticed that in the beginning of the 1990s, this service providing companies were, in their large majority, based in urban areas. The information yielded by the 2001 Census indicated, however, that these firms had moved out of cities into rural areas, thus leading to a drop in the KIBS sectors in urban agglomerations.

THEORETICAL APPROACHES ON FIRM LOCATION

According to Capello ([47]) there are two groups of theories (which she refers to as regional economics) that look into the issue of economic logic, which intends to explain the location of firms or, in other words, the existence of areas that are more developed than others: (i) Location theories: economic mechanisms that cause the distribution of activities in space; (ii) Growth and regional development theories: they focus on spatial aspects of economic growth and on territorial distribution of income. On the other hand, Hayter ([48]) set off to analyse the location of economic activity through three distinct approaches: (i) the neoclassical, which focuses mostly on the location theory and centres its analysis on profit maximization strategies and minimization of costs (transportation costs, human resources costs and external economies); (ii) institutional, which states that it is important to consider not just the firm's search for an appropriate location but also the institutional milieu it is part of (clients, suppliers, commercial associations, regional systems, the government and other companies); and (iii) behavioural, which focuses on situations of uncertainty and lack of information. Galbraith ([49]) studied 98 entrepreneurs of high technology firms in Orange County, California (USA). He concluded that high-technology firms, in their location decision process operate within a framework of factors that are different from those observed in traditional industries. These conclusions are similarly shared by Arauzo and Viladecans ([50]) in their study on the level of spatial concentration of new firms (in the period 1992-1996) in the municipalities of Spanish urban areas. In fact, smaller cities appear to be preferred for the location of technology-based firms, as they offer a quieter environment, better quality of life and become highly advantaged by the presence of qualified individuals working in these industries. Felsenstein ([51]) based on a study on a sample of 160 firms, both in urban and non-urban areas in Tel Aviv (Israel), he analysed the trend of high–technology firms to choose urban areas as a location. The author concluded that the location of firms does not follow a strategy or a calculation; in other words, it is not a founded decision. In turn, Ferreira, et al([52]) identified three types of approach on the location of technology-based firms (behavioural, neoclassic and institutional) and argue that the rurality constitutes no obstacle to the location of firms.Based on review literature our conceptual model is the following (figure 1).

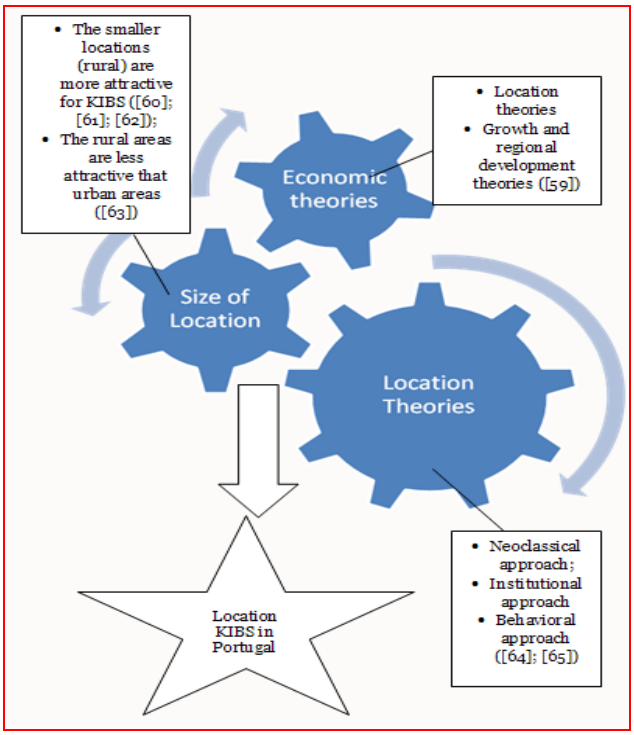


Figure 1: Conceptual Model

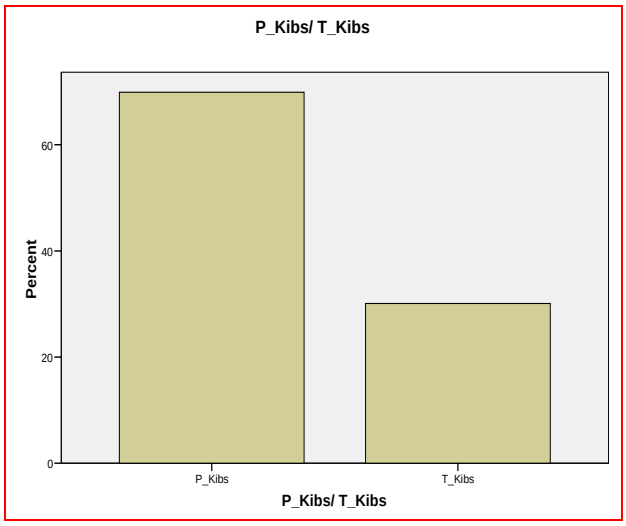
METHODOLOGY

KIBS were identified through use of database provided by COFACE Group integrating the total number of KIBS in Portugal created up to 2008 (latest year with available data). The extraction of the database was made from the turnover of the firms, i.e., only found that firms experiencing turnover exceeding € 0.01. These firms were selected for their CAE (Rev.3) codes and NACE (Rev. 2), as others researchers have mentioned already addressed. KIBS location was based on different theories of location and dichotomy rural KIBS (r-KiBS) and urban KIBS (u-KiBS), and typology of professionals KIBS (p-KiBS) and technology KIBS (t-KiBS) ([53], [54]; [55], [56]). The criteria that distinguish the rural and urban regions are not unanimous. Whether we seek a universal concept, with its boundaries of rurality, we cannot find. We will use the Kayser ([57]) criteria to distinguish the rural and urban regions. This author has used the resident population, which considered all rural areas with less than 5000 inhabitants, and all urban areas with people living above this value.

Table 1: KIBS distribution

*P_Kibs/ T_Kibs * Urban/Rural Crosstabulation*

			Urban/Rural		Total
			Rural	Urban	
KIBS	P_Kibs	Count	72	27371	27443
		% of Total	0,2%	69,7%	69,9%
	T_Kibs	Count	41	11770	11811
		% of Total	0,1%	30,0%	30,1%
Total		Count	113	39141	39254
		% of Total	0,3%	99,7%	100,0%



Graph 1: Number of P_KIBS and T_KIBS

We can state that in Portugal, from 39,254 KIBS, only 113 are located in rural areas which 72 are p-KIBS (table 1). Based on these data we can also evidenced that 69,9% of KIBS are p-KIBS and only 30,1% are t-KIBS. In terms of rural versus urban is the most part of KIBS is located in urban areas (99,7%).

So, there is a greater incidence of professional KIBS in Portugal (graph 1).

FINAL CONSIDERATIONS

In the present research, we aimed to focus on two theoretical topics, which, due to their complexity, have gained increased importance. We started by referring to the growing interest on the study of KIBS, due to their influence on innovation and regional development. Subsequently, we referred about location theories that help us to explain how and why some types of firms are located in a specific place. Through a brief descriptive analysis we found out that there are, in Portugal, more professional than technological KIBS as well as its location is more characteristic of urban than rural areas.

The main limitation of our study is precisely the failure to apply our model empirically and the absence of statistical multivariate analysis in order to evidence the influence of the nature of KIBS in regions innovation. Therefore we propose in future studies to analyze these type relationships and to study the evolution and transformation that occurred in Portugal in relation to KIBS location in the last 5 years. These are issues that we have in mind and already in course.

REFERENCES

[1.] *Becker, W. and Dietz, J." R&D Cooperation and Innovation Activities of Firms – Evidence for the German IPO Data". Economics of Innovation and New Technology, 2004, 15(1), 71-81.*

[2.] *Huergo, E. and Jaumendreu, J.. How does probability of innovation change with firm age? Small Business Economics, 2004 22 (3): 193-207.*

[3.] *Lynskey, M. J. Determinants of innovative activity in japanese technology-based start-up firms. International Small Business Journal, 2004 22 (2): 159-196.*

[4.] *Nieto, M. J. and Santamaria, L.Novelty of product innovation: the role of different networks. Business Economics Series. Universidad Carlos III de Madrid. Working Papers #05-65. November 2005.*

[5.] *Gallouj, F. Innovation in the Service Economy, Edward Elgar, Cheltenham. 2002*

[6.] *Tether, B. S. The Sources and Aims of Innovation in services: variety between and*

within sectors. Economics of Innovation and new technology. 2003 12 (6): 481-505.

[7.] *Tether, B., Hipp, C. and Miles, L. Standardisation and particularisation in services: evidence from Germany, Research Policy, 2001 30: 1115 – 1138.*

[8.] *Op. cit. Ref. 7.*

[9.] *Pavitt, K.: Sectoral patterns of technological change: towards a taxonomy and a theory, Research Policy, 1984, 13: 343-373.*

[10.] *Muller, E., and Zenker, A. Business services as actors of knowledge transformation: The role of KIBS in regional and national innovation systems. Research Policy, 2001, 30: 1501–16.*

[11.] *Howells, J.R.L. and Tether, B.S. Innovation in Services: Issues at Stake and Trends. Bussels, Luxembourg: European Commission 2004*

[12.] *Toivonen, M. Expertise as Business: Long-Term Development and Future Prospectives of Knowledge Intensive Business Services (KIBS). Doctoral Dissertation Series 2004/2, Helsinki University of Technology, Department of Industrial Engineering and Mannagement.2004*

[13.] *Koch, A. and Stahlecker, T. Regional Innovation Systems and Foundtion of Knowledge Intensive Business Services. European Planning Studies, 2006 14 (2): 123-146.*

[14.] *Miles, I. Kastrinon, N. Flanagan, K. Bilderbeek, R. den Hertog, P., Huntink, W. and Bouman, M.. Knowledge intensive Business services. Users and sources of Innovation. Brussels: European Comission 1995*

[15.] *Czarnitzki, D. and Spielkamp, A. Business Services in German: Bridges for innovation. The services industries journal , 2003, 23 (2): 1-30.*

[16.] *Koch, A. and Strotmann, H. The impact of functional integration and spatial proximity on the post-entry performances of Knowledge Intensive Business Service Firms. International Small Business Journal, 2008, 24 (6), 610-634.*

[17.] *Howells, J. "Innovation and Services: New Conceptual Frameworks", CRIC Discussion Paper 38 (Manchester: University of Manchester, 2000*

[18.] *Op. cit. Ref. 17.*

[19.] *Wong, P. K. e He, Z. L.: A comparative study of innovative behaviour in Singapore's KIBS e manufacturing firms, Services Industries Journal, 2005, 25: 23-42.*

[20.] *KaraÃmerlioglu, D. K. and Carisson, B. Manufacturing in decline? A matter of definition, Economy, Innovation, New Technology, 1999, 8: 175-196.*

[21.] *Tomlinson, M. and Milles, L. The Career Trajectories of Knowledge Workers (Paris: OCDE Workshop on S&T Labour Markets),1999 Available at http://www.oecd.Org./dataoecd/35/9/2101026.pdf.*

[22.] *Freel, M. "Patterns of Technological Innovation in Knowledge-Intenive Business Services". Industry and Innovation, 2006, 13 (3): 335-358.*

[23.] *Op. cit. Ref. 23.*

[24.] *Amara, N., Landry, R. e Traoré, N. "Managing the protection of innovations in knowledge intensive business services". Research Policy 2008, 37 pp. 1530-1547.*

[25.] *Cooke, P. "Strategies for Regional Innovation Systems", Policy paper, Vienna, United Nations Industrial Development Organization (UNIDO), 2001.*

[26.] *Wood, P. "A service-informed approach to regional innovation—Or adaptation?" Service Industries Journal 25: 429–45. 2005*

[27.] *Den Hertog, P. 'Knowledge intensive business services as co-producers of innovation', International Journal of Innovation Management, 2000, 4: 491-528*

[28.] *Haukness, J. 'Dynamic innovation systems: what is the role of services?', in Services and the Knowledge-based Economy, eds. M. Boden & I. Miles, Continuum, London, 2000*

[29.] *Op. cit. Ref. 10.*

[30.] *Gallouj, F. Innovation in the Service Economy, Edward Elgar, Cheltenham. 2002*

[31.] *Miles, I. Services Innovation: a Reconfiguration of Innovation Studies , PREST Discussion Paper Series, no. 01-05, University of Manchester, 2001*

[32.] *Op. cit. Ref. 23.*

[33.] *Shearmur, R. and Doloreux, D. Urban Hierarchy or Local Buzz? High-Order Producer Service and (or) Knowledge-Intensive Business Service Location in Canada, 1991-2001, The Professional Geographer, 2008 60 (3): 333 — 355*

[34.] *Op. cit. Ref. 34.*

[35.] *hUallach´ain, B., and N. Reid. The location and growth of business and professional service in American metropolitan areas, 1976–1986. Annals of the Association of American Geographers 1991, 81: 254–70.*

[36.] *Coffey, W., and Shearmur, R. "The growth and location of high-order services in the Canadian urban system, 1971–1991". The Professional Geographer 1997, 49:404-18. MacPerson.*

[37.] *Gong, H. "A hierarchical change model of business and professional services in the United States". Urban Geography 2001, 22:340–59.*

[38.] *Eberts, D, and J. Randall. "Producer services, labor market segmentation and peripheral regions: The case of Saskatchewan. Growth & Change1998, 29: 401–22.*

[39.] *Poehling, R. Locating producer services in the rural South of the US: The case of Alabama, Florida and Georgia. Paper presented at the*

Meetings of the North American Regional Science Association, Montreal, Canada, 1999.
[40.] *Wernerheim,M., and C. Sharpe. "High-order" producer services in metropolitan Canada: How footloose are they? Regional Studies 2003, 37:469–90.*
[41.] *Coe, N. "Exploring uneven development in producer service sectors: Detailed evidence from the computer service industry in Britain". Environment & Planning 1998, A 30:2041–68.*
[42.] *Keeble, D. and L. Nachum. Why do business service firms cluster? Small consultancies, clustering and decentralization in London and southern England. Transactions of the Institute of British Geographers NS27:67–90, 2002*
[43.] *Moyart, L. The role of producer services in regional development: What opportunities for medium-sized cities in Belgium? Services Industry Journal 25:213–28, 2005*
[44.] *Malecki, E., Nijkamp, P. And Stough, R: Entrepreneurship and space in the network age (Special issue editorial). Entrepreneurship and Regional Development, 2004, 16: 1–3.*
[45.] *Op. cit. Ref. 34.*
[46.] *Capello, R. Regional Economics. New York: Routledge advantage texts in economics and finance, 2007.*
[47.] *Hayter, R. The dynamics of industrial location: the factory, the firm and the production system. New York: Wiley, 1997*
[48.] *Galbraith, C. S. "High – Technology location and development: the case of Orange Country". California Management Review, 1985, 28 (1): 98 – 109.*
[49.] *Arauzo, J. M. and Viladecans, E. "Industrial Location at the Intra-Metropolitan Level: A Negative Binomial Approach". Estudos de Ecnomia Espanhola, 224, FEDEA, 2006*
[50.] *Felsenstein, D. "High – Technology firms and the metropolitan locational choice in Israel; A look at the determinants". Geografiska Annaler Series B, Human Geography, 1996, 78 (1): 43-58.*
[51.] *Ferreira, J.; Marques, C.; Fernandes, C: "Contribution of location theories for Regional Development: an empirical study applied to technology-based firms". International Conference on Entrepreneurship, Innovation and Regional Development, April 24-25, 2009, Thessaloniki, Grecia.*
[52.] *Op. cit. Ref. 23.*
[53.] *Op. cit. Ref. 14*
[54.] *Doloreux D, Muller E: The key dimensions of knowledge-intensive business services (KIBS) analysis. A decade of evolution, Working Paper Firms and Regions No. U1/2007, Fraunhofer-Institut für System-und Innovationsforschung-ISI, Karlsruhe, 2007*
[55.] *Op. cit. Ref. 34*
[56.] *Kayser, B. La Renaissance Rurale, Sociologie des Campagnes du Monde Occidental (Paris: Édition Armand Colin), 1990.*
[57.] *Op. cit. Ref. 48*
[58.] *Op. cit. Ref. 50*
[59.] *Op. cit. Ref. 51*
[60.] *Op. cit. Ref. 53*
[61.] *Op. cit. Ref. 52*
[62.] *Op. cit. Ref. 49*
[63.] *Op. cit. Ref. 53*

AUTHORS & AFFILIATION

[1.] CRISTINA FERNANDES,
[2.] JOÃO J. FERREIRA

1 UBI, ESTRADA DO SINEIRO, 1,COVILHÃ, PORTUGAL,
2 UBI AND NECE- RESEARCH UNIT, ESTRADA DO SINEIRO, 1,COVILHÃ, PORTUGAL,

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

[1.] LJUPCO DAVCEV

HIDDEN SOCKS FROM THE ECONOMIC CRISIS IN MACEDONIA DURING 2010

Abstract:
Macedonian managers are scared that the crisis will continue in 2010, giving new and much stronger economic socks. Most of them will be price oriented, coming from outside. People from the government are scared too, but they do not like to admit it. From one side this is good because they are the last which should show pessimism. They should be optimists because only then they will canalize and direct the economics ahead, which means that they will do all the necessary steps to help the real sector. But if this optimism is not real, than is not serious and detrimental. It is not allowing them to accept the fact that the economic crisis in Macedonia is not finished yet. Some numbers are predicting more complex period with higher budget deficit, lower consumption, bigger unemployment rate and significantly higher trade deficit. The beginning of 2010 is showing that company's profitability will be significantly low. It is obvious that the government anti-crisis actions do not gave the necessary results and there is an immediate need for completely new steps. There are some steps that immediately should be taken for better business climate in Macedonia. They should be oriented toward improvement of the company's liquidity and promoting investment activities with the same conditions for the domestic and international entities.

Keywords:
anti-crisis actions, business climate, company's liquidity, economic trends, investment activity

INTRODUCTION

With very pessimistic thoughts the managers in Macedonia finished 2009. Very sincerely they admit that are scared from the situation and that the crisis will continue and will be even stronger in 2010. In the Government are scared also, but they do not like to acknowledge. From one side this is good because they are the last one that should show pessimism. The prime minister and the other ministers should be optimists because only that way they will lead the economy, which means that they will do the necessary actions to help the real sector. But, if the optimism is not real, than it is not serious and realistic. It is not allowing them to open their eyes and see the real situation, which means publicly to admit something that is more than realistic, that the economic crisis in Macedonia is not finished yet.

The budget is the top priority of this Government. This budget must finance more than 100 000 public administration, social classes, retired people and even the Government campaigns. The main question here is-From where the money will come? Does the increased public spending can be financed by the lower income for the households and companies? Is it possible all the time to take, and never to give, and to help the private sector, as it is done in all the countries under this crisis? According to the ministry of finance, most probably during the second quarter of this year new Eurobond will be emitted, not to finance some infrastructure project, but mainly because of the lack of money in the budget.

It is sure that the electric energy will be expensive for more than 10%. The price of the

crude oil will have upward trend mainly because of the globally stronger economy. Both of them are included for about 50% in the overall expenses for the bigger industries in Macedonia, which in the same time are the biggest exporters and are making the biggest foreign exchange earnings.

Even though the necessary steps till now are not made, and the numbers form the first three months are showing bad condition of the Macedonian economy, we should expect that during 2010 the economic situation will be better than in 2009, but that the economic recovery will be slow and will take longer time than expected. This means that the economy officially is out of recession, but according to the best case scenario, the GDP increase will be not more than 2%. We can say that it will depend on the world economic recovery. We imported the recession. Now we should import the recovery also. But, as we were late with the import of the recession, it is obvious that the import of the recovery will be late also. Some pessimist scenarios are arguing that we haven't still seen the worst situation from the recession.

We still believe the Macedonian economy will recover from the crisis slowly, but surely. There are two main risks for the economic recovery. The first one is that the world economic recovery will fail to reach the expected increase between 1 and 2%. The second one is connected with the country's balance of payment, which should improve enough and to ensure lower interest rates, which is the main point in the economic growth.

Other types of risks in Macedonian economy are located in the labor market and financing sources, especially foreign investments. Although bigger usage of exported capacities is expected, the imported dependence and increased price of fixed costs will provoke bigger deficit in the current account. This will make bigger pressure on the foreign exchange market and denar's rate of exchange. This is guaranteeing stronger monetary policy, which main goal is stronger denar. Mainly the same situation as 2009.

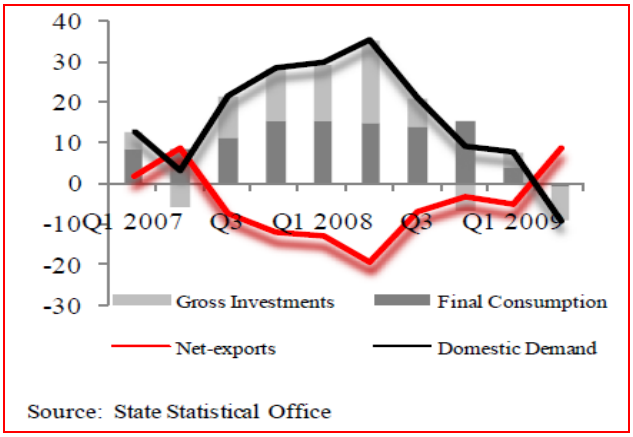
SOUTH EAST EUROPE

The crisis in the countries from Central and East Europe mainly entered via the channels of demand for their exporting products, decreasing the capital gains and significantly negative expectations from their companies initiated from the crisis in the developed countries. Opposing to the good economic results in 2008, in 2009 this group of countries had decrease in the economic activity. The domestic demand was under the influence of the negative expectations: slowing the credit growth in the situation when the risk increase and the places for financing decrease, uncertainty about the future economic trends and absence of bigger investment decisions. Depending on the variation of the economies and the stability of their fundaments, there is difference in the intensity and speed of entrance of the crisis, which will also make difference in the recovery from the crisis in those countries. Except Bulgaria and Croatia, the external debt of the other countries from this region has regular margins, which is one of the positive reasons why they should smoothly pass the crisis. Speaking separately, the biggest decrease in the economic activity is perceptible in Turkey, about 15% in the first quarter in 2009, but in the second the decrease was half in comparison to the first quarter. In this group of countries, Turkish economy has bigger chances for faster recovery, mainly because of the stabile banking system (in comparison to other regional countries), small external debt and diversified base for economic growth. On the other hand, the economic slowdown in Romania, which was 6% in the first and about 9% in the second quarter of 2009, does not give any signal for faster recovery, but longer anemic economic revitalization. This is coming mainly from the long period of low domestic demand, but also from the fact that the financial stability was not very bright point of Romanian economy even before the crisis. The inflation slowdown is noticeable in all the countries from South East Europe, mainly because of the lower pressure from the prices of imported products and the demand. But, in some countries like Turkey and Serbia, the inflation is gravitating around 7-8%, which is comparable to the nominal depreciation of their currencies.

MACEDONIAN ECONOMY DURING 2009
AGGREGATE DEMAND

A characteristic of the second quarter of 2009 is the faster decline of the domestic economy, but also the change in the direction of the domestic and net-export demand. Unlike the first quarter,

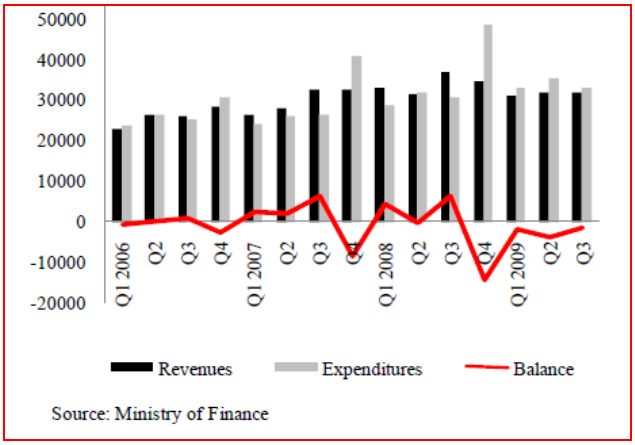
when the decline was a result of the lower exports as a consequence of the lower foreign demand, the main factor of decline in the second quarter was the reduced domestic demand, i.e. the lower private and investment consumption. Such structural changes indicate a process of adjustment of the behavior of the domestic entities, and they indicate that regaining of the confidence will be one of the factors for recovery from the crisis. On the other hand, the larger contraction of the domestic demand relative to that of the foreign demand spilled over in the imports, whose intensive decline is the reason behind the positive contribution of the net-export demand. This can be seen from the graph 1 presented below.



Graph 1: Domestic Demand and Net-exports

BUDGET AND PUBLIC CONSUMPTION

In circumstances of higher nominal growth in expenditures (10.7%), relative to the growth in the revenues (0.3%), in the second quarter of the year, the consolidated budget deficit went up to 0.9% of the projected GDP for 2009 (from 0.5% of the projected annual GDP in the first quarter).



Graph 2: Budget revenues and expenditures

The growth in budget revenues was entirely a result of the paid dividend of one company. On the contrary, the deteriorated economic condition continued to reflect also on the tax revenues, so that the VAT revenues registered a decline of 14.5%, as a consequence of the inhibited economic activity, while the revenues from the profit tax dropped by 70.4%, partially due to the deteriorated profitability of the companies, but partially also due to the tax relieves which came as part of the anti-crisis measures. On the other hand, the increase in budget expenditures is to a large extent a result of the higher current expenditures (11.2%), primarily of the growth in wages (16.3%) and pensions (10.8%), given the high rise both in the transfers to local authorities (22.3%) and other transfers (27%). Increase was registered also in the capital expenditures (6.5%), which stimulated the construction and investment activity in the economy.

EMPLOYMENT AND WAGES

Despite the annual contraction of the economic activity in the first two quarters of 2009, no changes in the trends were evident on the labor market in the following quarter. Thus, in the second quarter, the upward trend in the employment continued in this market segment, with simultaneous drop in the unemployment rate being registered. The lack of reaction on the labor market can be partially explained with several factors. First, the change in the phase of the economic cycle transferred on the labor market with certain delay. In most of the other economies, where the recession touched the bottom, the adjustment of the labor market already happened, whereas our economy expects the deepest drop to happen in 2010. Simultaneously, these economies characterized with more intensive fall in the economic activity relative to the drop in the Macedonian economy. Second, with most of the companies, the decrease in the level of facility utilization was followed with temporary termination of the engagement of the employees, as a consequence of the uncertainty about the character and the sustainability of the effects from the crisis. Simultaneously, the uncertainty on the crisis duration discouraged part of the employers to reduce the number of employees in this phase. These factors were still not enough to explain the improvement of the trends on the labor market,

manifested through the growth in the employment, which still can be explained mainly by the growth in the employees in the public administration. However, the fall in the domestic economy till the end of the year indicated to potential worsening in the conditions on the labor market in the area of the unemployment in the following period.

BALANCE OF PAYMENTS

In the first half of 2009 positive developments were registered on the current account. The effect from the drop in the export transferred on the import demand with more intensive dynamics, and it was intensified with the smaller pressures through the domestic demand as well, which resulted in annual narrowing in the trade deficit. Simultaneously, with the stabilization of the expectations of the domestic entities, the pressures on the domestic currency dropped as well, so since April the net inflows from private transfers registered upward trend. Opposite to this, the global financial crisis still restricts the foreign investors and creditors to make more considerable financial investments, so the annual fall in the net inflows continued in the capital and financial account. In July 2009, the trend of more intensive downward adjustment in the domestic demand relative to the foreign continued, thus narrowing the trade gap. Despite the positive trends, the risks about the recovery dynamics of the global economy and the re-stabilization of the global financial flows were still high. This created uncertainty about the possibility for the domestic economy to withdraw additional capital inflows, necessary for funding the gap in the current transactions.

INFLATION

The annual average inflation rate in the third quarter is negative of 1.4%, compared to the 0.6% price cut in the second quarter of 2009. Consequently, the cumulative price change shifted to the negative zone, and in the first three quarters of 2009, the average inflation rate equaled -0.4%. The price cut primarily reflects the high-base effects of the energy and food price component, and the decrease pressures of the import prices and the fall in the aggregate demand. The labor unit costs went up in the second quarter of 2009, as well, given the lower productivity and higher paid wages, but as the demand dropped, no larger inflationary pressures are expected through this channel. The annual inflation rate projections indicate further decrease in the next period, due to the broadening of the negative output gap and the expectations for relatively stable prices of the global products.

GOVERNMENT ANTI-CRISIS ACTION

The governments of most of the countries came with anti-crisis actions to smoothly overtake the global financial and economic recession. The same was done in Macedonia from the state government. First group of these actions was brought in November 2008 with the fiscal stimulus of 330 million Euros for the domestic economy. The actions, according to the government, were mainly pointed to the companies who have problems with liquidity, but also to help the companies that were in a good condition during the recession. The second anti-crisis actions were brought as eight year program for infrastructure projects with total amount of 8 billion Euros. The idea on the short run was helping the building and construction sector which is directly influencing the economic development, and on the long run to improve the competitiveness of the domestic economy. April 2009 there are another, third, anti-crisis actions which cover 70 steps which can be grouped in 3 segments. The first one is rebalancing the budget, which include change of the asset and liability sides in accordance to the macroeconomic projections and situation on the market. The second one is direct help for the companies with credit lines. This should be especially pointed to the small and medium companies which are either working for the domestic market or are exporting to other foreign markets. And, the third segment is consisted of 54 other steps for support of the companies in the specific fields like faster customs procedures, lower transportation costs for companies and transporters etc.

ECONOMIC SITUATION IN 2010

It is obvious from the beginning of 2010 that company's profitability will be significantly low. All the steps that will be taken from them for the exit from the crisis will be unsuccessful if there aren't specific actions that will give them the opportunity to work normally. Here, the priority is given to the public sector, which should be of support for the private companies, not just for

their rigorous control. It is normal to work according to the obligations given from the laws, but not to produce norms in order to oblige companies to pay penalties. This process must come to an end. There are two steps that are against the interest of the companies and are showing why the government should stop with this process. First, the Custom officials do not accept the custom guarantees from the import companies, which are issued from the banks. This means that the companies that already had guarantees from the banks will have to additionally deliver funds from their cash flow in order to pay the current customs. This will have significant financial impact on the companies which have to wait from the Custom to return back that funds. Second, on every fifteenth of the month, when the return of VAT should happen, in fact nothing is happening. This means lack of funds for the production companies that should be invested in the current production. It is a big question for the production companies when the return of VAT will be, while in the meantime the state liquidity is contemporary improved.

It is obvious that the budget has a lack of funds to finance the basic obligations. The revenues from the penalties from private entities and companies will cover the shortage to some extent, after which there will be no sources for funds to cover the rest of the government spending. After this, we will be all victims of the forced obligations and penalties for the private companies, coming together with the late return of VAT. With the forced obligations and penalties for the private companies the government should collect 50 million Euros in 2010. Even this is not the biggest problem if the government spends the money for some capital investment, building new factories or highways. All that money are planned for paying the interest rate for the domestic bonds, but also for the Eurobond issued from the government. In fact, the government will finance the banks, domestic and international, with the money collected from the private companies and the real sector in Macedonia.

ACTIONS FOR BETTER BUSINESS CLIMATE IN 2010

There are some steps that immediately should be taken for better business climate in Macedonia. Here are some of them as proposals:

1. Promoting investment activities with the same conditions for the domestic and international entities.

With the intention to assemble as more as possible international investments, the Government brought new measures with the changing of the Law for Technological and Industrial Development Zones, with which there is a possibility for the Government to give support for the potential international investors. As one of the news in this law is 100% relief for the personal tax obligations for 10 years for the international companies that will invest in Macedonia, which previously was 50% relief for five years. This is surprising for the business community. One of the basic issues from the economic crisis was the importance of the domestic production in the real sector and the influence it has on the domestic supply. This reason is enough for the government to equalize the conditions for investing for the domestic and international investors.

It is fact that the international investments are key factor for intensified production without increase of the aggregate spending in the country, which on the short-run will decrease the trade deficit. It is also fact that production increase is in direct proportion with the technical and technological modernization and know-how, which faster will come with international direct investments. That is why there should be a big priority for the Government to intensify the international investments in Macedonia. But, the increase of the international investments should not decrease the importance of domestic investments. After all, all business subjects are equal in front of the law and should be equally important for the country.

2. Actions for improvement of the company's liquidity in Macedonia

As mentioned previously, the liquidity is among the biggest problems for the companies in Macedonia. Very big percentage from the companies has problems with the payment of receivables. This is resulting with everyday problems, accounts blocked, inability to compete for better credit lines etc. Some of the proposed actions are:

- *Insuring the short-term inquiries from the domestic buyers on the basis of sold products and services - There is a possibility for the domestic companies to insure the short-term*

inquiries from the international buyers after the export is done, but the business sector is trying to have the same condition regardless of the origin of the buyer. With this, the Bank for Support and Development (MBSD) will indicate new service and scan the domestic company which is the buyer for the products of services (same as the international company), after which will guarantee or not that the payment will be done after the specific period..

- *Realization of the compensation for the debt obligations between the private and the public sector - On the long run this will regulate the obligation between the private and the public sector that are lasting for years. For this, a new law that will regulate this type of obligations is needed. This law will regulate the subjects which will enter in this type of compensation, type of obligations, their level, way and time of realizations etc.*
- *Coordinative actions of different inspection officials - Initiation of new Coordinative Body for inspection officials, which main activity will be collecting the data for the companies from different officials and making a data base for the companies, which will shorten the time that inspection officials are spending in the companies.*

REFERENCES

[1.] ADELMAN, I. and E. THURBECK, ''The Role of Institutions in Economic Development'', World Development, 17, (1999)

[2.] "Bulletins". Ministry of finance. 20.01.2010 <http://www.finance.gov.mk/node/971>.

[3.] DOSI, G. "Institutions and Markets in a Dynamic World", Manchester School(1998)

[4.] DOBRINSKY, R and N. MARKOV, "Policy Regime Change and Corporate Credit in Bulgaria", William Davidson Institute Working Paper No 2003-607. 2003

[5.] "Macroeconomic Policy". Ministry of finance. 20.01.2010 <http://www.finance.gov.mk/node/852>.

[6.] "Pre-accessioneconomic programme". Ministry of finance. 20.01.2010 <http://www.finance.gov.mk/files/u9/PEP_2008-2010_en.pdf>.

[7.] "Public Investment Programme 2009-2011". Ministry of finance. 20.01.2010 <http://www.finance.gov.mk/files/u9/komplet_pip_2009_2011.pdf>.

[8.] SLAVESKI, T. and NEDANOVSKI P. (2002) "Foreign Direct Investment in the Balkans: The Case of Albania, FYROM and Bulgaria", Eastern European Economics, 40(4):83-99.

[9.] ŠEVIĆ, Z., "Banking Reforms in South-East Europe, The Business School, University of Greenwich, London, UK

[10.] WINKLER, A. (2000) "Private and Financial Sector Development in Transition Economies: The case of Macedonia", IPC Working Paper, 25.

AUTHORS & AFFILIATION

[1.] LJUPCO DAVCEV

[1.] UNIVERSITY GOCE DELCEV, STIP, MACEDONIA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING

ISSN: 2067-3809 [CD-Rom, online]

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

ROBERT FREUND[1], ZORAN ANISIC[2]

HOW TO USE COMPLEXITY AND UNCERTAINTY FOR NEW BUSINESS?

Abstract:
This article is structured in the following way. The first part describes the idea of reflexive modernization as espoused by Beck and suggests some broad areas where the theory may illuminate activities in the economy. The second part describes complexity and uncertainty as main aspects of the new modernity. The third section offers some thoughts, how organizations can make business in such environment.

Keywords:
Complexity, Uncertainty, Reflexive Modernization, Management, SME

MODERNIZATION, POST-MODERNIZATION AND REFLEXIVE MODERNIZATION

Bell (1973) outlined the three stages of the development of the human society: pre-industrial (agrarian), industrial and post-industrial society. Modernization was the term to explain the transformation from agricultural society to an industrial society. According to HE (2004:3) the passing of Classical Modernization Theory (CMT) was described by several authors: Modernizing the Middle East (Lerner 1958), Politics of Modernization (Apter 1965), Modernization: Protest and Change (Eisenstadt 1966), Modernization: The Dynamics of Growth (Weiner 1966), Modernization and the Structure of Society (Levy 1966), The Dynamics of Modernization (Black 1966), The Stages of Economic Growth (Rostow 1960), Political Order in Changing Society (Huntington 1968). Some aspects of this kind of modernization are rational expectations and rational decision-making models. Management theories for example are focused on reducing complexity (Bandte 2007), managing risks and organizations are seen as machines (metaphor). This mechanical approach is focused on technical sciences and rational expertise. In this system customers are seen as homo oeconomicus and employees and supplier can be substituted by any other person/organization. Management models like Quality Management (DIN 2000), Total Quality Management (Zink 2004), Lean Production and Lean Management (Womack/Jones/Roos 1994), Business Reengineering (Hammer/Champy 1994) and Kaizen (Imai 1992) are traditionally grounded on Scientific Management (Taylor 1911). In this context Taleb (2007:275-276) is wondering, that students and businessmen all over the world are focused on "scientific methods, all grounded in the Gaussian" and he believes, that "people want a number to be anchored on".

Postmodernism tried to sketch the culture situation in the post-modern, which are very different from the classical modernization. La Condition Postmoderne (Lyotard 1979) is a very popular book on the post-modern issues. In this Knowledge Society (Stehr 1994) and Knowledge Economy (Rodrigues 2002, Soete 2006) knowledge-based organization (Drucker 1996) new management models appeared like Learning Organization (Senge 1990, 1992, 2000),

Knowledge Management (CEN/ISSS 2004, Heisig 2005, Mertins et al. 2005, Nonaka/Takeuchi 1995/1997, Pobst et al. 1998). Drucker (1959) coined the term Knowledge-worker to differentiate work in industrial settings from work in knowledge-based organizationsto. But in practice autonomy and external contacts - integral components of the new knowledge work - continue to be limited or non-existent in many workplaces (May/Korczynski/Frenkel 2002). Dankbaar/Vissers (2009:3) argue, that „the expected growth in the share of knowledge work may be less than expected: along with the forces pushing for an increase in knowledge work, there are also forces counteracting these." Moldasch (2010) brings forward the argument, that the dichotomy of knowledge work vs. industrial work isn't helpful to characterize work in modern organizations. So post-modernism comes under criticism on organizational level and as a social theory (Abicht 2010). This post modern approach was extended by several authors: Ecological Modernization (Huber 1985), Reflexive Modernization (Beck 1986), the Modernization of Modern Society (Zapf 1991), the New Modernization (Tiryakian 1991, Alexander 1995), the Multiple Modernities (Eisenstadt 1992, 1998) etc. In this paper, we will have a closer look on Second Modernization or Reflexive Modernization Theory (Beck/Giddens/ Lash 1994).

Beck´s Risk Society (Beck 1986/2008) was a critique on the post-modern society and Beck/Bonß/Lau (2003). Argue, that modernists and postmodernists are interested in deconstruction without reconstruction, second modernity is about deconstruction and reconstruction. Second modernity (Reflexive Modernization) is therefore different to modernization and postmodernism. What is new is that modernity has begun to modernize its own foundations. Where postmodernism simply celebrates this multiplication of boundaries, the theory of second modernity starts with the problem this new reality poses for individual and collective decisions, and with the problem that the continued existence of such decisions poses for theory. Institutions that are capable of such conscious boundary drawing are enabled in a way that those of the first modernity were not. A good example is the financial sector, where it is very common to use mathematical models, risk management systems, business intelligence, simulations etc. But as we know from the last two years, financial crisis emerged anyway. So, what happened? Some researchers said, that mathematical and analytical models should be improved (Welp 2009), but Phelps (2009) assumed, that the crisis is based on uncertainty (Knight 1921). "Uncertainty, as Keynes knew, is not the same as risk, or probability: risks can be calculated, uncertainty escapes calculation" (Mitchell/Streek 2009:6). So complexity and uncertainty increase in Reflexive Modernization and it involves far-reaching and deep changes to national, regional, and international institutions of economic, social, cultural, and political governance (SFB 2008). Reflexive Modernization is a social theory grounded on three theorems (Böhle/Weihrich 2009:10; Bonß 2009): Risk Society, forced Individualization, multidimensional globalization and with several interdependencies (Beck/Grande (2004:50).

COMPLEXITY AND UNCERTAINTY

"The social world, like most of the biological world and a good part of even the physical world, is populated by highly contingent, context-sensitive, emergent complex systems. Understanding these features of complexity requires an expansion of our paradigm of science itself" (Mitchell/Streek 2009:4). Complexity and historicity mean above all that human action inevitably takes place in the face of an uncertain future (Reflexive Modernization). Haken (2006:1-7) characterizes complex systems like this: "In a naive way, we may describe them as systems which are composed of many parts, or elements, or components which may be the same or of different kinds. The components or parts may be connected in a more or less complicated fashion. Systems may not only be complex as a result of being composed of so many parts but we may also speak of complex behaviour. The various manifestations of human behaviour may be very complex as is studied e.g. in psychology (…) An important step in treating complex systems consists in establishing relations between various macroscopic quantities. These relations are a consequence of microscopic events which, however, are often unknown or only partially known". In business organization its about complex/uncertain problem solving for customer. "Complex Problem Solving (CPS) occurs to overcome barriers between a given state and a desired goal

state by means of behavioural and/or cognitive, multistep activities. The given state, goal state, and barriers between given state and goal state are complex, change dynamically during problem solving, and are intransparent. The exact properties of the given state, goal state, and barriers are unknown to the solver at the outset. CPS implies the efficient interaction between a solver and the situational requirements of the task, and involves a solver's cognitive, emotional, personal, and social abilities and knowledge" (Frensch/Funke 1995:18). Therefore knowledge must be applicable to different, new, and complex situations and contexts.

SECOND MODERNITY BUSINESS

So the question is: How to manage an organization through complexity and uncertainty (Baecker 1999:170)? It is against this background that the concept of Multiple Competencies (Rauner 2004, Freund 2008, 2009; Freund/Tsigkas 2007) has attracted increased research attention. Competencies are conceptualized as complex ability constructs that are context-specific (Koeppen et al. 2008:61) but the concept of Multiple Competencies (Freund 2009) broadened Competency Management for social and reflexive environments to solve the problem of missing synchronization on individual, team and organizational level (Figure 1).

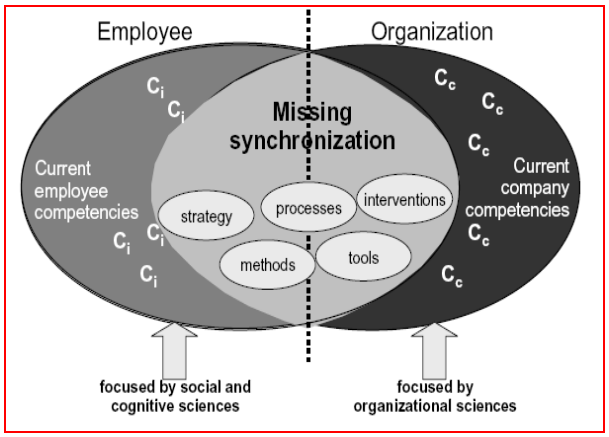


Figure 1: Missing synchronization (Reinhardt/North 2003:1373)

Reflexive Modernizations points on secondary-effects of industrial production. A simple example for this are cars, because it's the production of cars which is a big problem for climate change and other problems. This may remind one of John Ruskin's lament, put forward one and a half centuries ago: "We pour our whole masculine energy into the false business of money-making" (Ruskin 1865:88). Well, private firms always have to "make money", but that is not their business. "Organizations are in the business of solving customer problems, be they individual needs such as nutrition, health or locomotion, or the social and ecological problems faced by our world. These kinds of functions and purposes bestow upon organizations their very raison d'être" (Schwaninger 2006:78). To make business in a social, complex and uncertain environment is difficult, because economists and sociologists each hold half of the truth, „so to speak, when it comes to markets, it seems natural that they should try to coordinate their efforts" (Swedberg 2003:15). According to Economic Sociology (Smelser/Swedberg 1994, Swedberg 2008) capitalism follow the interest of shareholder and sociology follow the interest of social communities. We should follow the interests of both. Follow the interests! (Swedberg 2003:49) of Economic Sociology.

- *Sociology of production:*
- *Sociology of consumption*
- *Sociology of profit*

May be new business models like the Mass Customization (Pine 1993) or Open Innovation (Chesbrough 2003, von Hippel 2005, Daniel/Piller 2010) are able to support the idea of Economic Sociology.

CONCLUSION

Reflexive Modernization is different to modernization or post-modernization. It is argued, that scientific management or post-modern management models like knowledge management will not solve the problem of secondary-effects. To solve complex customer problems in an uncertain environment, dispositions of selforganization (multiple competencies) are necessary. The concept of Multiple Competencies is able to synchronize multiple competencies on individual, team and organizational level. According to Swedberg, business should follow the interest of social communities and shareholder. Further research: More and more business models should be reinvestigated from the reflexive modernization point of view.

REFERENCES

[1.] Abicht, L. (2010): Offene Zukunft. Menschliche Potenziale für eine neue Welt. Reinhold Krämer Verlag:Hamburg.

[2.] Alexander, J. C. (1995), Modern, Anti, Post, Neo, New Left Review, No. 210, March/April, pp. 63-101.

[3.] Apter, D.E. (1965): The Politics of Modernization, Chicago: Univ. of Chicago Press.

[4.] Baecker, D. (1999): Organisation als System. Frankfurt/M.

[5.] Bandte, H. (2007): Komplexität in Organisationen.

[6.] Beck, U. (1986): Risikogesellschaft.

[7.] Beck, U. (2008): Risk Society's 'Cosmopolitan Moment'. Lecture at Harvard University, 2008. http://www.labjor.unicamp.br/comciencia/files/risco/AR-UlrichBeck-Harvard.pdf

[8.] Beck, U.; Bonß, W.; Lau, C. (2003): The Theory of Reflexive Modernization. Theory, Culture & Society, Vol. 20, No. 2, 1-33 (2003)

[9.]Beck, U.; Giddens, A.; Lash, S. (Eds) (1994): Reflexive Modernization.

[10.] Beck, U.; Grande, E. (2004): Das kosmopolitische Europa, Frankfurt/Main.

[11.] Bell, D. (1973): The Coming of Post-Industrial Society. A Venture in Social Forecasting, New York.

[12.] Black, C. E. (Ed.) (1966): Comparative Modernization, New York: The Free Press.

[13.] Böhle, F.; Weihrich, M. (2009a): Ungewissheit, Uneindeutigkeit, Unsicherheit –

[14.] Braucht die Theorie reflexiver Modernisierung eine neue Handlungstheorie? In: Böhle, F.; Weihrich, M. (Hrsg.): Handeln unter Unsicherheit. VS Verlag für Sozialwissenschaften/ GWV Fachverlage GmbH, Wiesbaden 2009. S. 9-21.

[15.] Bonß, W. (2009): Das Subjekt als fiktiver Entscheider? Anmerkungen zur soziologischen Handlungstheorie. In: Böhle, F.; Weihrich, M. (Hrsg.): Handeln unter Unsicherheit. VS Verlag für Sozialwissenschaften, Wiesbaden 2009. S. 149-166.

[16.] CEN/ISSS (2004): Europäischer Leitfaden zur erfolgreichen Praxis im Wissensmanagement. Brüssel.

[17.] Dankbaar, B.; Vissers, G. (2009): Of Knowledge and Work. MPIfG Working Paper 09/16. http://www.mpifg.de/pu/workpap/wp09-16.pdf

[18.] Diener, K.; Piller, F. (2010): The Market for Open Innovation.

[19.] DIN (2000) (Hrsg.): DIN EN ISO 9000:2000. Qualitätsmanagementsystem – Grundlagen und Begriffe. Berlin: Beuth-Verlag.

[20.] Drucker, P. F. (1959): The landmarks of tomorrow.

[21.] Drucker, P. F. (1996): Umbruch im Management.

[22.] Eisenstadt, S. N. (1966): Modernization: Protest and Change, Englewood Cliffs N.J.: Prentice-Hall.

[23.] Eisenstadt, S. N. (1992): A Reapraisal of Theories of Social Change and Modernization. In: Haferkamp, H.; Smelser, N. J. (Eds), Social Change and Modernity, Berkeley/Los Angeles/Oxford: Univ. of California Press, pp. 412-29.

[24.] Eisenstadt, S. N. (1998): Multiple and Changing Modernities in Settings of Globalization, Paper given at the 34th World Congress of the International of Sociology, Tel Aviv, July 11-15.

[25.] Frensch, P. A.; Funke, J. (1995): Definitions, Traditions, and a General Framework for Understanding Complex Problem Solving. In: Frensch, P. A.; Funke, J. (Eds.) (1995): Complex Problem Solving. The European Perspective, pp. 3-23.

[26.] Freund, R; Tsigkas, A. (2007): How to improve customer interaction with the concept of multiple competence. Paper presented at the 4th World Conference on Mass Customization and Personalization, October 07-10, MIT Campus, Cambridge/USA.

[27.] Freund, R. (2008): Mass Customization, Personalization and Contextualized Multiple Competencies. 3rd International Conference on Mass Customization and Open Innovation, 03.-06. June 2008, Palic and Novi Sad, Serbia.

[28.] Freund, R. (2009): Multiple Competencies in Open Innovation Business Model. Paper presented at MCPC2009, 5th World Conference on Mass Customization and Personalization, 04.-08.10.2009, Helsinki, Finland

[29.] Haken, H. (2006): Information and Self-Organization. Third Edition. Springer. Berlin, Heidelberg, New York.

[30.] Hammer, C.; Champy, J. (1994): Business Reengineering. Die Radikalkur für das Unternehmen. München.

[31.] HE, Chuanqi (2004): The Civilization and Modernization. 36th World Congress of International Institute of Sociology Social Change in the Age of Globalization, 7th-11th July, Beijing, China. http://www.modernization.com.cn/civilization%20and%20modernization.pdf

[32.] Heisig, P. (2005): Integration von Wissensmanagement in Geschäftsprozessen

[33.] Huber, J. (1985): Die Regenbogengesellschaft: Okologie and Sozialpolitik, Fischer, Frankfurt am Main.

[34.] Huntington, S. P. (1968): Political Order in Changing Society. New Haven and London: Yale University Press.
[35.] Imai, M. (1992): Kaizen. Der Schlüssel zum Erfolg der Japaner im Wettbewerb. München: Wirtschaftsverlag Langen Müller Herbig.
[36.] Ingelhart, R. (1997): Modernization and Postmodernization, Princeton University Press, 1997
[37.] Knight, F.H. (1921): Risk, Uncertainty and Profit. Chicago.
[38.] Koeppen, K.; Hartig, J.; Klieme, E.; Leutner, D. (2008): Current Issues in Competence Modeling and Assessment. In: Zeitschrift für Psychologie, Vol. 216, 2/2008, pp. 61-73.
[39.] Lerner, D. (1958), The Passing of Traditional Society: Modernizing the Middle East, Glencoe III.: Free:Press.
[40.] Levy, M. J. (1966): Modernization and the Structure of Society, Princeton: Princeton University Press.
[41.] Lyotard, J.-F. [1979] (1984): The Postmodern Condition: A Report on Knowledge,
[42.] Minneapolis: University of Minnesota.
[43.] May, Tam Y. M./Marek Korczynski/Stephen J. Frenkel, 2002: Organizational and Occupational
[44.] Commitment: Knowledge Workers in Large Corporations. In: Journal of Management Studies 39(6), 775–801.
[45.] Mertins, K.; Alwert, K.; Heisig, P. (Hrsg.) (2005): Wissensbilanzen. Intellektuelles Kapital erfolgreich nutzen und entwickeln. Berlin, Heidelberg.
[46.] Mitchell, S.; Streeck, W. (2009: Complex, Historical, Self-reflexive: Expect the Unexpected! MPIfG Working Paper 09 /15, Max Planck Institute for the Study of Societies, Cologne, December 2009, http://www.mpifg.de/pu/workpap/wp09-15.pdf
[47.] Moldaschl, M (2010a): Zirkuläre Wissensdiskurse? Einige Einsprüche gegen gewisse Gewissheiten. No. 1/2010, http://www.tu-chemnitz.de/wirtschaft/bwl9/forschung/fprojekte/reflex/ergebnisse/download/MM_Wissensdiskurse_10.pdf
[48.] Nonaka, I.; Takeuchi, H. (1995): The Knowledge-Creating Company. Oxford University Press, Oxford.
[49.] Phelps, E. (2009): Die vergessene Unsicherheit. In: Gastkommentar in der Financial
[50.] Times Deutschland vom 24.04.2009. http://www.ftd.de/meinung/kommentare/:Gastkommentar-Phelps-Die-vergessene-Unsicherheit/504481.html
[51.] Pine, J. P.(1993): Mass Customization. Harvard Business School Press, Boston, MA.
[52.] Probst, G.; Raub, St.; Romhardt, K. (1998): Wissen managen: Wie Unternehmen ihre
[53.] wertvolle Ressource optimal nutzen. Wiesbaden: Gabler, 2. Auflage.
[54.] Rauner, F. (2004): Praktisches Wissen und berufliche Handlungskompetenz. http://www.itb.uni-bremen.de/downloads/Publikationen/Forschungsberichte/fb_14_04.pdf
[55.] Rodrigues, M., J. (Ed.) 2002: The New Knowledge Economy in Europe, Edward
[56.] Elgar, Cheltenham.
[57.] Rostow, W. W. (1960): The Stages of Economic Growth: A Non-Communist
[58.] Manifesto. Cambridge: Cambridge University Press.
[59.] Ruskin, J. (1865): Sesame and Lilies. 1907 edition. London: George Allen.
[60.] Schwaninger, M. (2006): Intelligent Organizations. Berlin - Heidelberg - New York
[61.] Senge, P. M. (1990): The fifth discipline. New York.
[62.] Senge, P.M. (1992): The fifth discipline: The art and practice of the learning
[63.] organization. New York: Random House.
[64.] Senge, P.M. (2000): The Dance of Change. Die Überwindung der 10
[65.] Wachstumsbarrieren. Wien: Signum.
[66.] SFB 536 (2008): Reflexive Modernisierung. http://www.sfb536.mwn.de/broschuere-2008-all.pdf
[67.] Smelser, N. J.; Swedberg, R. (Hg.) (1994): The Handbook of Economic Sociology.
[68.] Princeton: Princeton University Press.
[69.] Soete L. (2006: A knowledge economy paradigm and its consequences. In: Giddens,
[70.] A.; Diamond, P.; Liddle, R. (Eds.): Global Europe, Social Europe. Cambridge, Polity Press.
[71.] Stehr, N. (1994): Arbeit, Eigentum und Wissen. Zur Theorie von
[72.] Wissensgesellschaften, Frankfurt am Main
[73.] Swedberg, R. (2003): The economic sociology of capitalism: An introduction and agenda. http://www.economyandsociety.org/publications/wp5a_swedberg_03.pdf
[74.] Swedberg, R. (2008): Grundlagen der Wirtschaftssoziologie. Herausgegeben und eingeleitet von Andrea Maurer. Vorwort (zur amerikanischen Ausgabe).
[75.] Taleb, N. N. (2007): The Black Swan.
[76.] Taylor, F. W. (1911): The Principles of Scientific Management
http://www.eldritchpress.org/fwt/ti.html
[77.] Tiryakian, E. (1991): Modernization: Exhumetur in Pace (Rethinking Macrosociology in the 1990s'), International Sociology, vol.6, no.2, pp.165-80.

[78.] von Hippel, E. (2005): Democratizing Innovation.
[79.] Weiner, M. (Ed.) (1966): Modernization: The Dynamics of Growth, New York: Basic.
[80.] Welp, C. (2009): Weshalb Banken trotz aller Risikomodelle Milliarden verloren. In: Wirtschaftswoche vom 10.07.2009.http://www.wiwo.de/finanzen/weshalb-banken-trotz-aller-risikomodelle-milliarden-verloren-401968
[81.] Womack, J. P.; Jones, D. T.; Roos, D. (1994): Die zweite Revolution in der
[82.] Autoindustrie. 8. Auflage, Frankfurt/Main, New York: Campus Verlag.
[83.] Zapf, W. (Ed.) (1991): Die Modernisierung Moderner Gesellschaften. Verhandlungen
[84.] des 25. Deutschen Soziologentages, Frankfurt/New York: Campus.
[85.] Zink, K. J. (2004): TQM als integratives Managementkonzept. Das EFQM Excellence Modell und seine Umsetzung. München: Hanser.

AUTHORS & AFFILIATION

[1.] ROBERT FREUND
[2.] ZORAN ANISIC

[1] MARTIN-LUTHER-UNIVERSITY HALLE-WITTENBERG, GERMANY
[2] FACULTY OF TECHNICAL SCIENCES, NOVI SAD, SERBIA

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

[1.] PANAYIOTIS H. KETIKIDIS, [2] IVAN MIROSHNYCHENKO, [3] SOTIRIS ZYGIARIS

A PROPOSED FRAMEWORK OF REGIONAL INNOVATION SYSTEM: THE CASE OF THE KHARKIV REGION IN EASTERN UKRAINE

Abstract:
Regional Innovation System (RIS) model of economic growth, seeks to promote increased interaction across the government, business and academia. The importance of RIS stems from the increasing interaction of regional actors on the outcome of the innovation process. This paper proposes a framework of regional innovation system for the Kharkiv region in the Eastern Ukraine. A thorough theoretical analysis was conducted to apply the most appropriate scientific approach to the study. Qualitative research approach was applied to cover the purpose of the study and answer the research questions raised. Interviews and documentation review were carried out using research questions based on previous studies. It is concluded that the main components of the regional innovation system in the investigated region are knowledge application and exploitation subsystem, knowledge generation and diffusion subsystem. The major stakeholders of regional innovation system (academic universities; research institutes; public organizations; regional state administration; non-governmental agencies and private firms) and specific component of regional innovation system (knowledge support and promotion subsystem) are identified in the Kharkiv region. The specific paper contributes to the knowledge in region by providing a proposed framework for the Kharkiv region.

Keywords:
Regional Innovation System, Regional Innovation Development, Regional Competitiveness, Regional Systems of Innovation, Governmental and Regional Policies

INTRODUCTION

Regions are increasingly seen as essential parts of the global society [1]; innovation evolved as part of sustainable development [2] has become a driver of the competitiveness within the regions [3]. The concept of Regional Innovation System (RIS) has been the central goal of the European technology and innovation policy. This concept is considered to contribute to the Lisbon strategy by enhancing European regional competitiveness (RC) [4].
RISs have been successfully implemented in regions of the EU [5], [6], [7], [8], USA and Canada [9], [10], Taiwan and Japan [11]. Research in Central and Eastern Europe suggests the establishment of RIS on the network organizers and close linkages between the actors that lead business in the region [12], [13].
The Eastern Ukraine has one of the densest industrial concentrations in the world and is also homeland of numerous scientific and research institutions [14], [15]. In particular, the Kharkiv region is one of the leading industrial, educational and scientific centres in a whole country [16]. However, some attempts to establish regional innovation environment in the

Eastern Ukraine have failed [17], [18]. This provides an opportunity to analyze the current situation in the region and to compare with other regional development studies. This poses challenges and it is important to propose a framework of RIS for the Kharkiv region in the Eastern Ukraine that would be useful to decision-makers in developing appropriate regional innovation policies.

The paper is organised as follows: The next section begins by reviewing some of the key theoretical issues relating to regional innovation systems. This is followed by the methodology used and analysis of the study. The final section presents the proposed framework for the Kharkiv region and concludes with some key recommendations.

FRAMEWORKS OF REGIONAL INNOVATION SYSTEMS

One of the core ideas of the RIS approach is that different innovative businesses that function within regional networks, cooperate with consumers, suppliers, rivals, and interplay also with many research institutions, technology centres, innovation support agencies, venture capitalists, local and regional government representatives [19], [20], [21]. The literature suggests that RIS possesses two sides: the supply side and the demand side [22], [23], [24]. The supply side includes institutional sources of knowledge generation and institutions accountable for the preparation of qualified labour. The demand side incorporates the productive systems, companies that apply the scientific output of the supply side [25].

Andersson and Karlsson studied RISs in small and medium-sized regions of the UK and posited that the core of RIS formulated companies within the regional cluster is surrounded by supporting and additional organizations [26]. The main components of RIS are institutions, infrastructure, incentives (illustrated in Figure 1 - adopted from Andersson and Karlsson, 2004).

The rationale behind a "Complete RIS" is to capture synergies from the university-industry-government relationship. Different types of the institutions play the role of normative structures. The main task of these institutions is to support the cooperation between the actors and to facilitate knowledge exchange [27]. Etzkowitz and Leyesdorff mentioned the university-industry-government relationship as the "Triple Helix" and stated that it forms "knowledge infrastructure in terms of overlapping institutional spheres, with each taking the role of the other with hybrid organizations emerging at the interface" (p. 115) [28].

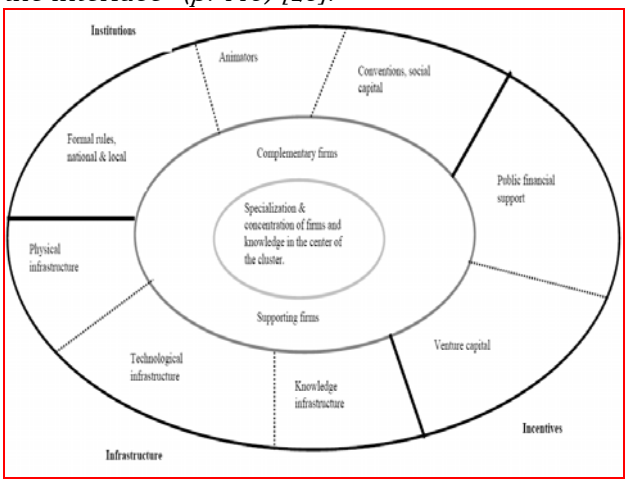


Figure 1. Complete RIS (Adopted from Andersson and Karlsson, 2004)

Cook and Memedovic investigated the regional innovation system-building processes in Europe and stressed that firms of RIS possess sizable opportunities to access or test knowledge that has been generated within the specific geographic area or outside of it. Regional Innovation Development (RID) plays an essential role for the successful development of RIS in a region [29]. Moreover, a later study across European regions by Cook and Memedovic highlighted that RIS consists of two subsystems: Knowledge Application and Exploitation System (KAES) and Knowledge Generation and Diffusion System (KGDS). KAES includes mainly companies and KGDS incorporates public and private research institutions, universities, technology transfer agencies (illustrated in Figure 2 - adopted from Cook and Memedovic, 2006) [30].

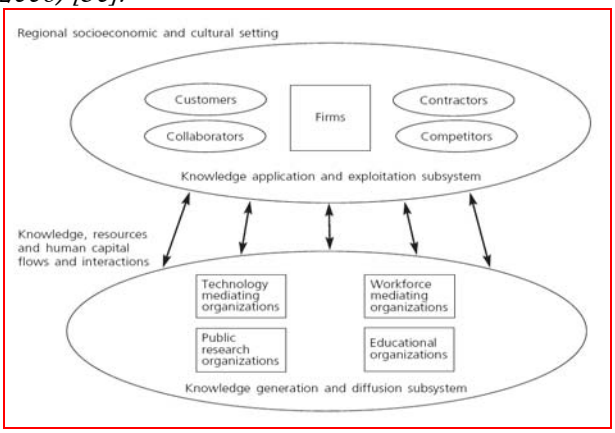


Figure 2 RIS: A Schematic Illustration (Adopted from Cook and Memedovic, 2006)

However, several authors consider two potential dangers regarding the development of RIS: weak research institutes with poor cooperation prospects and integration of core elements of the system [31], [32], [33].
Similar work in Grodno region in Byelorussia suggests that RIS can be described as a composition of interrelated subsystems facilitating access to various resources and services to the economic players. The author asserts that RIS has a multilevel character and that it should be regarded as a process of interconnected subsystems increasing access to different resources and activities to all economic players of RIS (illustrated in Figure 3 - adopted from Opekun, 2006) [34].

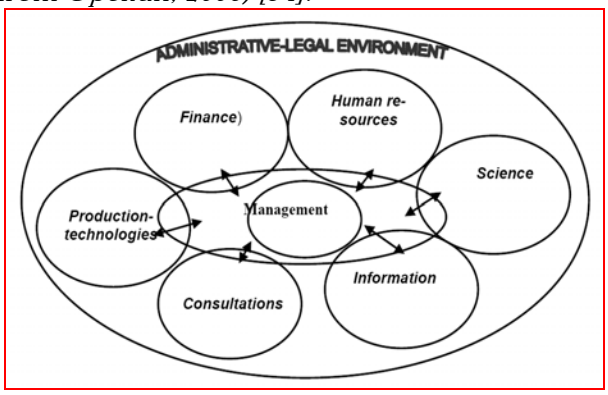


Figure 3 RIS (Adopted from Opekun, 2006)

The author proposed that RIS approach enables the augmentation of the spheres of promotion and stimulation of regional innovation processes as a composition of the nest subsystems: production-technologies; finance; services; science; human resources; information; expert consultations; and management, incorporating the sphere of their interplay. Nevertheless, Oughton and Morgan argue that nowadays a lot of regions are victims of "the regional innovation paradox" due to the lack of integration between the two sides of RIS: the supply side and the demand side [35], [36]. Several authors assert that the framework of RIS shapes the learning process in a region [37], [38], [39]. Therefore, a policy approach which connects major actors and influences both sides of RIS should be developed in order to solve the "regional innovation paradox" [40].

METHODOLOGY

Research Purpose and Objectives of the Study

The purpose of this paper is to propose a RIS framework for the Kharkiv region in the Eastern Ukraine. The objective of the present paper is to develop a framework of RIS for the Kharkiv region in the Eastern Ukraine. The research process included the following steps: state-of-the-art literature review, taxonomy of literature, setting the objective of the study and research questions, research design (preparation for data collection, data collection, and limitations), data analysis, reliability and validity of the study, development of a framework of RIS. The main research question was - What kind of RIS framework is needed in order to develop the framework of RIS for the Kharkiv region in the Eastern Ukraine? Our research questions can de specified: What are the major components of RIS? What functions do RIS perform? Who are the main stakeholders of RIS? What role could intellectual capital play in converting knowledge and intangible assets into innovation? How RIS can contribute to regional development?

Study Design

The research framework of RIS that covers the purpose and research questions of the study was adopted from Cook and Memedovic [41]. A qualitative exploratory research approach was adopted. Based on a literature review the data of this research were collected through a number of in-depth case studies. Unstructured interviews and documentation review were used in order to collect qualitative data. In addition, semi-structured face-to-face interviews were held with key personnel within the organisations and triangulated with additional available information, such as governmental reports and governmental websites. Research questions which were in line with the study objectives have been answered by the interviewees during the interviews. Within-case analysis was used in the present study for analysis of qualitative data and content analysis was used for the quantitative data. Two governmental organisations, three universities, and two private firms of the Kharkiv region participated in the study.

ANALYSIS OF THE STUDY

The Region: Facts of Regional Innovation Development

During the 2007 the turnout of industrial goods increased by 8,1 per cent against 2006 in the Kharkiv region. The productivity growth was reached in seven general branches that formed

73 per cent of the total turnout. In fact, more than a half of regional companies and firms (53 per cent) have improved their turnout [42]. The amount of the industrial firms of the Kharkiv region that were engaged in the innovation activities is 9, 6 per cent in 2007. Regional enterprises have developed 175 innovative products including 74 items of innovative machines, equipment, and devices in 2007 [43]. The majority of the innovative products are the products of machine building branch of industry (64 per cent) and the products of the equipment building branch of industry (19 per cent) [44].

Description of the Knowledge Application and Exploitation Subsystem (KAES) of the Kharkiv Region

The KAES of the Kharkiv region includes 11,700 SMEs and 604 large firms employing 244,200 people in the Kharkiv region. The region can be decomposed into three major industrial zones: Central, Eastern and Southern [45]. First, the Central zone includes Kharkivskiy district and the neighboring districts. It is characterised by the high level of industry agglomeration and specialisation. This zone is Ukraine's state-of-the-art center of energy industries, transport, electromechanical and agriculture mechanical engineering. Second, the Eastern zone, is located around the town of Kupyansk. Mechanical engineering is the dominating industry in this zone. Third, the Southern zone, is characterised by large natural gas deposits such as Krestishchenske, Shebelynske, Yefremovske and others. The cities of this zone are mainly focused on chemical industry, construction materials production and mechanical engineering. Cement and roofing slates production plant of Balakiya is one of the biggest in Europe [46]. Regarding the structure of material production, the largest shares belong to metal building and machine building (33, 5 per cent of the total regional industrial production), power industry (22, 2 per cent), fuel industry (14, 5 per cent), food production industry (18 per cent), materials construction industry (3,1 per cent), and light industry (0,9 per cent) [47].

The Knowledge Generation and Diffusion Subsystem (KGDS) of the Kharkiv Region

KGDS of the Kharkiv region includes nine business centres, three business support organisations, three public research organisations, and fourteen academic universities with 36,000 specialists and around 15 research centres with 30 Full Members and Corresponding Members of The National Academy of Sciences, with 9,000 Doctors of Philosophy, and 1,496 Doctors of Sciences. Fifty six per cent of R&D centres of Ukraine are located in the Kharkiv region . Then, around 56 per cent of fixed assets for research and technological activities (by their value in the state) are located in the Kharkiv region, in particular 15 per cent of equipment for scientific experiments. In fact, ten per cent of the total R&D projects of Ukraine are executed in the Kharkiv region. It is on the first place among the regions of Ukraine and on the second place on the national level after the city of Kyiv with regard to scientific capacity [48[, [49]. Therefore, intellectual capital could be considered as one of the core drivers of the economic value creation, competitiveness and profitability in the investigated region.

The Stakeholders

The major stakeholders of RIS model of the Kharkiv region are academic universities, research institutes, public research organizations, governmental organizations, non-governmental agencies and private firms. If we categorize the stakeholders of RIS model of the Kharkiv region the main groups that derive will be universities, research institutions, business incubators / firms, and governmental and regional agencies. As indicated by Morgan "recognizing of RIS stakeholders becomes complicated because they do not take one form in reality" (p.561) [50]. While there are only several regions which can be considered true RISs [51] in general, more studies will be required to define what forms RIS, who are its major stakeholders, and what constitute its core functions as a system [52].

The Proposed Framework of Regional Innovation System for the Kharkiv Region

Previous attempts to develop a regional innovation environment in the Kharkiv region has failed due to lack of financial support from the regional administration [53]. Considering that, it seems appropriate to include the knowledge support and promotion subsystem

(KSPS) in the proposed framework of RIS for the Kharkiv region. This subsystem could regulate the target-program financing mechanisms focused on realization of innovation and regional development priorities in accordance with legislation of Ukraine. The KSPS includes public financial funds of the regional administration (KOSA). The proposed framework of RIS for the Kharkiv region includes three subsystems: KAES, KGDS and KSPS with systemic connections between sources of knowledge production, firms of large and small sizes, and regional administration (see Figure 4). It will perform five major functions. Firstly, it will organise the interaction between scientific, research and innovation enterprises, institutions and firms, and state authorities. Secondly, it will provide scientific and other support for innovation development in the region. Thirdly, it will provide information and consulting services for firms. Fourthly, it will regulate the target-program financing mechanisms focused on realization of innovation and regional development priorities in accordance with the legislation of Ukraine. Last, but not least, it will establish regional innovation infrastructure. In short, it could positively influence the regional innovation activities and innovation knowledge utility in the investigated region. Consequently, RDC, RIC could be formed and overall RC of the Kharkiv region may be increased.

In terms of future policy directions, it appears that research performers believe that 'creating better networks that link companies with universities and other R&D performing organisations' together with 'making more R&D finance available to companies enabling them to become involved further in R&D and knowledge related activities' should form the core policy issues. Significant importance is also attached to the creation of start up companies, attraction of high value foreign investment and an improved system of business support and advice. This result shows the increasing awareness of research performers of the need to address corporate requirements through stronger links between companies and R&D performing organizations. There are some implications and opportunities for academia, research, business and government to develop collaborative links. Primarily, an explicit regional innovation policy has to be compiled to assist the development of reactive economic networks from one side and of proactive research institutes from another side. The next step is the enhancement of clustering support policies related to research and development (R&D) activities among R&D researchers and targeted business sectors; this will strengthen the role of intermediaries in the cluster building process. Also, the creation of the new technological firms should be considered as a means to support the introduction of new ideas and innovation processes into the marketplace through new or already existing firms. New areas need to be identified in between traditional sectors where innovation can flourish, capitalizing in new technologies and shifting to new activities. Finally, a culture of innovation should be fostered throughout the whole region. Cultural changes toward innovation and entrepreneurship should be promoted, especially in the community of young generation of scientists.

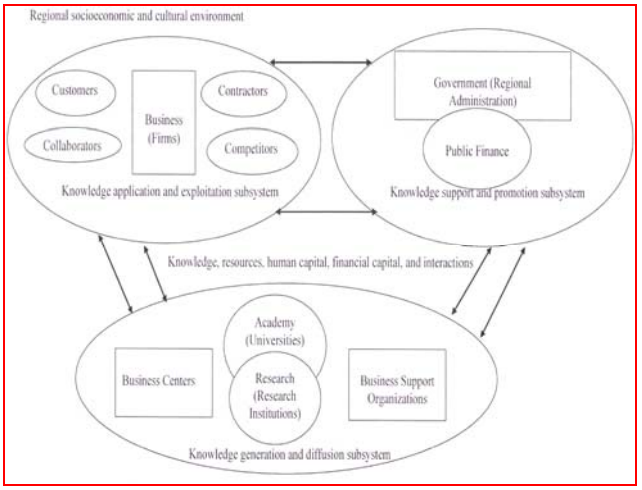


Figure 4 The Proposed Framework of RIS for the Kharkiv region (built on the Framework of RIS by Cook and Memedovic, 2006)

CONCLUSION

In terms of practical implications this study contributes to the knowledge in region by providing a framework for the development of a regional innovation system. In this study we have proposed a framework of regional innovation system for the Kharkiv region in the Eastern Ukraine. The present study revealed some important findings, but is not free of methodological limitations. Firstly, a relatively small sample of respondents was used and this rendered impossible the use of more sophisticated statistical analysis. By clarifying the limitations of this paper, we suggest directions

for future research. It would be interesting to carry out a survey of universities, research laboratories and research centres in the region, collecting data on knowledge assets, knowledge flows and interaction with relevant organisations and regional business. The specific research in that area could help to examine data in knowledge stock within the organisations and their competitiveness in order to benchmark the importance and effectiveness of various factors. In addition, the analysis of data on knowledge transfer would assess how knowledge is transferred by the research organisations to the regional economy. Furthermore, it would examine the barriers faced by the organisations in terms of transferring knowledge to firms in the region and their perceptions of barriers faced by firms with respect to acquiring or creating knowledge. Finally, their opinion about what should form the core policy for the development of R&D in the region could be examined in order to draw further conclusions. This research is part of a larger study examining/gathering data on knowledge assets, knowledge flows and interaction with support organisations in the manufacturing and services sectors, including sectors that are commonly identified as "knowledge-based". Moreover, it would be interesting to carry out similar studies in less favoured regions of the Eastern Ukraine in order to compare with the present investigation.

REFERENCES

[1.] *Lundvall, B. (2007), "National innovation systems-analytical concept and development Tool", Industry and Innovation, 14(1): 95-119.*

[2.] *Cooke, P. (2007), "To construct a regional advantage from innovation systems first build policy platforms", European Planning Studies, 15(2): 179-194.*

[3.] *Arundel, A.; Lorenz, E.; Lundval, B.; Valeyere, A. (2007), "How Europe's economies learn: a comparison of work organisation and innovation mode for the EU-15", Industrial and Corporate Change, 16(6): 1175-1210.*

[4.] *Bruijn, P. and Lagednik, A. (2005), "Regional innovation systems in the Lisbon strategy", European Planning Studies, 13(8): 1154-1171.*

[5.] *European Innovation Scoreboard (2008), "Comparative analysis of innovation performance", Available from: www.proinno-europe.eu/EIS2008/website /docs/EIS_2008_Final_report.pdf [Accessed on the 1st April 2009].*

[6.] *Niosi, J. (2008), "Technology, development and innovation systems: an introduction", Journal of Development Studies, 44(5): 613-621.*

[7.] *Pellegrin, J. (2007), "Regional innovation strategies in the EU or regionalized EU innovation strategy?", Innovation, 20(3): 203-221.*

[8.] *Cook, P. and Memedovic, O. (2003), "Strategies for regional innovation systems: learning transfer and applications", Policy Papers of The United Nations Industrial Development Organization. Available from: http://www.unido.org/fileadmin/user_media/Publications/Pub_free/Strategies_for_regional_innovation_systems.pdf [Accessed on the 5th April 2009].*

[9.] *Doloreux, D. and Parto, S. (2004), "Regional innovation systems: a critical synthesis", Discussion paper, United Nations University INTECH Institute for New Technologies Discussion Paper Series.*

[10.] *Freeman, C. (2002), "Continental, national and sub-national innovation systems-complementarity and economic growth", Research Policy, 31(1): 191-211.*

[11.] *Wu, W.; Chang, M.; Chen, C. (2008), "Promoting innovation through the accumulation of intellectual capital, social capital, and entrepreneurial orientation", R&D Management, 38(3): 265-277.*

[12.] *Kitanovic, J. (2007), "The applicability of the concept of national innovation systems to transition economies", Innovation: Management, Policy & Practice, 9(1): 28-45.*

[13.] *Radosevic, S. (2000), "Regional innovation systems in central and Eastern Europe: Determinants, organizers and alignments", Journal of Technology Transfer, 27(1): 87–96.*

[14.] *Bubenko, P. and Gusev, V. (2007), "Key moments in the development of regional innovation systems in Ukraine", Economics of Ukraine, 8(1: 33-39.*

[15.] *Gusev, V.; Eryomin, M.; Kuzmenko, O.; Murzikina, E. (2008), "Present conditions and future prospectives on the regional innovation development of the Kharkiv region", Economist, 5(1): 7-15.*

[16.] *Lupenko, U. (2008), "Current tendencies of the innovation development of Ukraine", Economist, 3(1): 35-45.*

[17.] *Bulletin (2008a), "Investments and innovation development of Ukraine", Available from:*

http://www.in.gov.ua/index.php?lang=en&get=141 [Accessed on the 1st September 2009].

[18.] Ibid. 15

[19.] Asheim, B. (2007), "Differentiated knowledge bases and varieties of regional innovation systems", Innovation: The European Journal of Social Sciences, 20(3), p.223-237.

[20.] Carlsson, B.; Jacobsson, S.; Holmen, M.; Rickne, A. (2002), "Innovation systems: analytical and methodological isuues", Research Policy, 31(2):.233-246.

[21.] Danson, M. (2000), "Regional development and the 'new regionalism' in England", Regional Studies, 34(9): 857-864.

[22.] Cook, P. and Memedovic, O. (2006), "Regional innovation systems as public goods", Policy Papers of The United Nations Industrial Development Organization. Available from: http://www.unido.org/fileadmin/import/60022_04_regional_innovation_systems_public_goods.pdf [Accessed on the 5th April 2009].

[23.] Laurentis, C. (2006), "Regional innovation systems and the labour market: A comparison of five regions", European Planning Studies, 14(8): 1059-1084.

[24.] Harmaakorpi, V. (2006), "Regional development platform method (RDPM) as a tool for regional innovation policy", European Planning Studies, 14(8): 1085-1104.

[25.] Ibid. 23

[26.] Andersson, M. and Karlsson, C. (2004), "Regional innovation systems in small & medium-sized regions", Innovation, 15(2): 102-132.

[27.] Ibid. 26

[28.] Etzkowitz, H. and Leyesdorff, L. (2000), "The dynamics of innovation: from national systems and mode 2 to a triple helix of University-Industry-Government relations", Research Policy, 29(1): 109-123.

[29.] Ibid. 8

[30.] Ibid. 22

[31.] Vigier, P. (2007), "Towards a citizen-driven innovation system in Europe", Innovation, 20(3): 191-202.

[32.] Doloreux, D. (2002), "What we should know about regional innovation systems?", Technology in society: an International Journal, 24(1): 243-263.

[33.] Edquist, C. (2000), "The systems of innovation approach and innovation policy: An account of the state art", Systems of Innovation: Growth, Competitiveness and Employment, 21(2): 54-76.

[34.] Opekun E. (2006), "Development of the innovation system in Grodno region: condition, problems, prospects", The Economic Conditions of Enterprise Functioning, 5(50): 80-85.

[35.] Oughton, C., Landabasso, M. and Morgan, K. (2002), "The regional innovation paradox: innovation policy and industrial policy", Journal of Technology Transfers, 27 (1): 97-110.

[36.] Morgan, K. (2000), "The learning region: institutions, innovation and regional renewal", Regional Studies, 31 (5): 491-503.

[37.] Ibid. 22

[38.] Ibid. 34

[39.] Ibid. 26

[40.] Ibid. 35

[41.] Ibid. 22

[42.] Taryanik, O., Gluhov, O. and Gluhova, S. (2008), "Today's innovation development of the enterprises of Ukraine", Statistics of Ukraine, 2(1): 63-67.

[43.] Bulletin (2008b), "Investments and innovation development of Ukraine", Available from: http://www.in.gov.ua/index.php?lang=en&get=141 [Accessed on the 1st September 2009].

[44.] Ukrainian Centre of Innovatics and Patent Information Services (2008), "Annual report", Available from: http://www.fabrikaidei.kiev.ua/newcipip/control/en/publish/article/mainpage?art_id=102367&cat_id=102418 [Accessed on the 1st September 2009].

[45.] Zayec, A. (2008), "Innovation development of the regions as a foundation of the economic prosperity: Case of the Kharkiv Region", Economics of Ukraine, 7(1): 12-25.

[46.] Bubenko, P. and Gusev, V. (2009), "Why innovation activities do not accelerate in Ukraine?", Economics of Ukraine, 6(1): 31-39.

[47.] Ibid. 43

[48.] Ministry of Economy of Ukraine (2004), "Review of Ukrainian economy development", Available from: http://www.me.gov.ua/control/en/publish/category/main?cat_id=42712 [Accessed on the 31st August 2009].

[49.] National Academy of Sciences of Ukraine (2008), "Annual report", Available from: http://www.ukrstat.gov.ua/ [Accessed on the 1st September 2009].

[50.] Morgan, K. (2004), "Sustainable regions: governance, innovation and scale", European Planning Studies, 12 (6): 872-889.

[51.] Ibid. 8
[52.] Doloreux, D. (2004), "Regional innovation systems in Canada: A Comparative Study", Regional Studies, 38(5): 481-494.
[53.] Ibid. 15

AUTHORS & AFFILIATION

[1.] PANAYIOTIS H. KETIKIDIS,
[2] IVAN MIROSHNYCHENKO,
[3] SOTIRIS ZYGIARIS

[1] CITY COLLEGE – INTERNATIONAL FACULTY OF THE UNIVERSITY OF SHEFFIELD, THESSALONIKI, GREECE
[2] SOUTH EAST EUROPEAN RESEARCH CENTRE (SEERC), THESSALONIKI, GREECE
[3] URENIO RESEARCH UNIT - ARISTOTLE UNIVERSITY OF THESSALONIKI, FACULTY OF ENGINEERING, THESSALONIKI, GREECE

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

[1.] ALEXANDER TANICHEV

NETWORKING AS A KEY FACTOR FOR SUCCESSFUL IMPLEMENTATION OF INNOVATIONS (COMPREHENSIVE ANALYSIS OF RUSSIAN AND EUROPEAN EXPERIENCE)

Abstract:
The purpose of the paper is to describe how the network of the innovative companies, government bodies and universities can provide a best solution for implementation of innovations under current turbulent business environment.
Using a sample of different Russian and European innovative companies preconditions and methods of building of successful networking were examined in order to make a comparative analysis and to analyse differences in implementation of innovations and to analyse the causes of these differences.
It was found that the differences in implementation Russian and European companies were engendered by the complex of the specific economic, politic and cultural (human) reasons. This research helps to better explain the ways to create a successful networking between different parties to provide better opportunities for implementation of innovations in current economic situation. The current research has the practical implication that it is important to understand the results of this research when deciding how to find a better way/network for the implementation of innovations. This study examines different situations in several countries using samples of different Russian and European companies.

Keywords:
Innovation, Networking, Venture Finance

INTRODUCTION

The systematic review from which the findings in this paper are presented was motivated by a quest to establish the extent to which Russian and European companies are engaged in networking activities when looking for develop their innovative capacity. Specifically, the objectives of the paper were to:
1.1) Establish the nature of the relationship between networking and innovation
1.2) Compare the degree and impact of networking behavior in different countries.
1.3) Explore examples and literature on the failure of business-to-business networks

INTER-RELATIONSHIPS BETWEEN THE NETWORKING INFRASTRUCTURE AND NETWORKING INTERFACE

For the purposes of this paper a network has been defined as: "a firm's set of relationships with other organisations" [1]. The literature provides two major reasons to explain why business-to-business networks form.
The first focuses on the resource requirements of firms where they are induced to form network relationships with other firms as a way of obtaining access to technical and/or commercial resources they lack [2]. From this perspective, the availability of opportunities to form relationships tends not to be viewed as a

constraint. The second argues that opportunities to form links tend to reflect prior patterns of inter-firm relationships. A firm's ability to develop network relationships with other firms is consequently based on its existing relationships and network capability [3].

The relative ease with which business-to-business networks form was also found to be influenced by social institutions. Empirical evidence shows that these institutions can shape the cultural conditions and infrastructure for networking, as well as, acting as brokers and intermediaries in network formation. Institutions such as: the legal system; the banking and finance system; the structure of labour markets, the education system and the political system [4] all shape the development of the infrastructure that is required to assist the formation of business-to-business networks.

Alliances enable firms to gain access to resources, particularly when time is of the essence [5]. Networks enable small business owners to link into R&D that is contracted out by larger firms, to engage in joint R&D ventures and to set-up marketing and manufacturing relationships [6]. Shan, Walker and Kogut [7] suggest that the number of collaborative relationships that a firm is involved in is positively related to innovation output, while conversely, closed networks have been found to foster innovation more than open ones [8]. The nature of networks encountered in this review illustrate that the optimal design for a network is contingent on the actions that the structure seeks to facilitate.

The evidence on network configuration shows a number of key points:

2.1) The nature of network configuration and its utility for innovation and competitiveness depends on the strategic requirements of individual firms [9].

2.2) Firms will use networks in different ways and will reconfigure them if necessary [10].

2.3) Network configuration often differs between different forms of innovation required by actors; networks for product innovation are quite different rom networks for process innovations [11].

2.4) All types of network configuration constantly change and adapt depending on the requirements of partners and the context within which the network operates [12].

To summarise, regarding networking formation and network configurations for innovation a number of points can be established from the empirical data. Networking can have a positive impact on innovation in all organisational contexts (i.e within established large organisations, small businesses and new entrepreneurial start-ups).

Research on 'innovation systems' has recently illustrated that innovation occurs more effectively where there is exchange of knowledge between systems, for example: between different industries; regions; or between science and industry [13]. Based on this work the importance of diversity of relationships in networks has been shown to have an impact on innovativeness [13]. The value of diverse partners for innovation is demonstrated in Kaufmann and Tödtling's [13] empirical research and were supported by Perez and Sanchez's [1] work on technology networks in the Spanish automobile industry and Romijn and Albu's [14] work on small high technology firms in the UK. These studies show that innovation is influenced by many actors both inside and outside the firm and that the most important partners are from the business sector, customers first (33.5% of firms) and suppliers second (21.9% of firms). Studies on partnering have also shown that the willingness of firms to co-operate outside of these 'direct' relationships was rather limited. For example, co-operation with Universities was 8.9% of firms in Kaufmann and Tödtling's work. In contrast, however, research in Germany highlights significant national differences with respect to involvement with research institutes and universities and illustrates the importance of scientific partners in some industry sectors [15].

The types of partner firms engaged in networking appears to be related to the type of innovation occurring. For example, incremental innovators rely more frequently on their customers as innovation partners whereas firms that have products new to a market are more likely to collaborate with suppliers and consultants. Advanced innovators and the development of radical innovations tends to demand more interaction with universities. This point is supported by Gemünden, Heydebreck and Herden's [16] survey of 4564 firms in the Lake Constance region (on the border between Austria, Germany and Switzerland).

The evidence shows that the innovation process, particularly complex and radical innovations benefit from engagement with a diverse range of partners which allows for the integration of different knowledge bases, behaviours and habits of thought. More risk adverse firms, however, tend to link their innovation activities and networking relationships to customers because knowledge of clients' demands as the risk of failure for the innovating firm is perceived to be lower. Innovation is no less valuable but is more incremental and productivity gains are more modest. This suggests a direct relationship between type of networking activity and innovation type (e.g. radical or incremental). The studies highlighted [15], [16] also show that firms that do not network possess much lower levels of competence in innovation.

The integration of suppliers in the innovation process has been highlighted as one of the factors leading to frame-breaking innovation [13], [1], [14].

The supply chain literature on networking behavior and innovation shows that supply relationships are one of the most important networking arrangements affecting innovation performance and productivity. Such relationships can be managed if firms are committed to collaboration are skilled in managing network relationships and are prepared to invest in research and development. Although much of the evidence points toward the important role of suppliers, co-suppliers and distributors in the innovation process it is to customers that businesses most often turn when seeking network relationships on issues associated with innovation [17].

Von Hippel [18] was one of the first researchers to highlight the pivotal role of customers or users in innovation processes. He highlights two forms of approach to innovation and networks and argues that customer focused approaches are the most effective as opposed to product focused ones. Customers should play an active role in the innovation process and are capable of identifying novel ideas for development [18].

In Gemünden et al's [16] study, for example, 75% of companies engaged customers in the innovation process and nearly 50% identified it as a precondition for innovation success. Conway [19] also found in his study of 35 successful innovations that customers were crucially important at the idea generation stage of the innovation process. Companies that stated they received essential information from customers were more successful with technological innovation and had greater commercial success.

The nature of the value of networks with key customers needs to be treated with some caution. Such networking relationships appear to be ideal for promoting incremental innovation and customers can usefully help innovators identify market opportunities. The role of third parties, such as professional associations, trade associations and publicly funded bodies specifically aimed at promoting innovation, such as technology transfer centres, have a positive impact on the development of interorganisational networks and innovation.

Whilst the review focused principally on business-to-business networks, science partners play an important role as independent network brokers and intermediaries within business networks. The important role of informal personal relationships in networks outside of the market interface was also evident in the wider research on science partners [20], [13]. As well as direct benefits of interaction between science and industry, science partners provide an important role as intermediaries within networks acting as network nodes where the exchange of knowledge can occur [21].

The importance of appropriate venture finance and loan finance for innovation has been widely documented [22]. The evidence base on venture capital networks and innovation shows a number of key issues. Coinvestment between venture capital firms in entrepreneurial businesses has been shown to be both beneficial for venture capitalists and provides better quality and larger funds for entrepreneurial businesses [23], [24]. The quality of links between venture capital firms, therefore, provides an important networking infrastructure for the commercialisation of innovation [25].

Examining the evidence on finance networks shows that they are important within the networking infrastructure and that cooperative investment appears to be beneficial for both investing firms and entrepreneurial businesses.

Institutional mechanisms designed specifically to create and facilitate networks come in many forms, the most common forms are clusters, incubators and centres for cooperation. Despite

the paucity of evidence, it is possible that innovation policies and regional infrastructures can assist networking activities leading to innovation.
The evidence on incubation tends not to focus specifically on the networking advantages of firms operating within incubators, however, it does illustrate some general benefits where networking is cited [26], [27], [25].

NETWORK MANAGEMENT

Network management is also considered crucial for successful innovation and firms need to improve their proficiency [28]. The evidence on the management of networks shows that managing informal and formal agreements, while establishing trust, means that the management of network relationships is inherently difficult. Those responsible for managing network relationships need to learn core network competencies over time, for example, being able to identify when an agreement needs a contract or should be based on good faith; the role that friendship or reputation plays in the identification of partners and, the kinds of milestones or interventions are needed to ensure a project stays on course [29].

NETWORK LIMITATIONS

The vast majority of the evidence analysed was extremely positive about the value of business-to-business networks and their impact on the innovation process. All networks have rules of engagement which constrain the partners' behaviour [30]. These rules are governed by the network's governance mechanisms and the infrastructure (particularly industrial culture) within which the network is embedded. Although the positive impact of networking on innovation performance appears conclusive some studies show that innovation can occur more effectively within large organisations.
Although networks have been shown to contribute to innovation and competitiveness, this paper has already demonstrated that they can also inhibit innovation by encouraging anti-competitive behaviour, suggesting that the ultimate value of a network is dependent upon what it is used for. The use of networking has also been shown to conflict with the strategic interests of particular companies at certain times.
From the review of the evidence a number of other limitations of networking have been demonstrated.
4.1) Love and Roper [31] when modelling UK, German and Irish investment in research and development in manufacturing find no link between external networking and innovation performance. Instead they find that innovation is more dependent on internal organisational networks. Tanichev [32], [33] pointed differences in the networking and innovation performance for Russian companies.
4.2) Harris, Coles and Dickson [34] find that inter-firm networking can facilitate the innovation process but it will not necessarily lead to innovation success.
4.3) Tomas and Arias [35] also point out that closely connected networks also encounter drawbacks for example, increasing the complexity of the innovation process; losing ownership control of the innovation; and, information lop-sidedness where partners have very different understandings about the nature of agreements.

CONCLUSION

This paper of the evidence base concerning the relationship between networking and innovation has highlighted a number of areas in need of future research. The first obvious gap in the literature concerns the relationship between networking and different forms of innovation, such as, process and organisational innovation. To date the focus of research across disciplines has been primarily on product innovations. Whilst process and organisational innovation may be, by their very nature, more difficult to study, the types of networking activity occurring in the development, diffusion and implementation of process and organisational innovation warrants serious attention. It may then be possible to compare networking activities and configurations across these different types of innovation and derive useful conclusions about the differences.
More generally, perhaps the most significant area for future research is in the area of network dynamics and network configurations. The evidence suggests that there is considerable ambiguity and contestation within the literature regarding appropriate network configurations for successful innovation. Whilst networking

configurations are clearly contingent upon such factors as sector, type of innovation (radical vs. incremental; product vs. process), far more systematic research needs to be conducted in this area.

The review also highlighted that study on innovation and networking attracts interest across many disciplines and it is useful to suggest here that funding be provided for more inter-disciplinary research in the areas that have been highlighted here. The paper has also highlighted that dense networks have a positive impact on long-term innovation.

REFERENCES

[1.] Perez, M. and Sanchez, A. Lean production and technology networks in the Spanish automotive supplier industry. Management International Review, 2002, 42 (3), 261.

[2.] Ahuja, G. The duality of collaboration: Inducements and opportunities in the formation of interfirm linkages. Strategic Management Journal, 2000, 21 (3), 317.

[3.] Granovetter, M. Economic action and social structure: The problem of embeddedness. American Journal of Sociology, 1985, 91, 481.

[4.] Grandori, A. and Soda, G. Inter-firm networks: Antecedents, mechanisms and forms. Organization Studies, 1995, 16 (2), 183.

[5.] Teece, D. Profiting from technological innovation: implications for integration, collaboration, licensing and public policy. Research Policy, 1986, 15, 285.

[6.] Rothwell, R. and Dodgson, M. External linkages and innovation in small and medium-sized enterprises. R&D Management, 1991, 21 (2), 125.

[7.] Shan, W., Walker, G. and Kogut, B. Interfirm cooperation and startup innovation in the biotechnology industry. Strategic Management Journal, 1994, 15, 387.

[8.] Coleman, J. Social capital in the creation of human capital. American Journal of Sociology, 1988, 94, 95.

[9.] Ostgaard, T. A. and Birley, S. (1994). Personal networks and firm competitive strategy – a strategic or coincidental match. Journal of Business Venturing, 1994, 9 (4), 281.

[10.] Kash, D. E. and Rycroft, R. Emerging patterns of complex technological innovation. Technological Forecasting and Social Change, 2002, 69 (6), 581.

[11.] Gemünden, H. G., Ritter, T., and Heydebreck, P. Network configuration and innovation success: An empirical analysis in German high-tech industries. International Journal of Research in Marketing, 1996, 13 (5), 449.

[12.] Larson, A. (1991). Partner networks: Leveraging external ties to improve entrepreneurial performance. Journal of Business Venturing, 1991, 6(3), 173.

[13.] Kaufmann, A. and Tödtling, F. Science-industry interaction in the process of innovation: The importance of boundary-crossing between systems. Research Policy, 2001, 30 (5), 791.

[14.] Romijn, H. and Albu, M. Innovation, networking and proximity: Lessons from small high technology firms in the UK. Regional Studies, 2002, 36 (1), 81.

[15.] Ritter, T. and Gemünden, H. Network competence: Its impact on innovation success and its antecedents. Journal of Business Research, 2003, 56, 745-755

[16.] Gemünden, H., Heydebreck, P. and Herden, R. Technological interweavement: A means of achieving innovation success. R & D Management, 1992, 22 (4), 359.

[17.] Ragatz, G., Handfield, R., and Scannell, T. Success factors for integrating suppliers into new product development. The Journal of Product Innovation Management, 1997, 14 (3), 190.

[18.] Von Hippel, E. Successful industrial products from customer ideas: A paradigm, evidence and implications. Journal of Marketing, 1978, 42 (1), 39.

[19.] Conway, S. Informal boundary-spanning communication in the innovation process: An empirical study. Technology Analysis & Strategic Management, 1995, 7 (3), 327.

[20.] Verspagen, B. Large firms and knowledge flows in the Dutch R&D system: A case study of Philips Electronics. Technology Analysis & Strategic Management, 1999, 11 (2), 211.

[21.] Bougrain, F. and Haudeville, B. Innovation, collaboration and SMEs internal research capacities. Research Policy, 2002, 31(5), 735.

[22.] Harding, R. Venture capital and regional development: Towards a venture capital system. Venture Capital, 2000, 2 (4), 287.

[23.] Bygrave, W. Syndicated investments by venture capital firms: A networking perspective. Journal of Business Venturing, 1987, 2 (2), 139.

[24.] Bygrave, W. The structure of investment networks of venture capital firms. Journal of Business Venturing, 1988, 3 (2), 137.

[25.] Dranitsyna, E., Klokova, N., Tanichev, A., Vinogradova, T., Zubarev, V., Zudilova E. System of Interaction between Government Bodies and Small Business Sector, Manchester Business School, Manchester, 1997

[26.] Smilor, R. Commercializing technology through new business incubators. Research Management, 1987, 31 (5), 36.

[27.] Smilor, R. Managing the incubator system: Critical success factors to accelerate new company development. IEEE Transactions and Engineering Management, 1987, 34 (3), 146.
[28.] Ferrary, M. Managing disruptive technologies life cycle by externalising the research: Social network and corporate venturing in the Silicon Valley. International Journal of Technology Management, 2003, 25 (1), 165.
[29.] Shaw, B. Innovation and new product development in the UK medical equipment industry. International Journal of Technology Management, 1998, 15, 433.
[30.] Boter, H. and Holmquist, C. Industry characteristics and internationalization processes in small firms. Journal of Business Venturing, 1996, 11 (6), 471.
[31.] Love, J. and Roper, S. Location and network effects on innovation success: Evidence for UK, German and Irish manufacturing plants. Research Policy, 2001, 30 (4), 643.
[32.] Таничев А.В., Пышкин А.В. Проблемы развития рынка инноваций и формирования инновационной инфраструктуры в российской экономике. Научно-технические ведомости СПбГПУ, Экономические науки, 2009, 4(81), 254-260
[33.] Tanichev A. Using long wave's theory for mastering growth strategy. Proceedings of International scientific conference "Insights into the sustainable growth of business", 19-21 November 2009, Vilnius, Lithuania
[34.] Harris, L., Coles, A. and Dickson, K. Building innovation networks: Issues of strategy and expertise. Technology Analysis and Strategic Management, 2000, 12 (2), 229.
[35.] Tomas, J. and Arias, G. Do networks really foster innovation? Management Decision, 1995, 33 (9), 52.

AUTHORS & AFFILIATION

[1.] ALEXANDER TANICHEV

[1.] BALTIC STATE TECHNICAL UNIVERSITY, SAINT-PETERSBURG, RUSSIA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

FACULTY OF ENGINEERING HUNEDOARA
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

ALEKSANDER JANEŠ[1], SLAVKO DOLINŠEK[2]

HOW TO UNDERSTAND THE COMPASS WHICH WE ALREADY HAVE?

Abstract:
Purpose of this research is the identification and analysis of the key process indicators which significantly contribute to the benefits of the business processes exploitation in the Luka Koper, d.d., and, to display the importance of the systematic process approach. With this case study we attempted to get deeper understanding, and to clarify and evaluate the enablers and results in the frame of the implemented EFQM business excellence model. Medium framed qualitative and quantitative analyses indicate the benefit of the identificated key processes (performance) indicators or Balanced Scorecard (BSC) and their influence on the strategic directions.

Keywords:
EFQM, business processes, BSC, sustainability, entrepreneurship

INTRODUCTION

The Port of Koper was established in 1957. Since then they developed into the significant port and logistic system in the Adriatic maritime market. Luka Koper, d.d. of today is exceedingly successful and rapidly developing company, which is founded on their adopted values: knowledge, enterprise, partnership, responsibility and respect.
Company Luka Koper, d.d. was the winner of the Slovenian national quality award (PRSPO) in 2002 and finalist in the European Excellence Award 2006 (EEA). With the European Foundation for Quality Management (EFQM) model integration in management system, the company develops a holistic measurement system, continuous improvements, self-assessment, benchmarking, inter-organizational learning and good practice transfer. EFQM model is usually implemented within the pilot project. Most frequent purpose for such approach is bound to participation in a national quality award (NQA) process.

EFQM model, when used in practice, shows that is difficult to determine transparent relations of enablers (causes) with business results (effects). Connecting approaches are undefined [1] and the problem lies in the structure of the EFQM model [2]. However, the implemented model doesn't enable the identification of all information on the relationships (correlations) between process Key Performance Indicators (KPI's) and the business results. In this manner company doesn't have transparent evaluation of resource inputs in efficiency of the implemented EFQM model in the management system. Diagnostic activities, in this context, are usually "too expensive" to the company and it's usually overworked employees. Because of the latter's outlook, diagnostic is regarded as being time-consuming activity. With the development and application of a model for identification of the influential processes KPIs' which gives important contribution to the business results, company can perform its own diagnostic activities and focus on improvements of the key processes in a short and long-time period.

Analysis of researches, documents and records, semi-structured questionnaires and processes KPI's values indicates the latter's significant influence on the business results. Qualitative and quantitative analysis of many researches about excellence model implementation, performed all over the world i.e. Australia, China, EU, New Zealand and USA, indicates the general favorable influence of KPI's on the business results of organizations [3,4,5,6,7,8,9].

LITERATURE AND RESEARCHES REVIEW

EFQM model was developed, mainly from recommendations of dr. Tito Conti, at the beginning of ninety's of twentieth century, and introduced to the public at EFQM Forum 1991 in Paris. First European Quality Award, actual EFQM Excellence Award (EEA), was handed over in 1992 [2]. Slovenian first pilot project of National Quality Award (PRSPO) was accomplished in 1996, and first award was handed over in 1998. EFQM model is founded on the self-assessment likewise as other excellence models around the world i.e. Malcolm Baldrige NQA (MBNQA) in USA and Deming Prize (DP) in Japan [10]. Self-assessment contains regular activity review and identification of active inertia on every area of organization's activity against the nine criteria of EFQM model [11], [12].

First five criteria represent enablers and the last four criteria represent business results of the organization. Enablers tell what organization is doing; meanwhile results indicate what organization achieves. In such a manner results are the consequence of enablers and enablers are improved on the feedback information's basis from the results. Model enables many approaches for the excellence achievement in all viewpoints of organization activities. Excellent results at key performance, customers, people and society are achieved with leadership which is the driving force of policy and strategy, people, partnerships and resources [13].

Self-assessment should be triggered from the management board when company defines key strategic objectives and directions. Triggering should be ended with the list of objectives which have the highest priority. At the same time the objectives list and priority tasks form the framework of the self-assessment process [11]. EFQM model is applicable also at definition of the Total Quality Management (TQM) philosophy. In that way represents a help at fostering TQM from the part of the management board [10], [14].

American research about effective implementation of the management paradigm-TQM and its impact on the financial results of 600 quality award winners, showed, that all of them achieved significant improvement in stock returns, operating income, sales, total assets, employees, return on sales and return on assets [4], [12].

In Europe, EFQM and BQF organizations sponsored the research for the identification of correlations between adopted principles of the EFQM model and improved business results. Research showed business performance improvement on a short and long-term for the companies which effectively implemented the principles of the EFQM model [9].

Results of PriceWaterHouseCoopers research on the sample of 3500 public sector organizations in the UK indicated that the tool for continuous improvements is the EFQM model in 56% [6].

Research, in the EU northern region, conducted by Kristensen, Juhl and Eskildsen showed that Danish companies, who applied Danish Business Excellence Index are achieving significantly better results than other companies [15]. Sweden Institute for Quality performed equal research for the Swedish companies which showed similar results [5].

Likewise the results of researches in Australia, New Zealand and China confirmed positive effects of systematic application of the excellence model [3], [7], [8].

Winning the Slovenian PRSPO means to get the highest national quality award of the Republic of Slovenia, which basis on the EFQM model.

Research about registered competitors in the frame of Slovenian PRSPO and comparative data from the EEA showed that main motives and benefits of the EFQM model application in the EEA frame are self-assessment, benchmarking, employee engagement and feedback information's. Meanwhile the Slovenian PRSPO competitors emphasized excellence as a part of the strategy, continuous improvements and good practice exchange [16].

In Slovenia we have, after more than a decade of PRSPO existence, some cases of excellent companies which achieved exceptional success also on the European level and placement

among the EEA finalists. This are: Hermes Softlab, d.d., in 1998, Luka Koper d.d. in 2006, and Trimo Trebnje d.d. in 2007.
Adaptation of the EFQM model to the company and its capabilities [2], [13] with regularly usage of self-assessment [16], [17] is essential for the successful companies. Prestigious award winner's cases all over the world are confirming that organizations with the systematic use of tools for continuous improvements are achieving lasting operational excellence. In the last 19 years the EFQM model showed validity in excellence recognition, as an informal standard for assessment and benchmarking tool [2]. At this segment excellence project represents important contribution to the measures for carefully planned operations, quality increasing as well as assurance for uniformed platform for benchmarking and understanding the business excellence achievement in EU space and wider.

METHODOLOGY

Main purpose of the research was to establish if it is possible to set up an adequate model for identification of the processes KPIs' which have significant influence on the business results. Based on problem identification and purpose of the research, the following specific objectives were defined:

1. Determination of the groups of processes KPIs' and groups of results,
2. Determination of the cause-effect relations between processes KPIs' and results.
3. Identification of influential processes KPIs' which gives important contribution to the key performance results of the company.
4. Setting up and the application of the model for identification of the KPI's in correlation with the results of the company.

The paradigmatic orientation of this research is quantitative, because the influence of the process KPIs' on the company's business results is discussed. As a research method was chosen case study [18] which is based on the following criteria: self-assessments are performed regularly since 1999, participation in PRSPO competitions (PRSPO winners in 2002) and participation in EEA competitions (R4E in 2005, Finalist in 2006 and participation in 2009).
Documents and records were studied closely and included analysis of public available data from company's application reports for PRSPO and EEA competition, web sites and annual reports. Observations were performed during research which is still being continued. Employees who participated into the research were mainly from the middle management level and some experts which are acquainted with the EFQM model and its terminology [14], [18], [19]. Data for the model testing, application and analyses were gathered in September and October 2009.

EMPIRICAL FINDINGS AND DISCUSSION

With the NCCA method we discussed non-linear relationships among four groups of variables, on the nominal and/or ordinal and numerical level [20], [21], [22]. All observed variables are processes KPI's, which are measured in eight Profit Centres (PC) for maritime throughput. The values of the general canonical correlations, implemented in the three year analyses, are relatively high and somewhat different. In most, the difference is expressed between the analyses of the years 2006 and 2007 and also between 2007 and 2008. In addition to the high canonical correlations are also high Eigenvalues, which show the suitability of the NCCA method (analysis 2007 Fit = 1,996). Loss or unexplained variance is relatively evenly distributed by the two dimensions and groups of variables, and is low (analysis 2007 Loss = 0,004).

Table 1 General canonical correlations ρ, Fit and Mean Loss

General canonical correlations / Analysis and optimal scaling level	ρ_1	ρ_2	Fit	Mean Loss
1. Analysis 2006				
Ordinal	1,000	0,667	1,750	0,250
Numerical	0,893	0,665	1,669	0,331
2. Analysis 2007				
Ordinal	0,999	0,667	1,749	0,251
Ordinal and Multiple Nominal	0,997	0,996	1,996	0,004
Numerical	0,937	0,608	1,659	0,341
Numerical and Multiple Nominal	0,989	0,952	1,956	0,044
3. Analysis 2008				
Ordinal	1	0,667	1,750	0,250
Numerical	0,831	0,592	1,567	0,433

The findings of the parameters calculation are represented in some detail with analysis of 2007, which had the highest general canonical correlation with ordinal and multiple nominal optimal scaling levels (Table 1).
Direction through 1st. and 3rd. quadrant is set by following variables (KPI's): number of

*improvements NIm4, Fuel consumption FC3 (Explained Variance (EV) 100% *), which are associated with higher values and the Correlation Coefficient (CC) 100*, while the number of improvements NIm4 and Maritime throughput MT2 (EV 14.15%) are correlated with the CC 37.62. Maritime throughput MT2 is associated with lower levels with electricity consumption EC3 (the CC between MT2 and EC3 is 10.45). On the other hand are, the added value per employee AV1 (EV 96.82%) and revenue per unit RU1 (EV 58.98%), which are correlated with a CC of 75.57. AV1 and total costs per unit TCU3 (EV 30.02%) are correlated with the CC of 53.91. All these variables are associated with higher values. Displayed variables (Figure 1) explain the increased fuel consumption in 2007 as well as maritime throughput, added value per employee and operating costs, compared to 2006.*

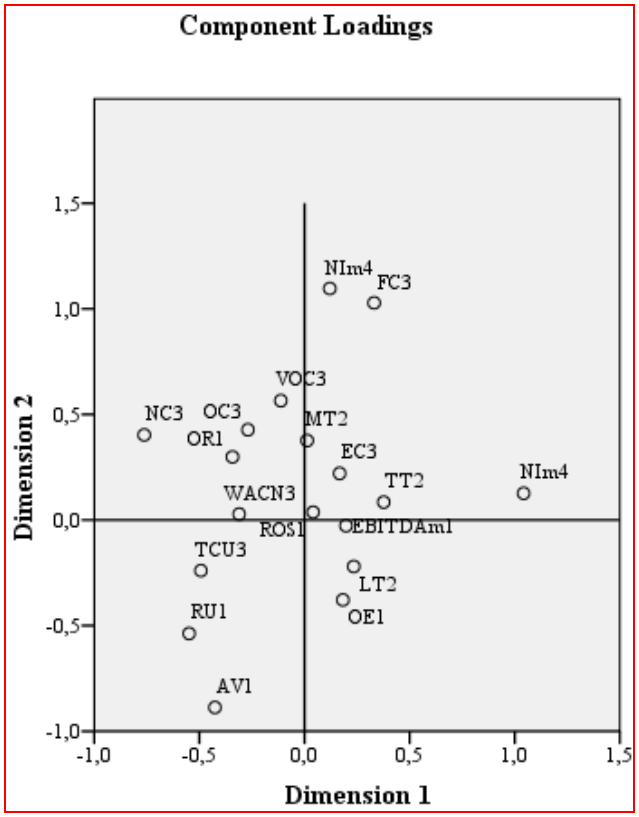


Figure 1 NCC Analysis 2007 (Ordinal and Multiple Nominal)

The direction through 2nd and 4th quadrant is set by variables (KPI's): Number of complaints on billing NC3 (EV 74.31%), variable operating costs VOC3 (EV 33.2%; NC3 and VOC3 are correlated with a CC of 49.67) and operating costs OC3 (EV 25.47%; NC3 and OC3* are correlated with a CC of 43.4) are associated with higher values.*

On the other side are, the Operating Efficiency OE1 (ev 17.64%) and Land throughput LT 2 (ev 10.32%e; OE1 and LT2 are associated with CC equal to 13.49) which are associated with higher values. The variables in the Figure 1 are explaining the decline in the number of complaints, increase in operating efficiency and land throughput compared to 2006 (22,23,24]. The results of calculation in this case, are certainly more reliable due to the chosen optimal scaling level and calculated Fit. In this case, the relationships between the variables, taken into account in the calculation, are treated as a non-linear what is in practice more likely. In a similar way we analyzed the KPI's from the 2006 and 2008 as illustrated in Figure 2 and Figure 3 below. Variables (KPI's) have been arranged somehow differently than in 2007 (see also Table 1).

All three analyses show the correlation and explained variance of variables which varies from fair to very good. On the basis of analysis carried out, we conclude on the importance of the observed variables (KPI's) which are monitored in the frame of the EFQM model and narrower in the four perspectives of business performance (BSC). Namely the length of the vectors from the origin to the coordinates (Figure 1) of each variable indicates its explained variance by all the other variables. The product between any two observed variables indicates the correlation between them [25]. For further in-depth analysis of the relationships between variables is recommended to perform analyses at the level of quarters of a year or even months.

CONCLUSION

With the increasing complexity of the business environment and actual global crisis, companies focuses more and more on managing the processes and employees who are involved with them. Holistic approach (i.e. EFQM model implementation) is the challenge to support development of the Integrated Management System in order to encourage nourishment of adopted values, processes exploitation, innovation, productivity, social responsibility and preservation of the environment.

While fostering exploitation of the resources and key processes, companies frequently integrate standards (i.e. ISO 22000, BS OHSAS 18001, BSC, and EMAS) into their management system. In the case of Luka Koper, d.d., standards and models

enables basis for identification and implementation of the strategic projects like: managing land terminals which are linking Koper Bay with Central and Eastern Europe, boosting the volume of quality cargoes by introducing new capacities, becoming the driving force of development in railway cargo transport, contributing to the development of the passenger port in Koper; and providing sea protection in the whole of the Slovenian sea.

Many researches of the excellence model indicate the general favorable influence of the EFQM model implementation [3], [4], [5], [6], [7], [8], [9], [22]. Regarding to the ascertainments of the NCC analysis above, we confirmed the model employability and identified their relationships in sense of explained variance of the observed variables (KPI's) and their correlations. Analyses findings represent the confirmation of the successful business model harmonization which has opportunities for improvements too. In this paper we represented only a part of our research findings because research is still being performed. From the actual analysis we ascertained that implementation of the EFQM model fosters exploitation of the key business processes and all involved resources. With the application of a model for identification of the influential processes KPIs' which gives important contribution to the business results, company can perform its own diagnostic activities and focus on improvements of the key processes and consecutively on the results in a short and long-term.

ACKNOWLEDGMENT

This Research Applicative Project is co-funded by the Public Agency for Research of Republic of Slovenia (ARRS) and Port and Logistic system Luka Koper, d.d.

REFERENCES

[1.] *Babič, M.: Odličnost ne pozna meja. 19. Mednarodni forum odličnosti in mojstrstva Otočec. Zbornik referatov. Društvo ekonomistov Dolenjske in Bele krajine. Novo mesto, 2007, 193-209.*

[2.] *Conti, T. A.: A history and review of the European Quality Award Model. The TQM Magazine, 2007, vol. 19, no.2, 112-128.*

[3.] *Hausner, A., Vogel, N.: Linking Botomline Improvements with the Australian Business Excellence Framework. The 1999 Australian Quality Council. University of Wollongong. Wollongong, 1999.*

[4.] *Hendricks, K. B., Singhal, V.R.: The Impact of Total Quality Management on Financial Performance, 2000, http://www.efqm.org/uploads/excellence/vinodfull 0report.pdf, 2008-7-27.*

[5.] *Eriksson, H., Hansson, J.: The impact of TQM on financial performance, Measuring business excellence, 7(2003), 36–50.*

[6.] *PWHC – PriceWaterHouseCoopers: Report on the evaluation of the public sector excellence programme, 2000, Http://archive.cabinetoffice.gov.uk/eeg/2001/pwcreport/pwcreport.pdf, 2008-7-25.*

[7.] *Mann, R., Grigg, N.: A Study of National Strategies for Organizational Excellence, Multinational Alliance for the Advancement of Organizational Excellence Conference: Oxymorons, Empty Boxes or important Contributions to Mangement Thought and Practice.Sydney 2006, Proceedings. Sydney: Multinational Alliance for the Advancement of Organizational Excellence, 2006.*

[8.] *Miyagawa M., Kosaku Y.: An empirical study of TQM practicies in Japanese-owned manufacturers in China, International Journal of Quality & Reliability Management, 22(2005)6, 536-553.*

[9.] *Boulter, L., Bendell, T., Abas, H., Dahlgaard, J., Singhal, V.: Report on EFQM and BQF funded Study, 2005, http://www.mirs.gov.si/fileadmin/um.gov.si/pageuploads/Dokpdf/PRSPO /EFQMFinalReport.pdf.*

[10.] *Bou-Llusar, C. J., Escrig-Tena, A. B., Roca-Puig, V., Beltran-Martin, I.: To what extent do enablers explain results in the EFQM excellence model?, International Journal of Quality & Reliability Management, 22(2003)4, 337-353.*

[11.] *Conti, T., Samoocenjevanje družb, DZS, Ljubljana, 1998.*

[12.] *Urad RS za meroslovje – MIRS: Model odličnosti. Velika podjetja. Ministrstvo za šolstvo, znanost in šport. Ljubljana, 2004.*

[13.] *Dolinšek, S., Piskar, F., Faganel, A., Kern Pipan, K., Podobnik, D.: Management kakovosti, Koper, Slovenia, Fakulteta za management, 2006.*

[14.] *Eriksson, H., Garvare, R.: Organisational performance improvement through quality award process participation, International Journal of Quality & Reliability Management, 22(2005)9, 894-912.*

[15.] *Kristensen, K., Juhl, H. J.,Eskildsen, J.: Benchmarking excellence, Measuring Business Eccellence, 5(2001)1, 19-23.*

[16.] Kern Pipan, K.: Management stalnih izboljšav in modeli odličnost (EFQM, CAF), HRM, 5(2007)17, 68-73.
[17.] Samuelsson, P., Nilsson, L. E.: Self-assessment practicies in large organizations. The International Journal of Quality & Reliability Management, 19(2001)1, 10-23.
[18.] Yin, R. K.: Case study research: design and methods, Sage, Thousand Oaks, 1994.
[19.] Janeš, A., Faganel, A.: Zadovoljstvo udeležencev projekta poslovne odličnosti v PS Mercator, d. d. Projektna mreža Slovenije, 11(2008)1, 9-17.
[20.] Gifi, A.: Nonlinear Multivariate Analysis, Wiley. Chichester, 1990.
[21.] van der Burg E., de Leeuw, J., Verdegaal, R.: Homogeneity analysis with k Sets of variables: an alternating least squares method with optimal scaling features, Psychometrika, 53(1988)2, 177-197.
[22.] Janeš, A., Dolinšek, S.: Management of technology: Case of the port and logistic system, Proceedings of MOTSP 2009, Sibenik, June 2009, 79-84.
[23.] Luka, Koper: Letno poročilo 2007, Luka Koper, Koper, Slovenia, 2008a.
[24.] Luka, Koper: Gradivo za poslovno odličnost po modelu EFQM za leto 2008, Luka Koper, Koper, Slovenia, 2008b.
[25.] Colonna, P., d`Amoja, S., Fonzone, A.: Structure of Mobility Phenomenon: Outcomes of an Exploratory Analysis with Techniques of Non-linear Multivariate Analysis, http://sed.siiv.scelta.com/bari2005/181.pdf, 2008-07-11.

AUTHORS & AFFILIATION

[1.] ALEKSANDER JANEŠ
[2.] SLAVKO DOLINŠEK

[1] UNIVERSITY OF PRIMORSKA, FACULTY OF MANAGEMENT KOPER, SLOVENIJA
[2] UNIVERSITY OF LJUBLJANA, INSTITUTE FOR INNOVATION AND DEVELOPMENT, SLOVENIJA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

FACULTY OF ENGINEERING HUNEDOARA
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

DIANA KOPEVA[1], NIKOLAY SHTEREV[2], DIMITAR BLAGOEV[3]

BASIC DETERMINANTS OF BULGARIAN INDUSTRIAL GROWTH AFTER THE EU ACCESSION BULGARIA

Abstract:
Bulgarian industry has lost many of its positions since of the beginning of 1990s. Structural reform during transition period resulted in markets' lost; lack of innovations, low product quality, inefficient organizational and production structure. This has changed after the end of the economic crisis of 1996. Industry growth in Bulgaria has been driven by two factors: 1) the increase in the effectiveness of use of the existing capital and labor resources, resulting from the financial stabilization, privatization, liberalization and institutional reforms, and 2) the gradual recovery of the physical capital lost during the transition period through a pick-up in domestic and foreign investment. The paper analyses basic determinants of industrial growth such as innovation behavior on sectorial and micro level, deregulation and investments, education, competitiveness, and the overall impact of macroeconomic environment respectively – fiscal policy, inflation, international trade, financial system. This problem is not deeply studied and only a few economists do a research on it after Bulgarian accession to the EU. The analysis reveals the level of impact of each factor on Bulgarian industrial growth before and after accession to the European Union.

Keywords:
Industrial growth, innovations, investment behavior, Bulgarian economy

INTRODUCTION

Bulgarian industry has lost many of its positions since of the beginning of 1990s. The structural reform during the transition period resulted in loss of markets, lack of innovations, low product quality, inefficient organizational and production structures. All this changed after the end of the 1996 economic crisis.
Industrial growth in Bulgaria was driven by two factors: 1) the increase in the effectiveness of the use of existing capital and labor resources, resulting from the financial stabilization, privatization, liberalization and institutional reforms, and 2) the gradual recovery of the physical capital lost during the transition period through a pick-up in domestic and foreign investment.

In this paper we claim that the problem has not been studied in depth and that only a few economists have researched it after Bulgaria's accession to the EU. The analysis reveals different factors that have influenced Bulgarian industrial growth before and after the accession. The assessment of the endogenous and exogenous factors determines the key role of innovation, R&D and human resource development, and demonstrates the interrelation between innovations – investments – industry growth.
Section one of the paper is Introduction. Section 2 provides a brief explanation of the current situation, while Section 3 is focused on the analysis of the basic determinants of industrial growth in the last eight years (2000 – 2008), based on macro and firm level data. The conclusions of the study are presented in Section 4.

CURRENT SITUATION

Many and different interpretations of growth and dynamics may be found in literature. According to Krafft [1], there is a different explanation of industrial dynamics and the role of industrial growth. One of the most common definitions treats industrial dynamics as a result of the increasing ability to enforce the industry evolution (Forrester [2]) for long-term periods. Industrial dynamics does not only describe and analyze the current industrial structure, but also those market-driven factors that can change the economic structures over time. (Krafft [3]).

Therefore, the adoption of the "evolutionary approach" of industrial dynamics is fundamentally set by Schumpeter's entrepreneurs. Thus, the existence of "entrepreneurial governance" as an economic phenomenon changed the industry from the inside. Not surprisingly, managing the endogenous factors for dynamic are the same which are the major challenge for industrial growth (Krafft [3]).

Bo Carlsson and Gunnar Eliasson [4] define economic growth as a result from the interaction of all market actors. From this point of view, economic growth looks like a continuous enlargement of present and potential markets. Therefore, economic growth is in many cases measured by the growth of GDP (Ju, Lin and Wang [5]).

According to the definitions, both industrial dynamics and economic growth are macroeconomic phenomena which are driven by micro level factors. Evidence and proof of both processes can be found at national, sectorial and micro level. Therefore, three essential steps that reveal the factors driven by industrial dynamics are defined:

- *to analyze changes of national growth indicators, such as GDP and GNP;*
- *to analyze some key structural changes, such as: level of competition; level of labor force absorption; level of innovation;*
- *to analyze intra-firm changes which are directly connected to economic growth.*

The ability to explore the link between economic inputs and outputs is essential in identifying industrial dynamics. We therefore need to focus our attention on "the systemic characteristics" of industrial development. We should mention that economic growth is not a result of single firm activities, but a result of market players' activities (see Ju, Lin and Wang [5])

ANALYSIS OF INVESTMENT AND INNOVATION BEHAVIOR IN BULGARIA IN THE LAST EIGHT YEARS (2000 – 2008)

Basic Determinants of Industrial Growth in Bulgaria

Macroeconomic stability. *Since 1999, the Bulgarian economy can be described as stable. One can see that all macroeconomic indicators, such as GNP, GDP unemployment, inflation, salaries, etc., have went up. The Bulgarian economy retained the strong growth of the past few years. The stable economic growth supports the industrial dynamics.*

Currency board. *A Currency Board was introduced in Bulgaria in 1998. The exchange rate of the Bulgarian national currency (BGN) was fixed at 1.95583 Euro. Currency board guaranteed the investments in Bulgarian economy have been guaranteed. Therefore we find that the stable currency, in combination with the economic growth, is used by investors to generate greater added value from their investments. Hence we can make the conclusion that the currency board has stabilized innovation growth in Bulgaria.*

Access to international markets. *Bulgarian exports, and especially the exports to the EU partners, has also increased in the last 10 years. The main reason for export growth is the free market access for Bulgarian industrial products. As a country of a pre-accession status, in 2000-2007 Bulgarian producers had free access to the EU markets. However, EU clients typically had higher product quality requirements. As a result, there was a growing need for innovative products and technologies. Therefore, the free access to markets was one of the engines of innovation growth on Bulgaria during the last decade.*

Innovations. *Today, the development of science, innovation and related investments is increasingly seen as a tool for solving important social and economic problems and overcoming the impact of economic crises at global, regional and corporate level. Therefore, they invariably become the strategic objective in the concept of sustainable industrial growth. To secure sustainable industrial growth in the long term, innovations have to support the improvement of human resources quality, the creation of new*

products and technologies and their timely implementation and use in industries, the development of markets and the availability of financing innovations. Despite some achievements in this respect, numerous shortcomings and lag from the leading countries in innovations have been observed. To overcome this lag, a decision was made to establish a national innovation system. The Bulgarian national innovation system is still under development. This is evident by the absence or the insufficient number of units specialized in brokering and transfer functions in the innovation process. Such organizations are the business incubators, the innovation centers, the technology parks. The measures undertaken so far at national and regional level have not produced all desired effects.

Finance. *Generated in recent years, industrial growth is concentrated in innovative companies from rapidly growing sectors of the economy. To ensure growth of industrial growth a great contribution and impact on innovations has the innovation policy and access to various sources of finance for innovation and innovation activity. Such sources of funding are the EU Framework Programs, the Scientific Research Fund, the National Innovation Fund, the EU Structural Funds. Experience shows that Bulgarian firms prefer to finance their activities either with personal funds (reinvestment of profits) or through bank loans. Another source of funding for company activities that became widely used in recent years is the issue of shares of public companies in the country. Initial public offerings have become a fashion trend and an easy way to raise funds for innovation and investment. It was a prerequisite for the establishment of a unified stock exchange and the possibility of listing the shares of most companies in the country. All this is a catalyst of the economic process and a prerequisite for ensuring industrial growth in the national economy*

Tax policy. *During the last seven years the tax policy was changed and enhanced in favor of the entrepreneurs. Since 1 January 2008, a 10% corporate income tax was introduced and Bulgaria becomes the country with the lowest flat rate tax in the whole EU. The main objectives of the scheme are to modernize the tax system and to provide an incentive to dynamic companies to develop at a rapid pace through the use of their generated profit. Taxation affects the incentives for the creation of more wealth and jobs. Lower taxes lead to more entrepreneurship and more investments. Therefore, lower taxes are important for increasing the rate of economic growth and play important role in industrial dynamics. Moreover, the dividend tax was cut by half to 7% (0% for EU residents). Furthermore, the tax-deductible depreciation rates for new production equipment were increased. All these tax measures have a positive effect on industrial growth.*

Competitiveness. *The key national priority is development of competitive and efficient business structures. The state developed an Operational Programme (OP) "Competitiveness of the Bulgarian economy 2007 – 2013". The overall objective of OP "Competitiveness" is to develop a dynamic economy competitive at the European and world market. The general objective of the operational programme is to implement through two specific objectives that cover both aspects of competitiveness – the readiness of Bulgarian enterprises for the Single European Market and for the fast changing conditions on international markets, as well as the condition of the environment in which they function.*

Analysis of Investment and Innovation behavior in Bulgaria

There are several studies focused on Bulgaria and Bulgarian economic changes before and after the EU accession. The questions which interest most economists are: What changes have occurred in the Bulgarian economy over the pre-accession period? Is there enough ground for fast industry growth? Was the pace of industrial growth retained after the accession? What are the main characteristics of industrial development and the future development paths? To answer these questions, the analysis is based on the growth indicators.

Is there a real industrial growth?

The Bulgarian national statistic data shows that there are enough evidences for industrial growth. Data analysis should be based on the differentiation of industrial sectors as follows: mining and quarrying; manufacturing; energy production.

According to the market variation index (Figure 1), there is a fairly strong differentiation between

the mining and manufacturing sectors. The mining sector shows a slight change in sales over the period in question. Vice-versa, manufacturing is a sustainably growing sector. Therefore, according to this picture, the industrial growth in the Bulgarian economy is based on manufacturing.

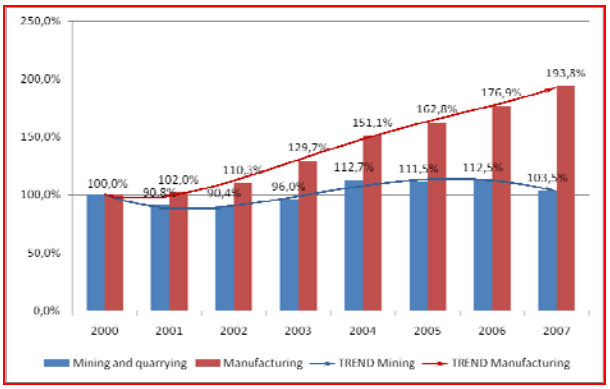


Figure 1. Market variation of industry growth (measured by total sells)[6]

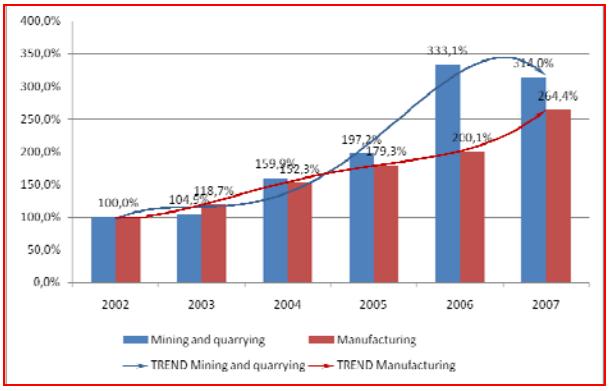


Figure 2. Quality market variation of industry growth (measured by added value)[6]

The Figure shows only the quantitative change of industry. But industrial growth is a long-term oriented concept and we need a confirmation of these results on a qualitative level. When we focus the attention on quality market variation (Figure 2), the interpretation of industrial growth changes radically. Despite the continuous increase of manufacturing sales, we find that quality changes in the sector do not occur very fast. Vice-versa, the mining sector shows sustainable sales but we find out a rapid increase of sales quality.

In conclusion, there is an evidence of industrial growth as a result of the increase in market sales and better product quality. But is this a long term trend? Which factors affect over Bulgarian industrial growth? To analyze industrial growth correctly, we should find out how different factors vary over the last few years. The most commonly used factors are the rate of investments (Figure 3) and the rate of newcomers (Figure 4).

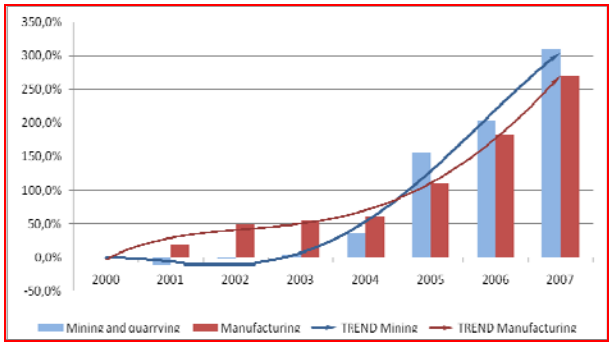


Figure 3. Investments' variation

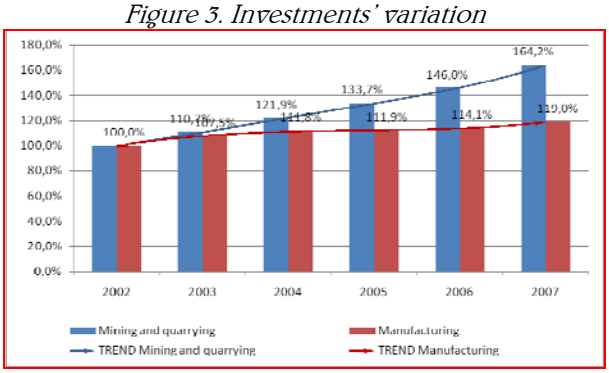


Figure 4. New comers' variation

Investment changes show a very fast increase of investment in the pre-accession period. This result is the first proof of EU trust in the Bulgarian industry of the increase of investments, especially in new technologies and products, is a guarantee for long-term economic growth.

In comparison, the newcomer's variation shows which market actors make these investments. The picture shows that there are not many new investors in manufacturing, but there are a lot of newcomers in mining. This is an indicator that manufacturing has stabilized its structure while the process of re-structuring mining has continued in the pre-accession period.

What is the impact of investments on Bulgarian industrial growth? The qualitative and the quantitative indicators show a stable industrial growth. But the question is: How stable is it?

We need to compare the conditional changes in observed indicators (Figure 5 and Figure 6).

In conclusion, investment growth is a result of the diversification and the expansion of company activities, which leads to increased market potential in several industrial sectors. In general, investments in technology resulted in value added growth. In some industrial sub-sectors, the decrease of value added is due to the use of recycled technologies and equipment.

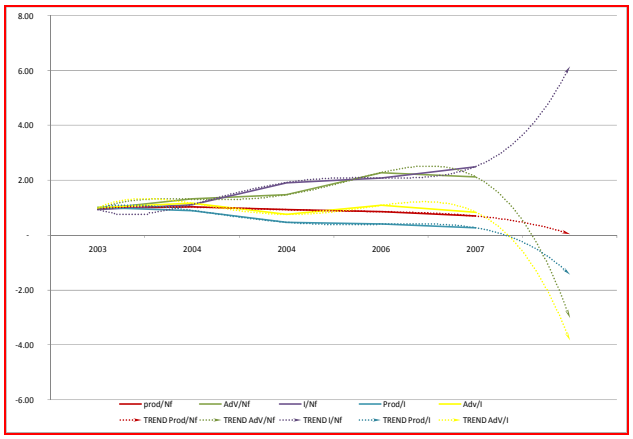


Figure 5. Dependency indexes in sector: Mining and quarrying

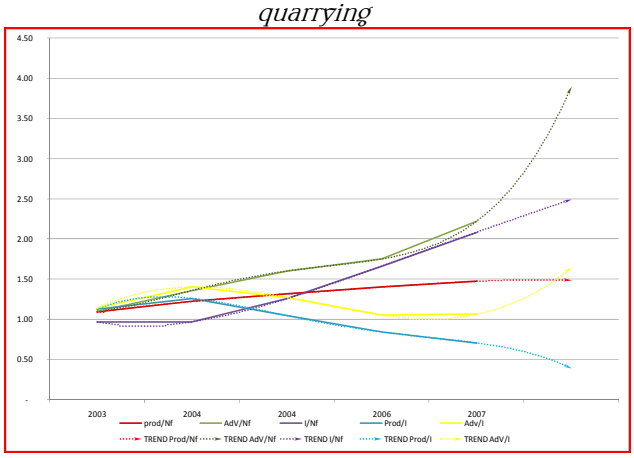


Figure 6. Dependency indexes in sector: Manufacturing

After the 1996-1997 financial and economic crisis, the Bulgarian economy experienced eight consecutive years of economic growth. Fixed capital investment reached 20% of GDP in 2004, for the first time since transition started, and continues to increase; credit activity booms and unemployment are steadily decreasing.

At present, Bulgaria competes with homogeneous, labor- and material-intensive products and low costs are the driving factor behind its competitiveness. Escaping from this low technology trap requires the development of a flexible and open national innovation system within a competitive market economy framework that would ensure an influx and wide diffusion of foreign innovation in the country, and gradual development of local innovation capacity of European and global quality.

Investment in innovation is an instrument for industrial growth through improving the competitiveness of Bulgarian enterprises in the long-run. During the last few years, R&D expenditure in Bulgaria has been limited.

In the past ten years, R&D expenditure as a percentage of Bulgaria's GDP (0.5% in 2006) has remained approximately six times lower than the EU27 average. In addition, the contribution of enterprises in total R&D expenditure remains less than half that of the state, which is exactly the opposite situation as observed in the leading innovation economies in Europe. As a result, the physical R&D capital in Bulgaria has been almost completely depreciated and the accumulated human capital has lost a substantial amount of its value.

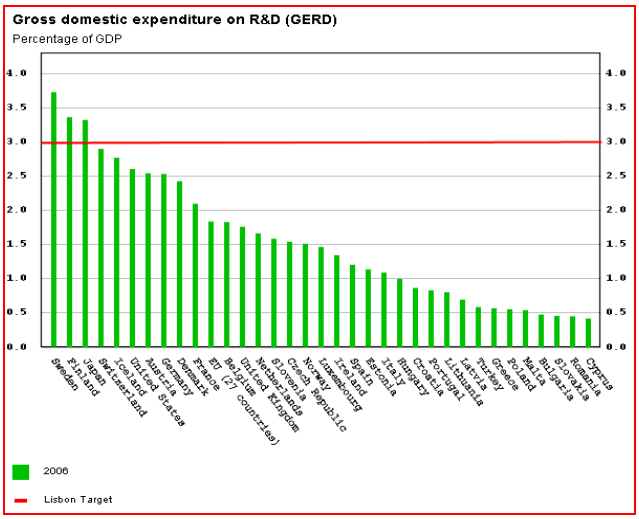


Figure 7. Gross Domestic Expenditure on R & D (GRED) [7]

Bulgaria ranks twenty-second among EU27 by Gross Domestic Expenditure of R&D (GERD), a highly unfavorable position. Bulgaria spends less than 0.5% of GDP on R&D.

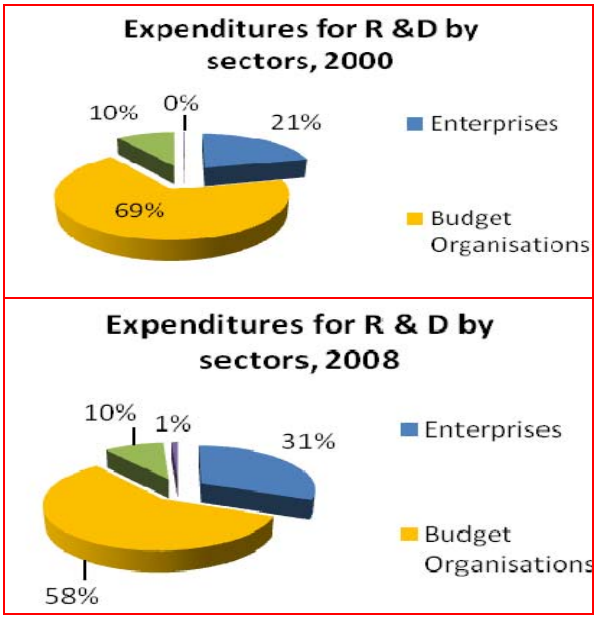


Figure 8. Expenditures for R &D by sectors, 2000 - 2008

Most of the R&D expenditures are concentrated in the group of Budget Organisations/ Government Sector. This group consists of research institutes, research centers and R&D laboratories that are funded by the state budget. More than 50% of all expenditures are done by Budget Organisations. Since 2000, there is a slight decrease in this group. In contrast, the Enterprises and Non-commercial Organisations group has increased its share of R&D expenditures.

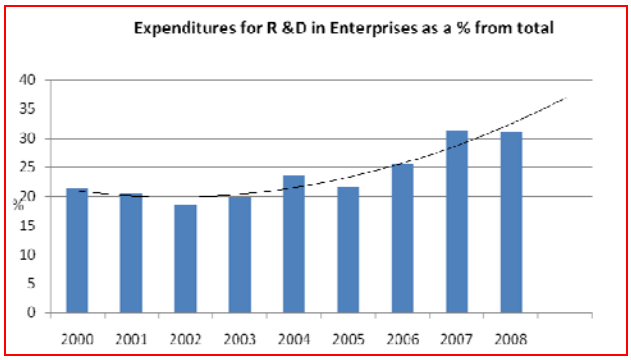


Figure 9. Expenditures for R &D in Enterprises as a percent from total expenditures for R&D (2000-2008) [9]

The analysis of the R&D expenditures of the enterprises shows a stable increasing trend. After the EU accession, there is an increase by 5 per cent in total R&D expenditures of enterprises compared to the pre accession period. In Bulgaria, the structure of expenditures by economic elements remained unfavorable in 2008 despite the small improvement over the previous eight-year period.

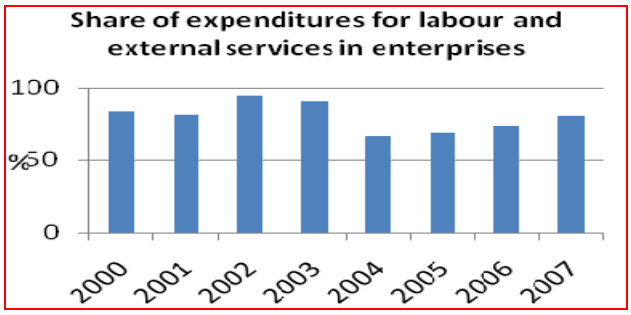


Figure 10. Share of expenditures for labour and external services in enterprises

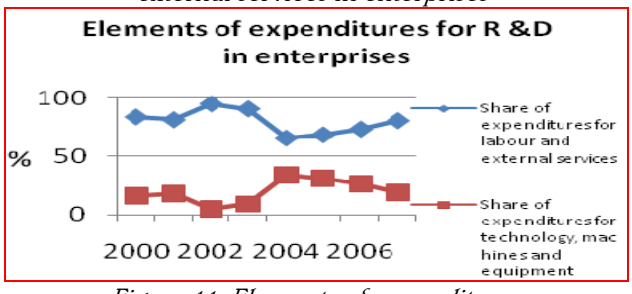


Figure 11. Elements of expenditures for R & D in enterprises

In the pre-accession period, two groups of R&D expenditures in enterprises show controversial tendencies. Since 2003, the share of expenditures for labor and external services has been increasing constantly, while the share of expenditures for tangible assets (technology, machines and equipment) decreased. Current expenditures amount to 80.79% of total R&D expenditures in 2008, while only 19.21% are allocated for the acquisition of tangible fixed assets (a 1% decrease compared to the previous year). Despite the increased share of R&D expenditures, this is a negative trend. Investments in innovation are funds spent on creating (or adapting) the innovation, technological and/or research product in the country. They are mainly used to cover the expenses for research and development (R&D). Investments in innovation depend on the functioning of the whole innovation system, yet they are most closely related to the presence of various funding mechanisms and tools, including venture capital [8]

In a dynamic pattern, Bulgarian enterprises focus mainly on the acquisition of machinery and equipment in their innovation activities. Innovative enterprises place R&D second and employee training comes third.

The sector with the largest share of innovation expenditures for the 2000-2007 periods manufacturing (more than 30%).

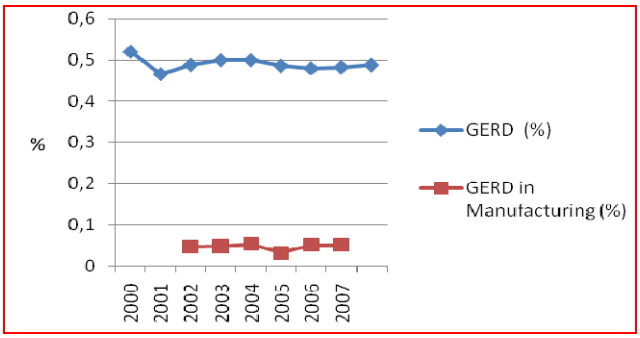


Figure 12. Gross Domestic Expenditure on R &D (GERD), % [9]

According to the latest available data of the National Statistics Institute, the share of innovation enterprises in the country is 16.2 % of the total number of working enterprises.

During the last years, a general increase in the number of innovation enterprises can be noticed, with the largest share being in the computer technologies, R&D, engineering and financial brokerage sectors (Figure 12).

The share of enterprises in the fields of computer technologies, architecture and engineering

sciences represents only 6.46 % of the total number of enterprises in the country (39.9 % of the total number of innovation enterprises). The share of innovation enterprises in the transport, storage and communications sectors is low (7.2 %) and the same applies to the electricity, gas and water supply sectors (9.9 %).

The number of innovation enterprises in the country represents approximately one fourth of the same share in EU. According to 22.7 % of the enterprises covered by a survey, the lack of innovation activities is due to different problems which impede their activities and 53.9 % of them answer that those activities are not necessarily under the existing market conditions. This comes to show that a great number of the enterprises do not realize the character and the significance of innovations for ensuring their competitiveness.

Product innovations prevail in almost all sectors of the economy (44.8%). Process innovations are carried out only in 7.3 % of the innovation enterprises. They are predominant in enterprises in the mining industry and the production and distribution of electricity, gas and water supply. In the EU, the share of process innovations, which ensure to a greater extent the increase of competitiveness of the enterprises, is larger. The technical level of innovations is still rather low. A great number of product innovations have a limited scope and can hardly influence the increase of company competitiveness. As a result of the innovation activities, a large number of enterprises have widened their product range and increased the number of new services and goods they offer (42.7 %), and the quality of the existing products has also improved (45.5%). The market share has expanded and the entry on new markets has been favorably affected (32.8 %), the production power of enterprises has also been increased (23.3 %) and the prime cost of existing products and services has been reduced (35.8 %). These values apply to the predominant number of innovation enterprises in almost all economic sectors except the production and distribution of electricity, gas and water supply, where the main result for most of the innovation enterprises (61.6 %) is the reduction of prime costs and only 7.7 % of the enterprises have launched new products and services. The relative share of innovation products represents a small part of the total volume of products. For 12.4 % of the enterprises surveyed, this share is up to 5%, for 245% – between 5 and 10%, for 24.8% - between 11 and 20%, and only for about 145 of the enterprises the share is over 50%. [10]

Bulgaria needs to be very active in its efforts to attract investment and introduce innovative decisions, so that its production would be competitive on the international markets. The data in the latest World Bank report on global competitiveness for 2006–2007 show that our country's rating has deteriorated in the global context in respect to technological development (68^{th} place) and innovation potential (87^{th} place), and that once again there is insufficient and non-efficient interaction between the main sections of the national innovation system [5]. The major challenge in this respect is the most effective commitment of these institutions and organizations and their integration into the European innovation infrastructure, in order to gradually transfer activities and responsibilities to the private sector [5].

The analysis of the enterprises in Bulgaria by type of innovation reveals a positive trend for the economy as a whole, increasing the share of mixed innovation (both products and processes) at the expense of purely product innovation.

Given the fact that most Bulgarian companies focus on well established and saturated markets (EU) rather than emerging industries, the implementation only of product innovation without accompanying process innovation means that enterprises rely mainly on the low cost of products and that they will receive just a small portion of the added value of the end customer.

The analysis of the innovative behavior of Bulgarian enterprises confirms that the Bulgarian economy is still at an early stage of its innovation development, where capital investments prevail over innovation.

CONCLUSION

Until recently, Bulgaria's economic growth has been driven by two factors: 1) the increase in the effectiveness of use of the existing capital and labor resources, resulting from the financial stabilization, privatization, liberalization and institutional reforms, and 2) the gradual recovery of the physical capital lost during the transition period through a pick-up in domestic and foreign investment. Low labor costs were

the main competitive advantage of the enterprises so far. However, this advantage will quickly be eroded in the face of growing international low cost competition. Hence, the enterprises redirect their long-term growth strategy towards investment in technological upgrading, innovation and improvement of the quality of human capital. This new strategy is centered on the development of a dynamic, market-oriented and internationally open national innovation system, which encourages entrepreneurship and investment in the acquisition and creation of new technologies and skills.

Investment growth is a result of the diversification and the expansion of company activities, which leads to increased market potential in several industrial sectors. In general, investments in technology result in value added growth. In some industrial sub-sectors, the decrease of value added is due to the use of recycled technologies and equipment.

The most appropriate approach of subsectors and enterprises with potential for development is to retain the investment volume and to increase the effect and the quality of the investment output.

REFERENCES

[1.] KRAFFT 2006, Introduction: what do we know about industrial dynamics?, Revue OFCE, June 2006, http://www.ofce.sciences-po.fr/pdf/revue/hs-06-06/rhs-06-06-intro2.pdf

[2.] FORRESTER, J.W., (1961), Industrial Dynamics. Portland, Oregon: Productivity Press.

[3.] KRAFFT 2006, Introduction: what do we know about industrial dynamics?, Revue OFCE, June 2006, http://www.ofce.sciences-po.fr/pdf/revue/hs-06-06/rhs-06-06-intro2.pdf

[4.] CARLSSON, B., ELIASSON, G. (2001), "Industrial dynamics and endogenous growth", paper prepared for the Nelson and Winter Conference of the Danish Research Unit for Industrial Dynamics (DRUID), June, available at: www.druid.dk/conferences/nw/

[5.] JIANDONG JU, JUSTIN YIFU LINY, YONG WANG, Endowment Structure, Industrial Dynamics, and Economic Growth, http://ihome.ust.hk/.../Endowment%20Structure,%20Industrial%20Dynamics%20and%20Economic%20Growth.pdf

[6.] Year Book. NSI (various years) – 2000 – 2009; http://www.nsi.bg

[7.] Eurostat, Gross Domestic Expenditure of R&D (GERD), http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/introduction Innovation BG 2009. ARC, Sofia.

[8.] Annual Report on the Bulgarian National Innovation Policy 2006, MEE, S., 2006. 335 p

[9.] KOPEVA,D., SHTEREV, N., BLAGOEV, D., GRADEV, T. (2009). "Industrial dynamics under conditions of European integration", Project: SRA21.03-7/1009, University of National and World Economy (UNWE), Business Faculty.

AUTHORS & AFFILIATION

DIANA KOPEVA[1],
NIKOLAY SHTEREV[2],
DIMITAR BLAGOEV[3]

[1.2.3] BUSINESS FACULTY, UNIVERSITY OF NATIONAL AND WORLD ECONOMY (UNWE), SOFIA, BULGARIA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

NENAD DJOKIC[1], INES MESAROS[2], KSENIJA FABIAN[3]

OVERVIEW OF CHARACTERISTICS OF BOTTOM-UP MARKETING AS AN INNOVATIVE MARKETING PARADIGM IN SMALL AND MEDIUM ENTERPRISES

Abstract:
In various perceptions of transition, in countries which have found themselves in this process, whether to authors who examine this process with liking or authors who have opposite attitudes there are certainly a few among them who would deny the need that entrepreneurship and entrepreneurial spirit has to take a special place in that process. Entrepreneurship does not have to be necessarily considered the same as small and medium enterprises, although the setting up and development of small and medium businesses can be considered as one of the most significant elements in the change of transitional economies structure, but can also be related to building entrepreneurial business within the existing corporation, that is, „intrapreneuring"(internal entrepreneurship). Expressing itself through the readiness and will to introduce novelty by experimenting and creative processes directed toward the development of new products and services, as well as new processes, innovativeness imposes itself as infallible element of the enterprise behaviour. When the application of marketing concept in small and medium enterprises is in question, certain authors placed in the centre of their interest the question of possibility whether the full spectrum of what conventional marketing involved can be included in these enterprises. This had implications on understanding the innovativeness of marketing in these companies. However, in light of the fact that the modern tendencies in the development of marketing have brought a number of new marketing paradigms, some of which are particularly suitable for the application in small and medium enterprises, the emphasis can be placed precisely on the display of such new opportunities. One of them, called bottom-up marketing, based on the appreciation of corporate strategy from the aspects of their tactical feasibility and ability to prevent competition in threatening company's tactic, is the central theme of this paper.

Keywords:
Bottom-Up Marketing, Innovation, Marketing, Small and Medium Enterprises, Transition

INTRODUCTION

The last decade of the 20th century was marked, among else, by the process of transition in a number of countries in which central planning was the main characteristic of their economies before this process started. Causing changes not only in economies of these countries, but also in foundations of other parts of their existence, such as law, culture, life habits of their people and many others, this process was at the beginning widely welcomed and embraced by many authors as positive and vital for these countries. After two decades of experience in performing this process and some poorly planned and examined steps undertook within it, the general level of enthusiasm has decreased and authors are nowadays very often divided from strong supporters to categorical opponents of transition [1].

However, in various perceptions of transition, in countries which have found themselves in this process, whether to authors who examine this process with liking or authors who have opposite attitudes, there are certainly a few among them who would deny the need that entrepreneurship and entrepreneurial spirit has to take a special place in that process. It could freely be said that the quality of a new formed ambient significantly depends on the level in which the total economic reality is being characterized by the development of entrepreneurship. Entrepreneurship does not have to be necessarily considered the same as small and medium enterprises, although the setting up and development of small and medium businesses can be considered as one of the most significant elements in the change of transitional economies structure, especially in the light of the fact [2] that 91% of firms in European Union have less than 20 employees and that even 99,8% of firms have less than 250 employees.

Entrepreneurship can also be related to building entrepreneurial business within the existing corporation [3], that is known as „intrapreneuring" (internal entrepreneurship). Regardless which of these two possible views of entrepreneurship one can have in mind, there are common characteristics for both of them [3], such as: having autonomy, being innovative and proactive, showing competitive aggressiveness and taking on a risk. Expressing itself through the readiness and will to introduce novelty by experimenting and creative processes directed toward the development of new products and services, as well as new processes, innovativeness imposes itself as infallible element of the enterprise behavior. However, the innovativeness of marketing in small and medium business was brought in question by many authors, as well as the need to practice marketing in such firms. Displaying "bottom-up marketing" as the modern, innovative paradigm in the development of marketing, particularly suitable for the application in small and medium enterprises, is the central theme of this paper.

MARKETING IN SMALL AND MEDIUM ENTERPRISES

The question of marketing in small and medium enterprises can be understood in several ways. Although it is generally accepted that the basic principles of marketing are universally applicable to large and small businesses [4], in some studies it is questionable whether small businesses need to practice marketing at all to survive and grow [5]. The study that had questioned the need to practice marketing in small businesses [5] concluded, after all, with accepting that marketing contributed positively to small business success and the ability to think strategically in despite of the fact that small business owner-managers were often generalists, not marketing specialists and the fact that complex marketing theories may not be appropriate for small businesses and probably would not aid in the understanding of their markets. In most cases, it was said in this study, competitive advantage was based on quality and service, while those competing on price were in the highly competitive markets with little or no product differentiation and low entry barriers. Product differentiation was a source of competitive advantage in some businesses while others were looking for niche markets.

It is also shown that the role of marketing shouldn't come only to contribution of thinking strategically in small and medium enterprises. Denison and McDonald [6] point out that studies have consistently shown that firms which were marketing orientated, or competent practitioners of marketing, performed better in terms of return-on-investment (ROI) and market share.

Although it plays an important role, in small and medium enterprises marketing is likely to be [7] haphazard, informal, loose, unstructured, spontaneous, reactive and conform to industry norms. The study that has presented this conclusion was focused on the fact that marketing in practice in small firms seemed to rely on personal contact networks and was often driven by the particular way an owner-manager did business. Personal contact networks were understood as communication between the small and medium enterprise's owner-manager and his/her competitors, so the competing firms might be quite supportive of each other, as well as it could be understood as networking with customers where building relationships were vital to a company's success, so companies invested considerable time and effort in maintaining good relations with regular clients. Such an approach was concerned with maximizing marketing opportunities and

ensuring the enterprise's survival and development.

Although presented studies, as well as others that are not mentioned at this place, deal with marketing in small and medium enterprises, there is a conclusion of certain authors that academic research appears unable to resolve a number of questions about small businesses and their relationship with the use of marketing and that insufficient knowledge about marketing in small business remains. In that sense should be understood what Siu and Kirby [4] were pointing out when they were saying that empirical evidence has been generated in an ad hoc manner as a consequence of a general absence of a systematic approach to the subject.

BOTTOM-UP MARKETING AS AN INNOVATIVE MARKETING PARADIGM IN SMALL AND MEDIUM ENTERPRISES

When the application of marketing concept in small and medium enterprises is in question, from the previous text could be driven implications on understanding the innovativeness of marketing in these companies. However, in light of the fact that the modern tendencies in the development of marketing have brought a number of new marketing paradigms, some of which are particularly suitable for the application in small and medium enterprises, the emphasis can be placed precisely on the display of such new opportunities.

One of them, bottom-up marketing, is presented in the book named Bottom-Up Marketing by Al Ries and Jack Trout [8], at the time when they wrote it, the first Chairman and the second President of Trout & Ries Inc. This was the third book of those two authors that came after Positioning: The battle for your mind, in which they described the process of putting company's brand into the mind of the prospect, and also after Marketing Warfare, showing marketing as war where the competitors are enemies and the customer is ground to be won. The first book was mostly devoted to communications, that they presented as the tactic of a business, while in the second marketing, as the strategy of business, was in the center of authors' focus. The third book by those two authors dealing with the practical issues of the usage of marketing in companies' activities was in some way integrating two previous books. This book published in 1989. was integrating business' strategy and tactic in revolutionary new manner, that was the essence of this approach, nowadays incorporated in activities undertook by companies in the developed countries.

Bottom-up approach understood not only as possible radically new marketing approach is also a way of thinking that is "challenging the obvious" when saying that tactics dictate strategies. The authors point out that the relation between tactics and strategy can be shown when saying that a tactic dictates strategy and then the strategy drives the tactic. The tactic is the angle that produces the results while the strategy is the organization of the company to produce the maximum tactical pressure. However, since the ancient times, say the authors, the wisest people like Seneca thought in top-down manner and were saying that their plans miscarried because they had no aim and even those people who understood that the best strategic plan was useless if it couldn't be executed tactically like Field Marshal Erwin Rommel worked for top-down thinkers. It was not only the common way of thinking that was causing domination of the top-down approach. Some characteristics of human nature that are seen at behavior of the top managers who like to be "free" of tactical details of business, but to participate in the "fun side of marketing, the development of the grand strategy" could also be the reason to prefer top-down approach. That situation in which top-down approach dominates prevents marketing to be what it actually should be-"the art of the possible, like politics."

Bottom-up approach presented in this book differes from bottom-up style of Japanese management, which considers incremental steps, consensus building and decision making from the bottom up. In such an approach it takes time to reach consensus, the concept is getting unanimous approval inside the company, so the marketing becomes more a question who "does" the marketing, than it is "what" is being done. In bottom-up approach by Trout and Ries, marketing is a question "what" tactic to use, how to build a tactic into a coherent marketing direction and then, at the end, to determine "who" should execute the strategy.

This innovative approach is vital in solving two main problems or "sins" of top-down thinking, as authors call them. Those two „sins" are that it is

the refusal to accept failure and that it is the reluctance to exploit success, often combined together and determining each-other. The principle of bottom-up marketing is to work from the specific to general, from the short term to the long term. The implication of this principle is that first what should be done is to find adequate tactic, which means one tactic, not more, and to build it into a strategy.

THE PROCESS OF IMPLEMENTING BOTTOM-UP APPROACH IN A COMPANY

The process of implementing bottom-up approach in a company considers at the beginning "going down to the front", where the front line is understood to be in the mind of the prospect. It considers a process where one puts himself in a position to explore what customers and prospects might be thinking and the best way to collect information is to do it firsthand, without judging, but by observing with open mind, escaping looking for the facts that will confirm previously formed opinion what should be done. At the front should be found an angle, which means a fact, an idea, a concept, an opinion on the part of the prospect that conflicts with the position held by competitors.

It is also very important to monitor the trends. However, it includes the need to understand the differences between a trend and a fad because very often short term changes can block someone's ability to notice long-term trend. If something is to be recognized as a trend it needs to be observed for a decade or more, it usually involves slow change, it's essential to understand its causes and its effects and it is usually not in the center of the press' interest. In order to monitor the trends, by the authors, it is needed to find out "what people have actually done" and not "what people will do" because their respond to questions is in most cases formed in socially acceptable manner and because basic habits change very slowly while the press often magnifies small changes. That is why authors claim that a company can not predict the future, as well as it can not predict the enemy, but can create the future by introducing product or service whose very success "creates" a trend.

Next very important step in bottom-up marketing approach in the company is narrowing its focus. The opposite process that is widely accepted in the practice of many firms is line extension which is often caused by ideas of management that on the basic of already known brand could be gained financial benefits while introducing new products. However, authors offer several arguments that support focus instead of line extension. The first is that by focusing and becoming specialist the firm can send strong message to their customers and prospects instead of confusing them. The second is that specialists are often perceived by customers as experts or the best. 'When a product tries to appeal to everybody, it winds up appealing to nobody." It is very important for understanding this approach to know that authors point out that the perception is reality and that marketing is not to change minds, but to take advantage of the perceptions that are already there. The third advantage of focus is that the specialist can become "generic" for the category. "In an overcommunicated, overbranded, overbeered society, you are lucky if your brand can mean one thing." Authors conclude that although line extension of company's brands is widely embraced in many companies and often performed in situation of flat and declining markets or consumer's concern about ingredients, the effect of such an approach is not only the long-term erosion of a brand's identity, but also spreading the forces of the firm and becoming "vulnerable" to competitive attack, that can cause serious problems.

After narrowing company's focus comes finding its tactic. The principles that authors recommend to be respected while finding tactic are that the tactic should not be company-oriented, that it should not be customer-oriented, but that it should be competitor-oriented. A good competitor-oriented tactic considers that it can not be copied quickly nor can it be copied economically. When finding tactic it's important to have in mind that clearly superior product happens very often in which case it would be better to avoid attacking competitors on the positions where the competitor is strong. However, since such a situation happens very rarely, it could be said that marketing today is a battle of concepts, not products. The authors add some recommendations about firm's tactic. If the firm dominates the category, it is sometimes recommendable to launch products to attack firm's product that dominates, but to do that

under its own brand name. They also add that simple ideas are easier to implement and prospects find them easier to understand, that for the reason of credibility it is as important to promote negative as positive and that when forming the price, although it can implicate the quality of a product the firm should balance it with demand.

When the company finds its tactic the next step is building its strategy. In a bottom-up approach essential part of this process is making changes in the company, especially when admitting that there have been mistakes, or in the product. It is not recomended trying to change the environment, while facing the challenge to maintain "single-mined clarity over an extended period of time". The whole process results in a coherent marketing direction.

Making the changes is also very important. It is needed to understand authors' presumption that marketing efforts can't make much of the change in market's structure or buying patterns, nor can it substantially change the mind of the prospect. However, it is task of marketing to find a competitive mental angle that already exists in the mind of the prospect. In order to achieve that, a company can change name if it doesn't support the tactic that company is building into a strategy and can also change the product or service.

The authors recommend to the company that if it is not "winning the battle", it should "shift the battle field". It is not easy sometimes to accept the fact that company "can not win the battle." Management is also reluctant to "shift the battlefield" because the change is required and "people are rarely comfortable with change". When speaking of shifting a battlefield, a company can shift its audience, respecting the fact that it's better not to target the total market, but to benefit from the emotional opportunities created by narrowing of the target audience. A company can shift the product, the focus and the distribution, as well.

A company should also test its strategy. The key tactical weapon of a company is advertising. But when trying to test the advertising the paradox happens that the more novel and more unique the program is, the more likely it will succeed and the less likely it will test well. However, in condition where the volume of advertising increases and its relative effectiveness decreases, companies do test their advertising. In order to avoid mistakes, one should have in mind that when looking at the numbers in the research report, those numbers are a consequence of artificial responses to artificial questions. In a bottom-up approach a company doesn't try to make its strategy interesting since its tactic is chosen to be interesting at first place. The testing of a strategy can be performed with a help of observing sales force and the level in which the tactic is "sold" to them, and of checking out the press through a potential news value of a company concept. The competition should also be checked and a way to do that is to reverse a company's statement and to see if the reversal is appropriate for its major competitor. The product line should be checked as well having in mind that when two brands have the same name, they are "locked together in mind" and that a company has to test both.

It is needed for the strategy to be accepted inside the firm. Suggestions how to achieve that goal authors present in a chapter named "selling your strategy". When presenting strategy inside the firm it is recommended that it is simple, that alternatives are not shown and that it should not be presented to the top management before it's presented to their subordinates in order to gain their support. A strategy's accepting can be disturbed with the lack of support from senior or junior executives who from their own interests are not prepared to make significant changes. In order to eliminate such a behavior it is possible publicly to identify the person who will benefit from the success of a new product or venture. The name plays an important role for the strategy, it is even said that it is the strategy, so it is better to accept an internal defeat on the name issue than to accept an inferior name and "lose everything on the marketing battleground". Getting the resources is also part of authors' interest. They claim that it is better not to launch a program at all than to launch one without the sufficient resources. The problem of small entrepreneurs is that although they are "long on ideas", they are "short on money". Quite opposite is inside a large company. Small firms can use the regional approach or franchising to overcome their problems while in large companies top management should be included in the process that will lead to centralization which concentrates company's resources.

There is also a need to test the objectivity by "calling in the outsider". The outsider can be the

advertising agency and in bottom-up marketing approach the agency is focused on the tactic while the company is focused on the strategy. Although agencies can play an important role especially when seeing "obvious tactical idea" that is not noticed in the company, in some occasions agencies can lose their objectivity.

When presenting launching company's program, the authors reveal that although they support bottom-up approach in planning, when it comes to execution they prefer top-down approach. If a company founds its strategy on a tactic that works, it becomes strategy driven. There are two possible choices of launching a program. The first, so called "big bang" approach has its advantages when it comes to making the first impression and "striking quickly". One should have in mind that "no good idea stays lonely for very long", but also that it is not necessary to have everything perfectly prepared before launching. On the other hand, the "roll-out" approach is more suitable for smaller companies that face larger competitors and launch their program in a single city or a state or a region. Smaller company can not afford the "big bang" not just because of funds but because of infrastructure needed to support a growing business, as well. "Roll-out" approach also provides small companies the possibility to avoid attracting too much attention from their big competitors. However, regardless which approach a company chooses, authors recommend aggressive behavior.

Maintaining strategy to be successful is very important, but very difficult as well. In order to do that a company must have lines of communication to the front and to reinforce success, understanding that, on the other side, early losses are usually followed by even greater losses when reinforcing such project. Authors point out the significance of centralized company because although a decentralized company is closer to the front, it is usually not able to turn an effective tactic into a strategy.

When considering possible success of the project it is good to remember that it's not the size of the success that matters, it's the direction that counts. The strongest protection from competitive inroads is a massive investment in resources. However, if the program doesn't become successful, a company should abandon it. There are three reasons for such a condition: wrong strategy, attempting things beyond resources or happening of something totally unexpected.

CONCLUSION

The differences between top-down and bottom-up approaches are presented by Trout and Ries mostly by describing examples of large companies where exists clear differentiation between top managers who create strategies and those employees who implement them using various tactics (in top-down approach). On the other hand, in small and medium enterprises functions of owner, entrepreneur and manager are very often integrated that implicates that strategy creator would also be its executor in potential top-down approach in such companies or at least would be in a better position than strategy creator inside large company to see if strategy couldn't be executed. The authors say that small companies have an advantage because they "are mentally closer to the front than big companies." "Entrepreneurs are down at the front. Their ideas and concepts tend to spring from their own personal experiences. They have the power to make decisions since they don't have to seek the approval of others. As a result, a vast majority of the big marketing successes have sprung from the entrepreneurial ranks. Money, however, is a major barrier to success".

This analysis of the advantages of small and medium enterprises doesn't mean that the need for bottom-up approach is less expressed in such companies. This, especially considering the lack of experience in the market environment, that is characteristic of entrepreneurs in countries in transition, and the percentage of the small companies that don't survive for long at the market, that is not only characteristic of countries in transition. Even if owner/ entrepreneur/manager discovers easier that the strategy can't be executed tactically, it still doesn't mean that top-down approach is abandoned. Bottom-up approach is not about how strategies are created and how tactics are executed. It is about finding one, adequate, competitive tactic and building it into a strategy that would make it hard to be copied by competitors. It is also about a way of thinking and acting in one company that allows escaping from the mistakes of the refusal to accept failure and the reluctance to exploiting success. It is, at

last, new marketing paradigm suitable for the application in small and medium enterprises, making their marketing innovative and creating new opportunities for their progress.

REFERENCES

[1.] STOJANOVIC A. Poreski sistemi zemalja u tranziciji. Sarajevo: Revicon; 2007.

[2.] POKRAJAC S. TOMIC D. Preduzetnistvo. Novi Sad: Alfa-graf; 2008.

[3.] DESS GG, LUMKIN GT, EISNER AB. Strategijski menadzment. Beograd: Data status; 2007.

[4.] SIU W, KIRBY DA. Approaches to small firm marketing: A Critique. European Journal of Marketing 1998: 32: 40-60.

[5.] HOGARTH-SCOTT S, WATSON K, WILSON N. Do small businesses have to practice marketing to survive and grow? Marketing Planning and Intelligence 1996: 14: 6-18.

[6.] DENISON T, MCDONALD M. The Role of Marketing Past, Present and Future. Journal of Marketing Practice: Applied Marketing Science 1995: 1: 54-76.

[7.] GILMORE A, CARSON D, GRANT K. SME Marketing in Practice. Marketing Intelligence and Planning 2001: 19: 6-11.

[8.] RIES A, TROUT J. Bottom-Up Marketing. New York: McGraw-Hill Inc; 1989.

AUTHORS & AFFILIATION

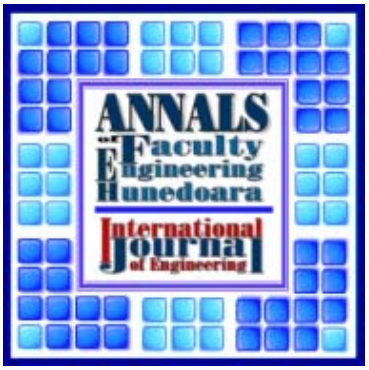
NENAD DJOKIC[1],
INES MESAROS[2],
KSENIJA FABIAN[3]

[1] HIGHER SCHOOL OF PROFESSIONAL BUSINESS STUDIES , NOVI SAD, SERBIA
[2,3] FACULTY OF ECONOMICS, SUBOTICA, SERBIA

Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro



ANNALS
of
FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL
JOURNAL of ENGINEERING
ISSN: 1584-2665 [print, online]
ISSN: 1584-2673 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://annals.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

[1.] SVETOSLAV DIMKOV

EMPIRICAL STUDY OF SHOP FLOOR CONTROL IN BULGARIAN SMALL AND MEDIUM ENTERPRISES

Abstract:
In the current work are discussed the shop floor control problems in the Bulgarian small and average enterprises in the context of the Supply Chain Management. The researched small and average enterprises are units in the European Supply Chains which implement strategies for mass customization. The empirical research aims to evaluate the degree of effectiveness of the shop floor control systems in terms of parameters like: operational planning, dispatching, operational quality control, production system status monitoring etc. Objects of research are the small and average enterprises of lighting and furniture industries.

Keywords:
Mass customization, Shop Floor Control, Supply Chain Management

INTRODUCTION

Currently, the most significant changes in the industrial management are caused by the fact that the different industrial enterprises do not operate like autonomous entities, but they are units in various logistic chains. The logistics and the supply chain management (SCM) are becoming ever more powerful instruments for achievement of sustainable competitive advantage for the business organizations.

Over the last ten years more and more Bulgarian industrial enterprises are integrated as units in different international supply chains (SC). The business organizations are facing many problems caused by the emergence of new cooperation methods within the supply chains (SC).

In order to cooperate for successful competition under the new circumstances, the industrial enterprises should have significant capability of adaptation, mostly through various dynamic interactions. These interactions should be implemented with the participation of all the units in the supply chain (SC).

That kind of adaptation is achieved not only on physical (hardware) level. By increasing the degree of the various systems for management (integration of systems for resource management - ERP and manufacturing execution systems - MES, any change in the physical infrastructure of the enterprise leads to significant changes in the system for Shop Floor Control. The situation can be coped with through considerable efforts of the managers responsible for the operations management in the organization.

When the industrial enterprises take part in various collaborative networks (like virtual enterprises for example) they should exceed the limits of the ordinary production management (Shop Floor Control) so that they can ensure the management of different joint processes.

The dynamics of the systems for Shop Floor Control is evaluated according to the capability of the manufacturing systems of adapting to different type of changes.[1] Under these circumstances, by using relevant characteristics of the Shop Floor Control systems, the production systems should manufacture the

products for a very short time even without intervention of highly-qualified managing personnel.

The purpose of the present work is to evaluate the degree of effectiveness of the shop floor control systems with respect to parameters like: operational planning, dispatching, operational quality control, production system status monitoring etc. The objects of research are Bulgarian small and average enterprises of the lightening and furniture industries, which are integrated as units in different international supply chains.

The degree of effectiveness of the shop floor control systems in the explored enterprises is assessed in four aspects:

- *Operative planning of the manufacturing*
- *Dispatching of the manufacturing*
- *Operative quality management*
- *Monitoring of the manufacturing system*

The exploration of the Shop Floor Control condition in these four directions will allow improving the adaptation of the industrial enterprises to the requirements of the contemporary supply chains.

Basing on literature research, the author has developed a system of 26 measures for evaluation of the effectiveness degree in these four directions.

REQUIREMENTS FOR THE CONTEMPORARY MANUFACTURING SYSTEMS

Under the pressure of the contemporary business environment, considerable changes are taking place in the business organizations. These changes create new requirements for the manufacturing systems of the organizations. A significant part of the requirements is connected with the shop floor control.

The final purpose of the industrial enterprises integration is to achieve business integration within the supply chain. Finally, inter enterprise operations should be fulfilled.

For the achievement of business integration, first, it should be achieved physical integrity as well as easy and fast adaptation of the different units in the supply chain. At the present moment the problem of the physical integration is to a large extent resolved.

The main characteristics which a contemporary manufacturing system should possess are as follows: [2]

Integration of all the systems in the enterprise

- *Integration of the manufacturing system with the systems of the organization's contractors (suppliers, customers, partners, etc.)*
- *Distributing architecture of the manufacturing system. There should be possibility for territorial distribution of the organization's production activity (operations, processes, functions, etc.)*
- *Heterogeneity of the elements of the production system. The contemporary manufacturing systems are composed of heterogeneous hardware and software components, incompatible with each other. Therefore, there should be suitable system for Shop Floor Control, which allows integration.*
- *Integration of human resources to the production system. There should be a possibility many employees with different qualification and knowledge to interact easily with the hardware and software components of the production system*
- *Cooperation in real time of the production system with the systems of the organization contractors (suppliers, customers, partners, etc.);*
- *Open and dynamic structure of the system. The production system should be open and should integrate with different new systems (or resources) in the organization. It should also be capable of removing existing systems at any time, without interrupting its own activity.*
- *Adaptability to dynamic organization structure of the enterprise. The production system should be able to adapt to different changes, which always occur in the organization structure as reactions to the changing environment;*
- *Resistance to disturbances. The production system should react adequately and timely to different disturbances and to recover fast and easy from them.*

In order to come up with these requirements, there should be implemented significant improvements of the production systems of the industrial enterprises and more specifically, of the existing Shop Floor Control systems.

FACTORS FOR INCREASING THE EFFECTIVENESS OF THE SHOP FLOOR CONTROL SYSTEMS

For achieving effectiveness of a Shop Floor Control system, improvements should be made

simultaneously in the already mentioned four directions: operative planning of the manufacturing; dispatching of the manufacturing; operative quality management; monitoring of the manufacturing system.

For improvement of the operation planning, the products created by the industrial enterprises must be grouped in product families, according to similarity of the manufacturing routes.

Pull manufacturing systems must be applied in order to minimize the delays of the manufacturing systems and the quantity of work in progress. The effect of this kind of systems depends on the capability of the managers' team to control the manufacturing through cards of "Kanban" type.

The preservation of the manufacturing systems capacity as well as the minimization of the delays in case of disturbances in the resource supply and problems with different customers and partners can be achieved through transposition of customers' orders. Other options are to reach agreements with logistic contractors inside the organization in order to overcome bottle necks in the manufacturing process and to vary the size of the production lots.

The capacity of the manufacturing system in critical situations can be increased significantly by applying outsourcing.

Another meaningful factor for meeting the orders deadline is the ability of using alternative manufacturing routes for manufacturing the products.

The main factor for the dispatching improvement is the availability of detailed description of all operations implemented by the manufacturing system. Secondly, assessments should be made whether the described operations are really implemented in the required manner and whether the operation's description is expedient in practice.

In order to cope with different disturbances in real time, the important thing is how much can be shortened the lead time at the expense of speeding up of the different operations, scheduling of the operations consequence, compromise increase of the work in progress. Minimizing the setup time for transition from manufacturing of one product to other (lots, customer's order), is of immense importance.

The ability of managing the loading level of the production equipment is essential for increasing the effectiveness of the manufacturing system. In this respect, meaningful factor is the ability of the manufacturing system operators to work on more than one working centers.

The perfection of the operative quality management allows to the industrial enterprises to plan the results of the production activity much more precisely so that the ordered products can be manufactured in the required quantities and agreed deadlines. The ability to apply statistic methods for quality management is essential for the achievement of high effectiveness of the operative quality management system. On the basis of these methods, there must be implemented different measurements, trials and tests in the production process. The results of these measurements, trials and tests must be generalized relevantly in different reports with statistic data for the quality.

The main factor for evaluation of the effectiveness of the operative quality management is the level of product reworks in the process of their manufacturing.

The maintenance of high effectiveness of the Shop Floor Control system is based also on the effectiveness of the production system monitoring.

The potential of the monitoring system depends on factors as: availability of norms and limits for resource consumption and production system loading; monitoring the ratio between consumed resources and manufactured products; monitoring the labor costs; monitoring the deviations for launch of the production lots in the manufacturing schedule; monitoring of the levels of inventories in warehouse of different resources and completed products; monitoring levels of work in progress; application of the principles of the Total productive maintenance (TPM); application of the principles for continuous improvement (KAIZEN).

Significant advantages for increasing of the monitoring effectiveness can be achieved through the application of the principles of the Total Productive Maintenance – TPM and continuous improvement (KAIZEN).

METHODS OF THE RESEARCH

As it was already mentioned, based on literature research, a 26-measure system was developed. On this system it can be evaluated the

effectiveness degree of Shop Floor Control systems in four directions.

The state of the operative planning of manufacturing will be assessed trough the measures:

- *degree of using of pull manufacturing system*
- *level of skills for using the "Kanban" system*
- *capability of rescheduling customer orders in case of disturbances*
- *degree of interaction with logistic contractors (suppliers) inside and outside the organization*
- *capability of changing the size of the production lots*
- *capability of applying outsourcing*
- *availability of alternative manufacturing routes*

The state of the production dispatching will be evaluated through the measures:

- *description fullness of manufacturing operations*
- *capability of deviation control throughout the production cycle*
- *capability for rescheduling operations in case of disturbances*
- *capability for minimization of the setup times*
- *capability for control of the loading level of the equipment*
- *capability for rotation of the working places of the operators*

The state of the operative quality management will be evaluated through the measures:

- *degree of applicability of the statistic methods for quality management*
- *implementations of measuring, trials and tests throughout the manufacturing process*
- *preparation of reports based on statistic processing of production data*
- *application of report analyses and problem identification*
- *remanufacturing of the production throughout the manufacturing process*

The monitoring of the production system capabilities will be evaluated through the measures:

- *availability of standards or limits about resource consumption and equipment load in the production system*
- *monitoring of the ratio between consumed resources and manufactured products quantity*
- *monitoring of the labor costs*
- *monitoring the deviations of launching production lots in the calendar schedule*
- *monitoring of the level of warehouse inventories (resources and products)*
- *monitoring of the work in progress share*
- *application of the principles of Total productive maintenance – TPM*
- *application of the principles of continuous improvement (KAIZEN).*

The condition of the systems for operative management of the manufacturing in the selected enterprises will be assessed on the basis of benchmarking with leading European practices.

The benchmarking will be accomplished by experts in the sphere of industrial management selected by the author. These are managers from the average and large industrial enterprises who manage the logistics, manufacturing, procurement etc. The selected experts have more than 15 years of experience in the area where they work and observations of the best practices of European enterprises with which they cooperate.

A group of four experts was elected. They will be given the results of the author's research of the selected Bulgarian industrial enterprises. Each of the experts will be given a copy of the author's report of the explored enterprises.

Before making the benchmarking, the author has held profound observations of the Shop Floor Control systems in 10 average Bulgarian enterprises which are units in European supply chains. Four of the enterprises are from the sphere of the lightening technology and six from the furniture industry. The results of the observations are documented in a report where the author has classified his findings and conclusions enterprise by enterprise. Photo material of different objects has been attached, concerning various findings and conclusions.

On the basis of this report have been identified six enterprises which, in the author's opinion have shown the best results. The data for these enterprises is put in separate report for the experts. The experts are expected to assess the condition of the Shop Floor Control according to the European practices they are familiar with.

In this special report the data is grouped in separate chapters, corresponding to the enterprises. Each chapter includes sections with

findings and conclusions in the following directions:

- *condition of the operative planning of the manufacturing*
- *condition of the manufacturing dispatching*
- *condition of the operative quality management*
- *condition of the monitoring of the production system*

The author has distributed copies of the special report among the experts in order to make them familiar with the data. Afterwards, the author held detailed discussions during which he clarified various questions concerning his findings and conclusions.

It is required that each expert gets acquainted with the author's report and afterwards gives assessment on five-grade scale. The measures on this scale characterize the condition of the Shop Floor Control in every explored enterprise.

The grades from 1 to 5 are formed as follows:

- *5 – condition which is significantly better than the average European level*
- *4 – condition better than the average European level*
- *3 – condition at the average European level*
- *2 – condition worse than the average European level*
- *1 – condition much worse than the average European level*

The grades are filled in special questionnaires. They are filled in table where in the rows are arranged measures for assessment of the Shop Floor Control in four directions: condition of the operative planning of the manufacturing, condition of the manufacturing dispatching, condition of the operative quality management, and condition of the monitoring of the production system. In the columns the experts fill in the values of the measures for each of the six enterprises.

After collecting the filled questionnaires the author has processed the data. For each enterprise and for each of the 26 measures are formed average values of estimates of the four experts.

RESULTS OF THE RESEARCH

The condition of the operative planning of the manufacturing is evaluated through 7 indicators: *degree of using of pull manufacturing system, level of skills for using the "Kanban" system, capability of rescheduling customer orders in case of disturbances, degree of interaction with logistic contractors (suppliers) inside and outside the organization, capability of changing the size of the production lots, capability of applying outsourcing of activities, availability of alternative manufacturing routes for the products.*

The research results show that generally, the condition of the operative planning of the manufacturing in the six enterprises is almost on the average European level. However, it is a little bit lower (2,81). Higher than the average level are the results of the capability of rescheduling customer orders in case of disturbances (3,7) and the capability of changing the size of the production lots (3,2). Very low is the level of capability of applying outsourcing (1,85) and the level of skills for using the "Kanban" system (2,55).

The condition of the production dispatching *is evaluated through six measures: description fullness of manufacturing operations; capability of deviation control throughout the production cycle; capability for rescheduling operations in case of disturbances; capability for minimization of the setup times; capability for control of the loading level of the equipment; capability for rotation of the working places of the operators.*

The research results show that, in terms of production dispatching, the Bulgarian industrial enterprises are almost on the average European level (2, 92). Better than the European results are the capability for rotation of the working places of the operators (3, 65) and the capabilities for rescheduling operations in case of disturbances (3, 25). Considerably lower than the European are the capabilities for minimization of the setup times (1, 75). The rest of the indicators are almost on the average European level.

The condition of the operative quality management *is evaluated through five measures: degree of applicability of the statistic methods for quality management, implementations of measuring, trials and tests throughout the manufacturing process, preparation of reports based on statistic processing of production data, application of report analyses and problem identification, reworking of the production throughout the manufacturing process.*

In this direction the results lag significantly behind the European practices (2, 26). Most

significant is the lag in relation to the application of report analyses and problem identification (1, 5). Almost on the European level are the capabilities for implementation of measuring, trials and tests throughout the manufacturing process (2,75) and the level of reworking of the production throughout the manufacturing process (2,6).

The possibilities of monitoring of the production system are evaluated through eight measures: *availability of standards or limits about resource consumption and equipment load in the production system; monitoring of the ratio between consumed resources and manufactured products quantity; monitoring of the labor costs; monitoring the deviations of launching production lots in the calendar schedule; monitoring of the level of warehouse inventories (resources and products); monitoring of the work in progress share; application of the principles of Total productive maintenance – TPM; Application of the principles of continuous improvement (KAIZEN). The research results are at the lowest level here. The lag behind the European practices is the biggest (2, 13). Drastically lower levels are achieved for: monitoring of the labor costs (1, 5), monitoring of the work in progress share (1, 65), Application of the principles of continuous improvement (1, 8). In this direction the only measure which is almost on the average European level is the monitoring the deviations of launching production lots in the calendar schedule (2, 85). Almost on the European level is also monitoring of the ratio between consumed resources and manufactured products quantity (2,7) and the availability of standards or limits about resource consumption and equipment load in the production system (2,6).*

CONCLUSION

The research results of the effectiveness level of the Shop Floor Control systems in the Bulgarian industrial enterprises which are units in European supply chains can be generalized with the following conclusions:

- *As a whole, the condition of the Shop Floor Control systems in the Bulgarian industrial enterprises is almost on the average European level (2, 53). The existing lag can be overcome and the Bulgarian industrial enterprises can operate successfully as units in different European supply chains*
- *The results for the operative planning and the dispatching of the manufacturing (respectively 2, 81 and 2, 92) are much better than the results of the operative quality management and the monitoring of the production system (respectively 2, 26 and 2, 13). This can be explained with the higher competence of the production managers and dispatchers in the Bulgarian industrial enterprises, in comparison to the competence of the quality and maintenance managers. Therefore, in order to reach the average European level, efforts should be made for improvement of the qualification of these managers and introducing contemporary European practices in the area of operative quality management and monitoring of the production systems.*
- *An important factor for the lag in the directions operative quality management and monitoring of the production system is the low level of application of contemporary technical devices for automatic data acquire like: Barcode systems, Radio Frequency Identification – RFID, computer terminals at the working places, etc. Insufficient attention is still paid to the feedback in the operative quality management and the maintenance of the production system;*
- *Rather unsatisfactory are the results, related to application of modern strategies for maintenance of the production system. Only at an initial stage is the application of the systems Total Productive Maintenance – TPM and continuous improvement (KAIZEN).*
- *It deserves to be noted that there are measures of the Shop Floor Control systems, on which the condition of the Bulgarian industrial enterprises is better than the average European level. These are the capability of rescheduling customer orders in case of disturbances (3, 7) and the capability for rotation of the working places of the operators (3, 65). These are crucial factors which affect the adaptability of the Bulgarian industrial enterprises to the requirements of the European supply chains and they should be the main source of competitive advantages.*

The present work is part of the author's research of the adaptability of the Bulgarian industrial

enterprises, which are units in the European supply chains. It concerns only one of the adaptability aspects. The approach of collective expert estimates of the Shop Floor Control is intentionally chosen. The purpose is to eliminate the impact of the author's subjective opinion.
The conclusions of the present work can not be considered representative for the Bulgarian industry. The purpose of the present research is mainly to probate the methods for assessment of the Shop Floor Control. In future the author plans a major research of the Shop Floor Control systems on national and supranational level. It will be carried out through participation in European projects.

REFERENCES

[1.] D'AVENI, R. A. (1994), Hypercompetition: Managing the Dynamics of Strategic Maneuvering, The Free Press, New York, NY.
[2.] SHEN, W. and D. NORRIE (1999) Agent-based systems for intelligent manufacturing: A state-of-the-art Survey. Knowledge and information systems: an International Journal, Vol1, n° 2, pp 129-156.

AUTHORS & AFFILIATION

[1.] SVETOSLAV DIMKOV

[1] TECHNICAL UNIVERSITY- SOFIA, SOFIA, BULGARIA

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ANNALS
of
FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL
JOURNAL of ENGINEERING
ISSN: 1584-2665 [print, online]
ISSN: 1584-2673 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://annals.fih.upt.ro

FACULTY OF ENGINEERING HUNEDOARA
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

ANA LANGOVIĆ – MILIĆEVIĆ[1], TATJANA CVETKOVSKI[2], ZLATKO LANGOVIĆ[3]

A STRATEGY FOR HUMAN RESOURCE MANAGEMENT IN SMALL AND LARGE COMPANIES IN THE GLOBAL ENVIRONMENT

Abstract:
It is very important for modern business to consider the system of management of human resources in different environments, their similarities and differences, especially the relationships that are developing in the United States, European developed countries and some countries and economies in transition. It is important to know how different countries manage people, how to find a balance between the needs of workers and employees in order to be competitive in the global market, whether to develop specific human resources management systems tailored to local labor markets and the like. Today, in modern business conditions, the successful management of business systems means respecting the environment. How the development of business activities spread out within single country managers who work in a multicultural environment should approach the study and understanding of intercultural management, to know to analyze business problems in the global business context. The success business management systems required by managers and the development of cultural awareness, knowledge and new competencies. It is necessary to ensure that managers develop new skills in managing human resources in global business systems. On the other hand, due to rapid changes in the environment, modern enterprise organizations are trying to find new organizational forms, new structural solutions, flexible enough and necessarily adaptive. The transformation is visible in all elements of an organization, its objectives, resources, human resources, information systems. The new organization has deep and significant implications for the practice of human resource management and causes major changes- the emphasis is on people, motivating employees and managing their potentials.

Keywords:
global environment, human resources, intercultural management

INTRODUCTION

The above changes in the global environment shape of strategy human resource management. On the other hand, the organization of modern enterprises due to changes in the environment finds new organizational forms, new structural solutions, necessarily flexible enough. The new organization has deep and significant implications for the practice of human resource management and that is causing major changes. The emphasis is now on human resources and management of their resources. Because of the crucial role of human factors in a business enterprise, it is considered that investment in people is far more attractive than investment in physical capital. Still, it is necessary to be well aware of cultural specificity of human resources in some regions due to globalization. Of course, you should always bear in mind that existing cultural factors affect policies and practices of human resource management. In fact, more and more business

activities are carried out outside the home country and then it is necessary to know, understand, and adapt to cultural diversity that is present in human resource management strategies. In the process of human resource management an important question is motivation of employees especially over last few years. Of course, it should be noted here that the strategy that is applied to motivate employees depends on cultural diversity. Regardless of the everyday challenges and problems, an increasing number of corporations at the global level has a greater macroeconomic stability. Namely, even small companies, often family corporations, have now grown into companies with a larger number of employees. Despite the stock market turbulence and a global crisis that is increasingly felt in the market and which affects daily operations, managers of these corporations need to work as a team in order to realize business objectives and the question of motivating the employees who contribute to the success of corporations is very important. To this end, each leader is faced with the challenge of finding the right solution that will be best run by the employees while respecting cultural diversity. So, the solution now depends on the conditions of globalization of the cultural differences. Therefore, we can conclude that large and small corporations in globalization process have profound and significant implications for the practice of management of human resources and causing major changes focusing on people and their cultural diversity.

Despite the fact that most of motivating factors found in the results of conducted research are similar, there are still significant differences in their importance to managers from different cultures. This is a clear signal to international corporations that inflexible policies of human resources, which have not been adapted to the cultural peculiarities, will allow managers to successfully motivate each employee individually. Therefore, studies prove that there are different values among different cultures and therefore any international corporation must be aware of them. Different needs and expectations from employees in different countries require human resource managers to implement a policy that is flexible enough to respond to local specificities and to meet a higher level of personal expectations.

HUMAN RESOURCE MANAGEMENT STRATEGY IN JAPAN, THE EU AND COUNTRIES IN TRANSITION

It is very important for modern business to consider human resource management system in different environments, their similarities and differences, especially those related to developing countries in the developed economies of Europe and some countries in transition and with reference to the United States. It is important to know how different countries manage people, how to find a balance between the needs of workers and employees in order to be competitive in the global market, whether should they develop specific human resource management systems tailored to local labor markets and so on. In order to improve manager preparations for global business it is necessary to take into account, and understand the peculiarities that exist in different cultural regions (9). - Having that goal in mind, this paper suggests specific strategies for human resource management in large and small companies. In some countries, like Japan, we should start from the fact that Japan has no natural resources. Thus, their government was forced create a competent work force in many different industries. Not only hours spent in training, but also but also methods are important to them. Japanese organizations invest in their people more than other nations. The first phase emphasizes construction of teamwork and problem-solving, but over time they are going to create a workforce that is loyal, flexible and able to adapt to rapid changes in technology and cultural diversity. Unlike the United States the relationship between management and workers is not that of being opponents. With movement of employees, common practice is to start recruiting some university-educated people before employment actually begins. Also, when the economic teams are bad, companies will often rely on part-time workers. Number of changes at work is on the increase, but the improvement of observing system in Japan, which is based on senior positions, it is difficult to believe that experienced workers will work so long, when it is known that the changes are happening very fast now. Senior promotion system in Japan created a valuable, but uncreative directors. Newly employed people are expected to do everything. The national culture encourages the sense of collectivity and

implies a strong identification with the expertise of profession, i.e. workers see themselves as part of a company in which they are employed. Reward system in Japan starts with a monthly salary which is based on education. Employees get salary increases every twelve months and the progression is based on the principle of seniority. Compensation in Japan is not considered as a measure of personal values in like it is America. Increase in salary and promotion are automatic and they are the result of work and not only a remarkable business success. While these bonuses are common, the main drivers of interest are business tasks, for training and promotion to a managerial position. Japanese firms continue to take into account the age and years of service when they plan promotions. Status differences between managers and workers are rare and they see each other as colleagues. Differences in pay between workers and directors are much smaller than in the United States. The crucial question is -"Can Japanese human resource management be applied outside Japan?" We can say that the Japanese human resource management system is largely applicable outside Japan, but not completely. Japanese global companies headquartered in the United States have achieved a great success thanks to the implementation of its own human resources management system of the host culture. However, the practice of human resources in the Toyota in the United States is not the same as in Japan. Western Europe is characterized by the diversity of cultures. Multinational corporations that want to do business in Europe must understand the national culture, tradition, labor, government and economic philosophy. Although the common currency has led to changes in business practices, changes in the market and changes in the work of government, significant differences still depend on how people manage. Three major business partners: France, Germany and the United Kingdom continue to have a variety of human resource management systems that reflect different cultures, laws, traditions and economic systems work. As Japan and France are classified as high-context cultures, communication depends less on what is said than how or when it is said. In France, people and relationships are always more important than respect for rules. Labor, management and government are part of the business environment. The government provides a legal framework for essential things, and labor and management agree on the details of organising and implementation in everyday business life. Training and development of employees have a high priority among social partners with a government that provides financial and technical assistance for the unemployed and for those industries where jobs have become redundant. France achieved its success thanks to people who have the same attitude when it comes to substantive matters. French unions are unique, because it is their political orientation, not social, or economic. Different types of collective agreements form the basis for relations between employers and employees on almost all levels. Notwithstanding the great role of unions in the French society, labor unrests are more frequent than in the United States. Part of the reasons for this lies in the belief that French workers have little economic mobility, and thus expect to find solutions to any problem from the government France is stricter in terms of structural classes, but it has great social benefits, even when the price of labor falls. Recruitment and selection methods and the law does not differ much from those in the United States. The largest number of new employees are employed on probation and they are a subject to collective negotiation agreements. Laying off workers in the private sector does not differ much from the practices of the United States. Usually you must provide an extensive explanation, and then follow strict procedures. Laying off workers in the public sector is much more difficult. Reducing and restructuring prevails, and must follow special procedures. Job security and free time are more important to people in France than in America. German workers work hard, they always say what they think, they are always right, serious, disciplined, methodical and precise, but they have paid holidays, and the price of labor is the highest in the world. Decision-making process takes longer than in the U.S., but this is usually because a German worker investigates every possibility. Labor, management and the government put a great emphasis on training, especially vocational. An extensive internship program is available for qualified young people. It is expected that managers and

professional technicians are educated and their education needs to be in the area of leaning toward engineering and other specialized areas. Desirable quality of management and leadership from the German perspective can be achieved by the top technical and communications skills. While the Americans prefer to have leaders who are charismatic and confident. Compared with the United Kingdom and France, Germany has the lowest ratio of staff to the line workers. This means that German companies have fewer layers of management, a greater amount of control, or line workers who want and are able to do business - stuff. Although Germany does not offer a lifetime guarantee of employment, there are strict rules to end the contract of employment, which makes laying off unproductive workers difficult. A characteristic unique to Germany is legally defined role of labor in all business decisions. Employees have certain rights and obligations in relation to employer and as a group they have the right to participate in matters concerning the work of a plant. Every company, except the smallest, must have a working council, which represents the employees, and they can refer to them to the appeal and ensure impact on policy decisions important for the workers. The size of the workforce, compensation systems, systems selection, work planning, training, restructuring and termination of work are examples of where employment advice and management share the responsibility. Management of the co-determination still retains substantial power, but since it has to take into account the perspective of business advice, the link between human resource planning and business planning has significantly increased. In practice, labor councils have a great legal power, but generally do not need to use it. The interests of workers are more closely aligned with the objectives of the company because of constant interaction between workers and managers, and because does not create a substantial inelasticity of Management. The United Kingdom is one of the main trading partners of the United States and the primary source of foreign direct investment. Great Britain is the first European location for the Japanese automotive industry and the Asian electronics industry. English class system still exists regardless of the changes that have occurred, and people still tend to remain in the class in which they were born. The British tradition of love and hate changes. Like the Germans, the British work in low-context culture, where people say exactly what they think. In the United Kingdom university managers are less educated or technically trained than in other advanced nations. One of the reasons is that the manager's job is less appreciated than a job in law, medicine, finance, or government service. One study showed that only 40% of UK corporations have a budget for the education of their employees. Collective negotiations process in the UK is similar to that of the United States, as both are based on opposed relationship between workers and management. Old-fashioned methods of selection for employment almost completely rely on the following: questionnaire, interview and recommendations- this helps in making a final decision. Centers for testing and evaluation are rarely used. There are laws on equal conditions for employment there, but there are no laws against discrimination, for example, by age and the like. Women who work part time and temporary workers are an important source of flexible labor and they are generally paid less and have fewer benefits. Employers in the UK differ from those in continental Europe in having a great freedom provided by the government with regard to firing workers and reducing the organization. Workers are laid off due to the decrease in the number of employees and they receive modest a compensation determined by the government. Neither management nor the workers have a strategy for planning work such as construction teams, or quality circles. Management sees the strengthening of the workers as a threat to their autonomy, while unions have other priorities, such as the amount of wages, job security and participation in decision-making management. British supervisors on the front line, unlike those in Germany, have a management style that emphasizes support and consideration rather than the content of the task. Workers in manufacturing tend to have more impact on business planning, distribution and determining the number of workers. In the UK the pay is a function of job classifications in which employees are paid the same rate for the same job, which in some way corresponds to the unions. Over the past few years, plans to pay for performance have emerged, but it's still less than

in the United States. Communism in the countries of Eastern and Central Europe has left people badly prepared for the establishment of market reforms and the adoption of market economy. Millions have created non-productive workers, abandoned factories, destroyed infrastructure, high unemployment and unstoppable inflation. The countries of the Central Europe such as Hungary, Poland and Czech Republic have made enormous progress. Unlike these countries, Eastern European countries such as Russia, Ukraine, Bulgaria, Romania, and our country prosper and grow much more slowly. China is a special country, a country with two systems, in which the government is still communist, but the country where communism did not prevent the progress and openness to the world. In China, market reforms have been already largely carried out and they have shown significant results not only in the economic field but also in all other areas. The previous system neglected the role of human resources. In the open market systems employees and management look for professionals in human resource management. A director of personnel in enterprises controlled by governments has often been associated with the Communist Party. The party wanted to have a political voice in the company and use the personnel titles that would have legitimacy. Centralized plan depended on workers who were involved. Promotions were allocated on the basis of connections and loyalty to the party. Training manager was neither available nor appreciated. . China, most populous country in the world is changing rapidly. Doing business in China today is not easy, and one of the biggest obstacle is corruption, bribe and bribery. Foreign employers are likely to have problems attracting unskilled labor force that wants to work for low pay, but employers must also be prepared to provide a lifetime employment, housing discounts, maternity leave, pensions for employees, as well as cash payments to those already retired. In China, the owner must pay the state for already trained workers. When it becomes necessary to lay off employees they must follow strict rules, which have been proscribed by government. The largest number of employers provide generous severance pay, hoping to avoid long and costly legal procedures . We should point out that in this global environment it is very important to understand and to be familiar with different business cultures which will have influence on motivation, communication of people and control. It will have an impact on success of business communication.

NEW STRATEGIES FOR HUMAN RESOURCES AND GLOBALIZATION

Modern and new conditions also mean big changes and globalization. Globalization consists of transformation of world market from expensive national to unique market where enterprises from different countries compete with each other with minimal barriers. It implies accelerated flows movement of capital trade, mobility factors production exchange technologies information etc. Today, managers are facing group activities and teamwork. A basic idea of integrated companies affects everyone in interdependent environment where cooperation is an essential factor for success. Teamwork functions naturally through cooperation and integration but these concepts are similar in its application in international federations and collaborative joint activities. International company can be successful only if there is teamwork. A lot of managers should fulfill expectations developing group access to global tasks and begin international teamwork. International teams are formed or based on international initiatives management or they evolved as a result of global expansion. In both cases teams working primarily on helping their companies to distinguish global effectiveness. Teams as form of strategic management are substantive for strengthening global organizations. Without intensive focusing on global network relations international companies can effectively lead (especially transnational configuration).
International teams create and give power to local branches - companies or regional groups- so they can react on pressures competition. Teams bring benefit and by nature are groups which already have power thanks to certain stage of possibility to make independent decisions. In ideal configuration teams provide interdependent activities between specific operations of a company. Accordingly, global network teams of one company may combine significant independence within their subsystems with interdependent contributions to the global

system. International teams operate as a pipeline for learning organization. Team unites individuals with different interests individually and they contribute to the activities of the team. This process of division enables transferring knowledge because team members discuss, negotiate and react amongst themselves. Of course, heterogeneity increases risk of conflict and misunderstanding but concrete heterogeneous management can enrich the experience of members of groups and be useful for organization to spread the volume of making decision. If management is bad, there is always a danger from conflict or unproductive compromise for potential and then groups can disintegrate or there can be bigotry among their members. Accordingly, effective management team is a crucial factor for success. Success is assigned to ability of company managers to inspire development team. Managers are in charge of creation constructive group processes what involve group members. Group leaders work as mediators helping individuals to confederate in collective body which makes decision so that they could together work on realization of justified goals. When work group is composed of multinational members whose activities include several countries we to call it a transnational team. Unlike other strategic teams transnational team work in extremely complex environment and have personnel managers from different global operations: members must not work in immediate physical vicinity already cooperate via information network and they need to have occasional meetings to consider numerous plans . Geographical distance can cause problems in communicating between members of teams, but they must be psychologically coordinated if their strategic focus has common and valuable goals. Forming transnational teams is a complex problem because members of international team represent different cultures and bring their personal perspective, prejudices, linguistic characteristics and behavior to the group which enriches work team but also breaks up the unity. Variety obviously has its advantages but it also represents a special problem for management. Modern conditions caused that international teams increasingly receive status of basic coordinating elements of global strategies in multinational systems. They take part in making decisions in overall portfolio interests of transnational firms of global symbols and products of global export strategies. They are also in charge of management and Coordination of activities of former subordinate teams (regional). Managers of strategic transnational teams must carefully develop a system of human resources forming teamwork needed for success in all international activities. Regional or administrative groups are called representative teams. This term initiates notion of representative managers of international operations. (Representative regional manager or corporate manager doesn't have a hierarchical role but a role of a coordinator of a regional interest). Such manager supports autonomy of international team (on that level) and makes decisions related to responsibility for interdependent requirements of organizational systems. Representative team is only a mediator coordinating body and a channel of information and decisions between peak company and its regional or group branches. A manager-mediator must concentrate on staff development, not management from the top. There also must exist working conditions for team to facilitate cooperation among members and if necessary reconcile differences among them. Team focuses on operational effectiveness, distribution sources transferring priorities from one affiliate to another and optimization obtained by any member in one branch or between regional alliances.

CONCLUSION

The way in which employees and managers behave in business and all other types of organizations is determined largely by subconscious assumptions, values and norms of national culture which they brought into the company. Companies and other organizations in every national community are organized and they operate according to rules that are deeply rooted in national culture and community. People in organizations cannot act otherwise than according to their assumptions, values and norms of their culture. Cultural determinants of management imply that an organization and management needs to subject to the assumptions and beliefs of national culture in the community. For example, as the distance power in the Serbian national culture is higher than in the UK, it will lead all companies in Serbia, under the same business conditions, to

be more centralized and autocratic than British companies. This does not mean, however, that the national culture is the only factor of organization and management of enterprises in a country. Culture is the only additional factor that complements and influences the other factors. If the national culture was the only factor of management, all companies in a national community would be organized and managed in the same way. The national culture determines the trends before they define the situation. The organization, for example when it starts to grow needs decentralization but decentralization depends on the culture. Companies in Serbia and Great Britain will be equally subjected to the rule that they are larger, more decentralized. But the companies in Serbia which are the same size as companies in Great Britain will be a more centralized one. The globalization of markets and international competition will require companies that operate in multicultural environments. The above mentioned facts indicate the need for multicultural managers. Experts estimate that company annually loses 2-2.5 billion dollars due to employee errors that occur in business in other cultures. Large companies are taking steps to globalize the training of managers and their ability to understand other ways of thinking feeling and the way they realize their business activities. The aim is to improve their ability to operate effectively with customers, suppliers, managers and employees in other countries and regions. Managers need to examine their own beliefs, overcome comparisons with other cultures and adapting the way of communication, problem solving and decision making process. Global enterprises, and multinational companies that invest in Serbia, as well as any other country culturally different from their parent company, are (in) a significant dilemma. Their crucial question is: how to deal with cultural differences between their units in different countries? These companies must find a way to reconcile the two conflicting requirements. On the one hand, multinational companies need to preserve the unity of their corporate cultures and values, beliefs and norms of behavior that are shared by all employees and managers. Also, multinational companies need to ensure the implementation of unique strategies, policies and procedures throughout the system. You cannot manage people in the same way people London and Belgrade. And it's not just because of cultural differences but also because of the economic environment and legal system. Multinational companies need to preserve the unity of its key systems, structures and mechanisms of governance, and also allow local units of these systems, procedures and structures to adapt to their specific features to a level that will not jeopardize the unity of the whole system.

REFERENCES

[1.] BATCHELDER (1993) D. BATCHELDER, Using critical incidents. In: T. Gochenour, Editor, Beyond experience. The experiential approach to cross-cultural education, Intercultural Press, Yarmouth, Maine (1993), pp. 101–112.

[2.] BENNETT (1993) M.J. BENNETT, Towards ethnorelativism: A developmental model of intercultural sensitivity. In: M.R. Paige, Editor, Education for the intercultural experience, Intercultural Press, Yarmouth (1993), pp. 21–71.

[3.] CVETKOVSKI T., LANGOVIĆ A.: «Komunikacija u uslovima globalnog poslovanja» Međunarodni naučni skup «Radikalne promene u preduzećima i privredi u uslovima globalizacije», Megatrend univerzitet primenjenih nauka, Beograd (2003)

[4.] JOVANOVIĆ M., LANGOVIĆ MILIĆEVIĆ A.: "Interkulturni izazovi globalizacije", Druga internacionalna koferencija ACE, decembar, APEC studijski centar, Fakultet za poslovne studije i Univerzitet Hong Konga (2007)

[5.] JOVANOVIĆ M., LANGOVIĆ-MILIĆEVIĆ A.: Interkulturni izazovi globalizacije, drugo dopunjeno i izmenjeno izdanje, Megatrend univerzitet, Beograd, 2009.Jovanović M.: Uvod u biznis sa osnovnim principima menadžmenta, dopunjeno i izmenjeno izdanje, Megatrend univerzitet, Beograd, 2009

[6.] LANGOVIĆ A., CVETKOVSKI T." »Uticaj kulture na pregovaranja« IX Internacionalni Simpozijum "Menadžment – ključni faktori uspeha", Symorg'2004., Zbornik radova, Zlatibor, Fakultet organizacionih nauka, Beograd

[7.] VID. LANGOVIĆ MILIĆEVIĆ A., CVETKOVSKI T.: Realization Business Activities in Respect of Cultural Factors, 2nd International Conference on Entrepreneurship, Innovation and Regional Development – ICEIRD 2009, 24 -25 April Thessaloniki- Greece, 2009. Organized by CITYSHEFFIELD THESSALONIKI, The University of Sheffield, South- East European Research Centre, Editors: P. Ketikidis, A. Sotiriadou, T. Hatziapostolu, F. Misopoulus: ISBN 978-960-89629-9-6 pg. 367-376

[8.] LANGOVIĆ MILIĆEVIĆ A., CVETKOVSKI T., LANGOVIĆ Z.: "Uticaj kulture – realizacija projekta", XI Internacionalni simpozijum iz projektnog menadžmenta pod nazivom "Projektno upravljanje organizacijama – novi pristupi" - YUPMA 2007, Zlatibor 06-08. jun 2007. godine, Udruženje za upravljanje projektima, str. 117-121 ISBN 978-86-86385-02-4; COBISS.SR-ID 140567308

[9.] DONABEDIAN B. &. MCKINNON S. M & BRUN W. J (1998) "Task characteristics, managerial socialization and media selection," Manag. Commun. Quart., vol. 11, no. 3, pp. 373–400

AUTHORS & AFFILIATION

ANA LANGOVIĆ – MILIĆEVIĆ[1],
TATIANA CVETKOVSKI[2],
ZLATKO LANGOVIĆ[3]

[1,2,3]GRADUATE SCHOOL FOR BUSINESS STUDIES,
SERBIA

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

JELENA ĆIRIĆ[1], SLOBODAN MALINIĆ[2]

MEASURING THE PERFORMANCE OF BUSINESS SEGMENTS AND DIVISIONAL MANAGEMENT

Abstract:
Multidivisional company consists of several divisions or business segments, usually in the form of profit or investment centers. Business segments are not independent legal entities, but have their own revenues, expenditures, financial result, and if it comes to investment centres decisions on the amount of investment are made. Something useful to a business segment or division may not be optimal from the aspect of the company as a whole. Business segments are also competitors. In those business segments managers have information that is not fully available to management at the highest level. Divisional managers, as agents are motivated to achieve better results in business segments that are delegated to them, and compensation schemes and bonuses can be so set that short-term financial interests of the segment dominate in relation to long-term interest of the owner - increasing the company value.

Keywords:
business segments, decentralisation, management, performance

INTRODUCTION

Centralized management of complex business in an uncertain and dynamic environment does not provide conditions for survival and development of a company. The growing instability and complexity of environment and technology, as well as growth and development of the company through diversification requires a certain degree of decentralization of management and flexible organizational structure that will adapt with frequent changes in the environment and the company. Reply of a modern enterprise in a complex and turbulent environment is the complex internal organizational structure that is essential for effective management. By choosing an organizational model company can respond more or less successfully to the action of numerous internal and external factors in the business. Managers of profit and investment centers as decentralized organizational units have the discretion to make decisions, select and implement specific activities. In order to estimate the performance of the managers of these responsibility centers, ways of measuring their performance have to be defined and it is duty of management at the highest level. Top management defines the rules and measures for managers at lower levels, as well as rewards for those managers whose decisions and actions are consistent with the objectives of the company as a whole.

DECENTRALIZED DECISION MAKING AND DIVISIONAL MODEL OF THE COMPANY ORGANIZATION

Through decentralized decision making and delegation responsibilities to lower levels specialised information of managers at local levels can be used. They respond more quickly and flexibly to changing customer demands,

changes in technology, environment and so on. By delegating decision making, top management is released from operational decisions, and their time as a limited resource is used for strategic decisions making. At the same time, managers at the lower level benefit, because they gain authority and responsibility for decision making in order to acquire the necessary training and experience that can be useful to them in the future and can provide them top management positions. In this way motivation, creativity and entrepreneurial spirit of local managers are encouraged and also those who are able to become decision makers at the highest level are selected. In the modern business environment is almost impossible to process local character information to the top management. It would require too much time and other resources and benefits would not be greater than the costs. Generally there is a view that decisions should be made at the level where the relevant information are produced, stored and processed. When the local managers have authority, they can make and realize some decisions without consulting top management and react timely to changes and problems in the life of a company. This prevents the delay in communication and unnecessary waiting for responses from the highest levels.

The company with decentralized decision making usually apply divisional organizational model where divisions are formed as decentralized organizational units. Divisions do not have legal independence, but have their own revenues, expenditures and results. Division should be profitable in the markets or market segments they serve and should also contribute to profitability and competitive advantage of a whole company. Division as a separate organization unit whose management has special authority and responsibilities in accordance with the objectives they wish to achieve, is known as strategic business unit - SBU. Divisional organizational model requires the definition of the relationship between the divisions and implementation of motivational mechanisms. Divisions are competing with each other, but at the same time try to be profitable and to contribute to corporate profitability. Divisional model is quite flexible due to the short communication lines is more efficient, faster response to the changing demands of consumers with the possibility of direct contact with them. Employees can see their place and role in the division and be motivated through different mechanisms, and top management can control easier performance of a division. The disadvantage of this model is that there can occur a conflict between divisions that are also competing with each other for company's resources, then possible rising costs of joint activities and loss of top management control over the operations of business segments [1]. By implementing decentralized decision making the right measure of delegating authority and responsibility should be find, then actual effects of decentralized units and their management should be assessed and evaluated, and depending on their achievements the incentive mechanisms should be implemented in order to achieve a balance between benefits and costs of decentralization.

THE IMPORTANCE OF THE FORMING OF PROFIT AND INVESTMENT CENTERS AND THEIR CHARACTERISTICS

From the aspect of financial performance, as traditional method of monitoring the success of decentralized organizational units, they can be in the form of cost, revenue, discretionary centers (budgeted) expense, profit and investment centers. Standard cost centers are established when the output is measurable and when the standard prices and standard expenditures are known [2]. Cost center managers are responsible for the efficiency and the effectiveness of its center, ie. for the producing products on time and according to quality standards, which reflects the performance of other organizational units. All other decisions such as production volume, pricing, product mix are made at the level of top management.

Revenue center manager is responsible for sale and distribution of products. If manager has the authority to define the selling price, he is also responsible for the gross income. But if the selling price is defined at the corporate level, revenue center is responsible for sale volume and sale mix. The performance evaluation of revenue center should include some concept of cost, otherwise the center will be interested only to increase revenue, and not to increase marginal profit. Revenue center managers will insist on reducing sales prices in order to increase total sale and spend additional funds to

promote low budget products. Although this is the way to increase the total sale revenue, this reduces the profitability of the company. Centers of discretionary (budgeted) expenditures are formed in the organizational units that do not produce a measurable output expressed in the financial indicators (e.g. department of administration and sales) and in units where there is no stronger relationship between inputs and outputs (e.g. research and development department). Due to the impossibility of measuring the actual results of the center there is a risk of the appearance of information asymmetry.

Profit center manager has the authority in the field of production and sale. He decides which products, at what price and how to produce, sell and distribute. Manager decides to which products he will allocate resources. He should establish an optimal relationship between scope, cost, quality and product cost. Most profit centers managers do not have authority about the level of investment and realized profit is the main short-term indicator of the performance of profit center and its management. Usually it's made the comparison between realized and budgeted profit. Profit centers are important from the aspect of planning, control and motivation in a decentralized company. Regarding the profit center also consists of the cost and revenue center, the costs and revenues are also planned, which is important to the top management who has to adjust the budgets of many organizational units. The higher the degree of controllable factors, the greater is management responsibility for results. More divisions can create a profit center, but also in one division may exist more profit centers. In order to become a profit center, division should meet the following conditions [3]: 1) to have a critical mass of direct revenue and expenditure, in order to control profit center through the profit, 2) that managers have sufficient authority to take actions that could significantly affect the result, 3) to have their own recognizable external market of inputs and outputs, 4) that the relationship between organizational segments are clearly defined so that profit of each of them is independent of the decision and the efficiency of other profit centers, and 5) that there is readiness of top management to control the success of decentralized units through the realized profit or loss.

Top managers delegate authority to the investment centers managers and on that basis they make decisions on assortment, pricing and the amount and type of investment. In this way, investment centers get characteristics of an entity, but without legal autonomy. An investment center can consists of several profit centers. In order to become an investment center a division should [4]: 1) meet the requirements relating to the establishment of profit centers, 2) organizational segments are recognizable enough and have their investments and costs of capital so that control over the rate of return has meaning, 3) to the managers of these organizational units should be delegated the authority to make decisions that determine profit, but also the type and quality of the investments, 4) the readiness of top management to decentralize decision making and to control responsibility centers and their managers through rates of return and / or residual income. Although the decentralization process is deepened by forming investment centers, obtaining external funding sources, as well as research and development activities generally remain at the top management level. In order to determine the performance of an investment center, two basic indicators are return on investment - ROI and the residual income or economic value added - EVA. It is no longer enough to use only data from the income statement (as it is case for the profit centers), but also data from the balance sheet, where tha data about amount of assets is used. Managers of profit and investment centers are held accountable to the top management, who had delegated authority to them, unlike top management who is held accountable to the shareholders and other external users of financial statements for the results of the company.

MEASURING THE PERFORMANCE OF BUSINESS SEGMENTS AND DIVISIONAL MANAGEMENT

Performance of a company and its segments can be expressed with financial and non-financial indicators. The most common is a profit because it expresses the total performance of a company and it is a common denominator for objectives of a company and its segments. There are different performance measures in

manufacturing and service companies, in profit and nonprofit organizations and institutions, and measures depending on the key factors of success such as cost, quality, time, innovation, flexibility and others [5].

Traditionally performance measurement and analysis is based on the financial statements. Company's performance can be expressed by the ratio numbers such as revenue profitability and assets and capital profitability. Revenue profitability ratios are calculated as relation between the different forms of profit and realized revenue. In that way can be determined rate of operating profit, gross profit, contribution, residual or net profit, which shows their relative share in the revenues. Ratios of capital and assets profitability indicate the level of increase of employed assets and capital. It can be counted rate of return on total assets, or only the operating assets, or the rate of return on total capital or only return on own capital. Rates of return are counted as relation between the realized returns in the form of profits and accounting positions by whose engagement is achieved the return on the assets or on the capital.

By measuring profit center performance, results of manager and his responsibility center should be distinguished. Factors that divisional manager cannot control, such as changes in the value of property and equipment of profit center, should not be included in the assessment of his performance, because such decisions are usually made at the highest level. If managers of profit centers or strategic business unit (SBU) have responsibilities about level of investments, then return on investment (ROI) is calculated, when net return before tax is divided to investments.

Regarding capital still has an alternative usage managers should direct capital to those business segments in which the ROI is above the cost of capital. Calculating the ROI is useful from the point of budget the necessary amount of capital in the planning period. Capital is invested in the noncurrent and current assets and through the measuring the ROI an incentive is given to the divisional management to reduce current assets through faster realization of receivables and inventory reduction, or through the acceleration of their turnover.

For evaluating the performance of investment center usually is calculated ROI, but it also has certain disadvantages. In the modern performance measurement systems one of the criteria for awarding divisional management is the level of ROI and thus managers could rejected those projects whose ROI is below average, but above the cost of capital at the level of division. In other words, managers will accept those projects that give higher divisional ROI, but do not increase a long-term value of the division and the company. So it is not enough to calculate a ROI as only success indicator of the of profit and investment center, and as criteria for awarding divisional management. It is necessary to calculate the economic value added - EVA or residual income. Residual income harmonizes the divisional objectives and activities with the decisions that increase the value of the divisions and company. From the point of this indicator eligible projects are those who reject the ROI above the cost of invested capital. This indicator is flexible and varies depending on the rate of risk. EVA or residual income is calculated by subtracting opportunity cost of invested capital from the net business profit after tax. EVA is an estimate the amount above or below the minimum acceptable rate of return for shareholders and creditors. Unlike the market value added, EVA can be counted on divisional level, ie. business unit level. As an economic indicator EVA is based on the idea that the business must cover operating expenses and capital costs.

EVA calculating:

Net sales - Operating Expenses = EBIT - Taxes = NOPAT - Cost of capital (Invested Capital x Cost of capital) = EVA

EBIT - Earning Before Interest and Taxes

NOPAT - Net Operating Profit After Taxes

ROI indicator is calculated for almost ninety years and has been developed for the first time in the company Du Pont, in 1923. Regardless the abovementioned disadvantages, it is a relative measure of the company success and is easy to compare to other relative financial measures - rates, unlike EVA that is an absolute measure of success of the company and its segments.

When incentives are known to the divisional managers, they tend to maximize the defined performance measures of the responsibility centers and those measures are mostly return on investment (ROI) and Economic Value Added (EVA). It is very important to define correctly the rewards and incentives for divisional managers

in order to motivate and evaluate their performance. Often managers are motivated to improve short-term performance of its responsibility center, but at the cost of achieving the objectives of other divisions or whole company. For example, a manager of a revenue center may be primarily interested in increasing revenue, although contribution is more important from the company's aspect. As a result, it's more insisted on monitoring strategic (long term) performance indicators of the company and its segments through strategic tool such the BSC is. If divisional measurement are compared only internally, e.g to the previous period performance or in relation to the planned indicators, one could get an unrealistic picture of the division performance. If the conjuncture impact positively on all companies in the branch, the majority of companies and their decentralized units will achieve better performance than expected or the past. Therefore, it is always advisable to consider effects of external factors, such as whether the market share or profitability of the observed division have changed. For this purpose top management need information of divisional management. Another problem in measuring performance arises because most of the performance measures are short-term. Motivated to achieve better and easily measurable results in the current period, on which they get bonuses and rewards, divisional managers avoid investments in intangible assets - research and development, human resources, quality improvement. The effects of these investments are not objectively measurable, appear in the future, and in the current period reduce rate of return, which is the base for evaluation of manager performance. Also the effects of investments in intangible assets manifest later in the period when manager who decided about investment would be on some other managerial position in the same or even in another company. Regardless the great importance of these investments to the long-term value of company, such as increasing product quality, improving employee morale, better services, are hard to measure, visible only in the long term and differ from traditional financial indicators of performance. That is the reason why periodic profit reporting dominates and in order to improve short-term results long-term profitability is sacrificed. The solution may be to define the target values that managers need to achieve in the field of human resources, quality products and services, distribution and other areas or to implement BSC at the divisional and corporate level.

In complex companies there are some decentralized organizational units (divisions) that exchange effects, at prices that are called transfer. Transfer prices depend on whether market-based, cost-based or negotiated model of transfer pricing is applied [6]. From the transfer prices depends income or selling division i.e the cost of purchasing division, which is further reflected on the performance of divisions and their management. Because of that transfer pricing are often a source of conflicts and managers are very interested in the way of determining transfer prices. Whenever it's possible, advantage in the purchasing should be given to the transfers of intermediate products between divisions. But if the transfer prices are set too high divisional managers will prefer an external purchase, which will increase the benefit of purchasing division, but not the benefit the company as a whole. Except the price, in the transfer of intermediate products, the quality and timely delivery are also important. Transfer prices have dual, mostly conflict role. On one side they are essential for business decisions and they inform production manager how much to produce and to sale manager how much to order. On the other hand, they help to the top management company to evaluate performance of profit centers. The problem arises when divisional managers make decisions that misuse the performance measurement of their responsibility center. Guided by the desire to maximize short-term divisional profit, managers take actions that cause falling of corporate profit. Transfer pricing leads to conflict between, on one side the business decision making, and on the other side between divisional performance measurement and their management [7]. Dysfunctional behavior of managers during the negotiations about transfer pricing means that they favor the maximization of short-term performance at the expense of long-term corporate profitability.

By implementing the Balanced Scorecard (BSC) concept the company gets a performance measurement system which identifies factors that enhance long-term financial performance

through four interconnected perspectives - financial, learning and growth, customers and internal process perspective. It is based on 15 to 20 different measures that are implemented. The high morale of employees improves internal processes, increase customer satisfaction and improve financial performance of the company. This is the way how to achieve short-term financial goals and at the same time through the successful realization of the other three BSC perspectives, long term strategy is implemented and the value of the company is increased. Regarding most companies are multidivisional and consists of more divisions or decentralized units, each of them can create own BSC, but also contribute to the realization of the corporate strategy.

CONCLUSION

In the company as a complex organization exist many interest groups that attempt to achieve their own goals, even if it does not contribute to optimization of company's goals and interests. As a result, top management faces the problem how to encourage local management to achieve corporate goals through realization of individual interests. At the same time due to opposite interests arise conflicts and top management should be involved in eliminating potential conflicts. Regardless of the difficulties in choosing the best way to measure divisional management performance, it is necessary to assess and evaluate their contribution to the success of their responsibilities centers and company as a whole. Different incentives mechanisms reduce cost of acquiring and processing information, in order to eliminate dysfunctional behavior of divisional managers and to harmonize divisional and corporate goals. Most managers is primarily focused on maximizing short term profits of which depends on the height of their awards. It reflects negatively on the long-term performance of the company. Therefore, the company management assess performance of divisional management and their responsibility centers not only on the basis of financial indicators, such as mostly ROI and EVA are, but also on the basis of non-financial indicators. Through implementation of the Balanced Scorecard concept (BSC) are included financial and non-financial performance indicators of the company and its segments.

REFERENCES

[1.] STEVANOVIĆ, N., (2005). Upravljačko računovodstvo, str 560., Ekonomski fakultet, Beograd

[2.] KAPLAN.,R., ATKINSON, A., (1998). Advanced Management Accounting, p. 294, Prentice Hall

[3.] MALINIĆ, D., (1999). Divizionalno računovodstvo, str. 73, Ekonomski fakultet, Beograd

[4.] MALINIĆ, D., (1999). Divizionalno računovodstvo, str. 75, Ekonomski fakultet, Beograd

[5.] MALINIĆ, S., (2008). Upravljačko računovodstvo, Ekonomski fakultet, Kragujevac

[6.] SEAL, W., GARRISON, R.H., NOREEN, E., (2006). Management Accounting, The McGraw-Hill Education

[7.] KAPLAN.,R., ATKINSON, A., (1998). Advanced Management Accounting, p. 462, Prentice Hall

AUTHORS & AFFILIATION

JELENA ĆIRIĆ[1],
SLOBODAN MALINIĆ[2]

[1] FACULTY OF TECHNICAL SCIENCES, NOVI SAD, SERBIA
[2] FACULTY OF ECONOMICS, KRAGUJEVAC, SERBIA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

MANUEL JOSE OYSON[1], D. HUGH WHITTAKER[2]

CREATIVITY AND PROSPECTION: CREATING AND EXPLOITING OPPORTUNITIES FOR INTERNATIONAL ENTREPRENEURSHIP

Abstract:
The increasing interest in international entrepreneurship calls for conceptual frameworks to better understand firm internationalisation. This paper explores an entrepreneur-firm-opportunity framework and advances an opportunity-based approach to international entrepreneurship. The role of the entrepreneur in the formation of international opportunities and the subjective dimensions of entrepreneurial creativity and a new construct of 'prospectivity' are examined. The firm – through its capabilities – is located as the vehicle for internationalisation and opportunity exploitation. The 'opportunity' construct is re-examined and the notion of the 'entrepreneurial opportunity' clarified. The paper shows how the entrepreneur orchestrates the dynamic interplay between firm capabilities and market opportunities to form entrepreneurial opportunities, leading to dimensions of opportunity formation processes and a Typology of Entrepreneurial Opportunity Processes (opportunity discovery, development, construction, and creation). Finally, the paper outlines how conceptualising internationalisation as the formation and exploitation of international entrepreneurial opportunities, and applying the opportunity-based approach to international entrepreneurship, can lead to a better understanding of the phenomenon of firm internationalisation.

Keywords:
Entrepreneur; entrepreneurial opportunity; firm capability; international entrepreneurship; opportunity discovery; opportunity creation

INTRODUCTION

The proliferation of 'little heroes' in international markets has attracted strong interest in international entrepreneurship [1]. To explain the process of firm internationalisation, Johanson and Vahlne [2] advanced a 'stage' model that described firm internationalisation as a gradual, incremental process with firms evolving through stages as they acquire experiential knowledge. Bilkey and Tesar [3], Cavusgil [4], and Czinkota [5] propounded alternative internationalisation models – characterised as 'innovation-related' – by Andersen [6]. The stage and innovation-related models of internationalisation, while gaining considerable support, have drawn heavy criticism [7]. Cannon and Willis [8] questioned the assumptions of incremental, step-by-step internationalisation, arguing that many internationalising firms often jump stages to hasten the internationalisation process. Reid [9] found existing models too deterministic and suggested a contingent view of internationalisation. McDougall, Shane et al. [10] questioned the failure of the stage-model and innovation-related models to account for the rise of international new ventures (INVs) that not only skipped stages of internationalisation but went international from inception.

Another framework to analyse firm internationalisation explores the drivers of firm internationalisation. For both stage and innovation-related models, the lack of

experiential knowledge and the uncertainty associated with internationalisation influenced the gradual pattern of firm internationalisation. Yet, the phenomenon of INVs that internationalise at or near inception, obviously without experiential knowledge, cast doubts on this theory. The role of resources, following the resource-based view [11], have been cited by Kundu and Katz [12] and Westhead, et al. [13], who showed that firms with greater resources have a higher likelihood for internationalisation. But there is clear evidence that highly-resourced firms do not necessarily internationalise. On the other hand, some firms with insufficient resources have overcome this constraint by harnessing networks and alliances [14]. The network approach [15,16] sought to show that internationalising firms build relationships with other independent firms that belong to a common network. Yet, this approach has also failed to account for firms that have internationalised without the benefit of networks [10].

Other studies have focused on the entrepreneur to explain internationalisation. These studies have concentrated on the objective elements of the entrepreneur such as his education, experience from living abroad, internationally-oriented jobs [16], international work and educational experience [17], age, place of college education, and foreign language skills [18]. However, the study of Cavusgil and Naor [18] showed age, education, place of college education, and foreign language skills to be poor discriminating variables between exporters and nonexporters. Andersson et al. [19] also found no support for the link between the age of the entrepreneur and international activities.

In this paper, we will explore an entrepreneur-firm-opportunity framework and advance an opportunity-based approach to international entrepreneurship. In particular, we will explore the role of the entrepreneur in the formation of international opportunities and examine the subjective dimensions of entrepreneurial creativity and prospectivity. We will also situate the firm – through its capabilities – as the vehicle for internationalisation and opportunity exploitation. We will re-examine the 'opportunity' construct and clarify our notion of the 'entrepreneurial opportunity'. The paper will also show how the entrepreneur orchestrates the dynamic interplay between firm capabilities and market opportunities to form entrepreneurial opportunities, leading to dimensions of opportunity formation and a Typology of Entrepreneurial Opportunity Processes. A final section on the opportunity-based approach to international entrepreneurship will outline how the process of internationalisation may be conceived as the formation and exploitation of international entrepreneurial opportunities. We will show how the application of the opportunity-based approach to international entrepreneurship can lead to a better understanding of the firm internationalisation phenomenon.

ENTREPRENEUR-FIRM-OPPORTUNITY NEXUS

Shane and Eckhardt [20] suggested an 'individual-opportunity' nexus in entrepreneurship. This follows Shane and Venkataraman's [21 p. 218] argument that 'entrepreneurship involves the nexus of two phenomena: the presence of lucrative opportunities and the presence of enterprising individuals'. These scholars, like Stevenson and Jarillo [22], view opportunity cognition and exploitation as being at the heart of entrepreneurship. Di Gregorio, et al. [23] suggested the extension of the individual-opportunity nexus framework to international entrepreneurship studies. But they focused on firm-level analysis instead of accounting for the roles of both the entrepreneur and the firm in internationalisation. It is probably safe to say that a framework that integrates the entrepreneur, the firm, and opportunities in international entrepreneurship studies is missing. Such a framework becomes all the more important if Oviatt and McDougall's [24, p. 540] definition of international entrepreneurship as the 'the discovery, enactment, evaluation, and exploitation of opportunities – across national borders – to create future goods and services' is to have even wider acceptance.

Advancing an entrepreneur-firm-opportunity framework, we argue that the entrepreneur, the firm, and opportunities are crucial to international entrepreneurship. Cognition and formation of opportunities is only the beginning of the entrepreneurship process and is the domain of the entrepreneur [21,25]. He is also responsible for the decision to internationalise and to pursue international opportunities. For entrepreneurship to take place, the opportunity

must be exploited [21], through new [26] or existing organisations [27,28]. The firm is needed for opportunity exploitation because of its capability to turn opportunities into market outcomes [29].

NATURE OF ENTREPRENEURIAL OPPORTUNITY

Notwithstanding the voluminous literature on opportunities and entrepreneurship, there remains some dissatisfaction on the current state of research on opportunities [30]. One problem is the less than robust use of the 'opportunity' construct, where 'opportunity' is used by researchers without defining and explaining what they mean by it or in what sense they are using the concept [31]. It is common for entrepreneurship writers to define 'opportunity' in multifarious ways. We will, therefore, begin by clarifying our notion of entrepreneurial opportunity.

Opportunity is defined by Webster's New World Dictionary [32] as 'a combination of circumstances favourable for the purpose'. In the context of the firm, the combination of circumstances favourable for the purpose of forming economic value must reside: 1) within the firm from whence the economic value is formed; and 2) in the market where the economic value is realised. The entrepreneurial opportunity may thus be said to require the combination of two circumstances that are favourable for the formation of the economic value: firm capabilities and market opportunity. Firm capability and market opportunity independently considered merely represent nascent, elements of opportunities. It is the combination of firm capability and market opportunity that gives rise to an entrepreneurial opportunity. Since what is deemed favourable is relative and idiosyncratic, what might be favourable to one firm might not be to another. This allows us to define an entrepreneurial opportunity as 'the creative combination of firm capability and market opportunity for the formation of economic value'.

OPPORTUNITY DISCOVERY AND OPPORTUNITY CREATION

Are opportunities like mountains 'just waiting to be discovered and exploited' or are they mountains to be built, ask Alvarez and Barney [33, p. 11]? Opportunity discovery has predominated the literature on opportunity processes [30,33]. Hayek [34], Kirzner [35-37], Shane and Venkataraman [21], and Shane and Eckhardt [20] all employ the paradigm of opportunity discovery. It is Kirzner's alert entrepreneur who gets credited with discovering opportunities. Under the 'discovery theory', the failure of some to discover opportunities results from alertness not being uniformly distributed in the population [35-37].

An aspect of entrepreneurial behaviour that appears to have been neglected, however, is the 'subjective' entrepreneurial process of opportunity creation [38]. Slowly emerging in the literature, the 'creation theory' (or 'creative view' of Venkataraman [39]) 'assumes that entrepreneur's actions are the essential source of these opportunities – they build mountains' [33, p. 15]. Endres and Woods [38] argue that this points to the need for a more 'subjectivist' orientation. For Lachmann, an Austrian economist with such a subjectivist orientation, this means that social phenomena are 'the outcome of human action guided by plans (even though these often fail) and prompted by mental acts' [40, pp. 22-23]. The entrepreneur forms mental images of an 'unknown though not unimaginable future' [41, p. 59] that 'leads to creative, spontaneous acts and not just 'passive responses to external stimuli' [42, pp. 169-170]. The entrepreneur creates 'by conjecture and reasoned imagination... the things on which hope can be fixed' [43, p. 246].

The creation approach acknowledges that 'entrepreneurial opportunities often have to be "created" by using the entrepreneurial imagination to embody human aspirations in concrete products and markets' [44, p. 9] and that entrepreneurial activity creates realities [45]. Kirzner [35, p. 56] himself acknowledges that 'the human agent can... in fact create the future'. But how exactly are opportunities created? In the next section, we suggest a framework for opportunity creation that recognises that entrepreneurial opportunities are created by the interplay of firm capabilities and market opportunities, the interplay being strongly shaped by the entrepreneur.

DIMENSIONS OF ENTREPRENEURIAL OPPORTUNITY FORMATION PROCESSES

Our definition of entrepreneurial opportunity is ontologically-neutral in that it does not assume that nascent opportunities or firm capabilities

exist. It does denote that entrepreneurial opportunities are created by the dynamic interaction between firm capability and market opportunities as driven by the entrepreneur. Firm capability refers to the capacity of a firm to undertake some task or activity [46] and involves 'adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment' [47, p. 515]. Firm capability is distinct from firm resources [48]. Resources 'are inputs into the product process' [46, p. 118] and require firm capability for them to be integrated to strengthen a firm's ability to compete [48].

Market opportunities, on the other hand, may emerge from a variety of sources: exogenous shocks, market disequilibrating factors, production-enhancing factors, and entrepreneurial activity that creates new entrepreneurial opportunities [49]; the unexpected, incongruities, process needs, changes in industry or market structure, demographic changes, changes in perception, mood, and meaning, and new knowledge [50]; etc. The dynamic interplay between firm capabilities and market opportunities – orchestrated by the entrepreneur – exposes the four dimensions of opportunity cognition and creation: opportunity discovery, opportunity development, opportunity construction, and opportunity creation ex nihilo as captured in a Typology of Entrepreneurial Opportunity Processes (below):

		Market Opportunities	
		Current	*New*
Firm Capability	*Current*	*Opportunity Discovery*	*Opportunity Construction*
	New	*Opportunity Development*	*Opportunity Creation*

We have already discussed the concept of opportunity discovery. Opportunity development involves the development of new firm capabilities to pursue a current market opportunity, such as an export order or market demand. IXI, a desktop windowing computer software for UNIX operating systems, exemplifies this process. IXI founder, Ray Anderson, perceived a need in the international market for a desktop windowing computer software for UNIX operating systems [10] and led the development of IXI's firm capabilities to deliver on that need.

Opportunity construction involves the construction by an entrepreneur of a new market opportunity that is within the firm's current capability to pursue. It can best be described as trying to construct a new market opportunity for what the firm is able to meet. SPEA Software AG, a manufacturer of computer graphic boards, internationalised in this manner by venturing abroad without waiting for orders from foreign customers [10]. It already had the firm capability to produce computer graphic boards and went on to construct the market for its products.

Opportunity creation involves the creation of both new firm capabilities and a new market opportunity. This process may come close to what Lachmann describes as an entrepreneurial process to 'create ex nihilo' [51, p. 240]. U-Haul, the largest rental fleet company in the world, traces its beginnings this way when its founder, L.S. Shoen, built the first U-Haul trailers from his garage which led to the creation of the do-it-yourself moving industry [52].

CREATIVITY AND PROSPECTION

Aside from entrepreneurial alertness, Kirzner [35, p. 58] cited entrepreneurial creativity – 'the unpredictable, the creative, the imaginative expression of the human mind' as central to opportunity discovery. Creativity, an important characteristic of entrepreneurs [53-55], involves 'the ability to develop new ideas and to discover new ways of looking at problems and opportunities' [56, p. 9]. It is also instrumental in opportunity creation through the creative imagination of combinations of firm capabilities and market opportunities to form entrepreneurial opportunities. Creativity 'extrapolates from context, sifts out and disregards elements from the confusing welter of experience that would otherwise distract effort and blur focus' [57, p. 59].

Creativity is also related to an entrepreneurial attribute we call prospectivity – 'the ability to create an imagined future'. Prospectivity is Lachmanian in that it 'consists in first creating, by conjecture and reasoned imagination on the basis of mere suggestion offered by visible or recorded circumstance, the things on which hope can be fixed' [43, p. 246]. Prospection is aimed at the future which 'is to all of us unknowable, though not unimaginable. The formation of expectations, is an act of our mind

by means of which we try to catch a glimpse of the unknown [41,p 59]. Prospection is important in international entrepreneurship since it allows the entrepreneur to overcome the constraints of experiential knowledge and uncertainty that are central to stage- and innovation-related models of internationalisation. That which the entrepreneur does not know can be creatively imagined. Prospection also drives the entrepreneur to pursue international opportunities despite limited resources and firm capabilities. Prospection involves the creation of the means to create the imagined future. To a great extent, what fails the test of reason is sustained by the moving and inspiring power of prospection. Prospectivity may be associated with self-efficacy [58] and entrepreneurial orientation [59], especially the dimensions of autonomy, risk-taking, and proactiveness. Prospectivity can involve cognitive bias which Baron [60] has observed as often leading to excessive optimism and overconfidence. It can be theorised that entrepreneurs who organise INVs, despite their limited or lack of prior international experience, engage in prospection.

OPPORTUNITY-BASED APPROACH TO INTERNATIONAL ENTREPRENEURSHIP

In IE studies, the opportunity-aspect of internationalisation has received limited attention [1]. Even Johanson and Vahlne [61, p. 167] recently acknowledged that 'the opportunity side of the internationalization process is not very well developed in our earlier papers.' However, this neglected dimension of internationalisation may provide new insights and better understanding of the process of internationalisation. We address this gap by advancing opportunity-based approach (OBA) to international entrepreneurship which argues that the process of internationalisation itself may be conceived as the formation and exploitation of international entrepreneurial opportunities. This suggests, for instance, that the locus of an entrepreneurial opportunity determines whether opportunity exploitation takes place domestically or internationally. To view domestic entrepreneurship and international entrepreneurship as distinct phenomena is to create a false dichotomy. In addition, viewing internationalisation as the pursuit of international entrepreneurial opportunities indicates that the location of the opportunity determines the choice of foreign market for opportunity exploitation. An export order from Amsterdam would mean that internationalisation takes place in that country. The presence of strategic partners in Serbia would denote opportunity exploitation in that country.

Conceptualising internationalisation under the OBA as the exploitation of international entrepreneurial opportunities can also provide an explanation for how some internationalising firms seem to skip internationalisation stages, even becoming global at inception. Johanson and Vahlne [2, p. 24] had reported that internationalising firms generally begin by 'exporting to a country via an agent, later establish a sales subsidiary, and eventually, in some cases, begin production in the host country'. Bilkey and Tesar [3] introduced a six-stage model that showed how internationalisation began by firms delivering on an unsolicited export order, and then moving on to regular exports to a psychologically close country, and finally to exporting to additional countries that are psychologically further away. But the nature of the entrepreneurial opportunity might actually determine the process of internationalisation. For example, if an internationalising firm with existing firm capabilities perceives a market opportunity in an international market, it may decide to establish a foreign sales subsidiary at the outset. A manufacturing company may also determine that production in an international market may also be more attractive because of cost-advantages and availability of specialised resources and internationalise in this manner. Internationalisation is non-deterministic under the OBA.

The opportunity-based approach can also theorise on the speed, precocity, and entry mode of internationalisation. A discovered opportunity would imply more rapid internationalisation than opportunity creation. A domestic firm that responds to an unsolicited export order can internationalise much faster than a firm that has to build its capabilities or construct a market in order to internationalise. A new domestic firm that has strategic partners abroad can internationalise earlier (i.e. be more precocious) than an established firm seeking to pursue international opportunities on its own. The latter will have to amass the resources

necessary for internationalisation – which takes considerable time – and acquire experiential knowledge before internationalising. Mode of entry will also be determined by the nature of the entrepreneurial opportunity. An export order will trigger exporting as the entry mode while a strategic alliance can lead to licensing/franchising or joint ventures.

CONCLUSION

This paper has sought to deepen our understanding of international entrepreneurship by exploring the entrepreneur-firm-opportunity nexus and suggesting an opportunity-based approach to international entrepreneurship. In particular, we had explored the role of the entrepreneur in the formation of international opportunities and examined the subjective dimensions of entrepreneurial creativity and prospectivity. We also situated the firm – through its capabilities – as the vehicle for internationalisation and opportunity exploitation. The 'opportunity' construct was re-examined and our notion of 'entrepreneurial opportunity' clarified. The paper also showed how the entrepreneur orchestrates the dynamic interplay between firm capabilities and market opportunities to form entrepreneurial opportunities, leading to an examination of the dimensions of opportunity formation and a Typology of Entrepreneurial Opportunity Processes. Finally, the paper outlined how conceptualising internationalisation as the formation and exploitation of international entrepreneurial opportunities, and applying the opportunity-based approach to international entrepreneurship, can lead to a better understanding of the phenomenon of firm internationalisation.

REFERENCES

[1.] *Chandra, Y., C. Styles, et al. (2009). "The recognition of first time international entrepreneurial opportunities: Evidence from firms in knowledge-based industries." International Marketing Review* ***26****: 30-61.*

[2.] *Johanson, J. and J. Vahlne (1977). "The internationalization process of the firm--- A model of knowledge development and increasing foreign market commitment." Journal of International Business Studies* ***8****: 23-32.*

[3.] *Bilkey, W. J. and G. Tesar (1977). "The export behavior of smaller sized Wisconsin manufacturing firms." Journal of International Business Studies* ***3****(Spring/Summer): 93-93.*

[4.] *Cavusgil, S. T. (1980). "On the internationalization process of firms." European Research* ***8****(6): 273-281.*

[5.] *Czinkota, M. (1982). Export development strategies: US promotion policies. New York, Praeger.*

[6.] *Andersen, O. (1993). "On ther internationalization process of firms: A critical analysis." Journal of International Business Studies* ***2****: 209-228.*

[7.] *Bell, J. (1995). "The internationalization of small computer software firms: A further challenge to 'stage' theories." European Journal of Marketing* ***29****(8): 60-75.*

[8.] *Cannon, T. and M. Willis (1981). "The smaller firm in international trade." European Small Business Journal* ***1****(3): 45-55.*

[9.] *Reid, S. D. (1984). Market expansion and firm internationalization. International marketing management. E. Kaynak (Ed.). New York, Praeger: 197-206.*

[10.] *McDougall, P. P., S. Shane, et al. (1994). "Explaining the formation of international new ventures: The limits of theories from international business research." Journal of Business Venturing* ***9****(6): 469-487.*

[11.] *Barney, J. (1991). "Firm resources and sustained competitive advantage." Journal of Management* ***17****: 99-119.*

[12.] *Kundu, S. K. and J. A. Katz (2003). "Born-international SMEs: Bi-level impacts of resources and intentions." Small Business Economics* ***20****: 25-47.*

[13.] *Westhead, P., M. Wright, et al. (2001). "The internationalisation of new and small firms: A resource-based view." Journal of Business Venturing* ***16****: 333-358.*

[14.] *Coviello, N. E. and H. J. Munro (1995). "Growing the entrepreneurial firm: Networking for international market development." European Journal of Marketing* ***29****(7): 49-61.*

[15.] *Johanson, J. and L. G. Mattson (1988). Internationalization in industrial systems -- A network approach. Industrial networks: A new view of reality. B. Axellson and G. Easton (Eds.). London, Routledge: 205-217.*

[16.] *Madsen, T. K. and P. Servais (1997). "The internationalization of bornb globals: An evolutionary process?" International Business Review* ***6****: 561-583.*

[17.] *Bloodgood, J., H. J. Sapienza, et al. (1996). "The internationalization of new high-potential U.S. ventures: Antecedents and outcomes." Entrepreneurship Theory and Practice* ***20****: 61-76.*

[18.] Cavusgil, S. T. and J. Naor (1987). "Firm and management characteristics as discriminators of export marketing activity." Journal of Business Research **15**: 221-235.
[19.] Andersson, S., J. Gabrielsson, et al. (2004). "International activities in small firms: Examining factors influencing the internationalization and export growth of small firms." Canadian Journal of Administrative Sciences **21**(1): 22-34.
[20.] Shane, S. and J. Eckhardt (2003). The individual-opportunity nexus. Handbook of entrepreneurship research: An interdisciplinary survey and introduction. Z. J. Acs and D. B. Audretsch (Eds.). Boston, Kluwer Academic Publishers.
[21.] Shane, S. and S. Venkataraman (2000). "The promise of entrepreneurship as a field of research." Academy of Management Review **25**(1): 217-226.
[22.] Stevenson, H. H. and J. C. Jarillo (1990). "A paradigm of entrepreneurship: Entrepreneurial management." Strategic Management Journal (Special issue) **11**: 17-27.
[23.] Di Gregorio, D., M. Musteen, et al. (2008). "International new ventures: The cross-border nexus of individuals and opportunities." Journal of World Business **43**: 186-196.
[24.] Oviatt, B. M. and P. P. McDougall (2005). "Defining international entrepreneurship and modeling the speed of internationalization." Entrepreneurship Theory and Practice **29**(5): 537-553.
[25.] Shane, S. (2000). "Prior knowledge and the discovery of entrepreneurial opportunities." Organization Science **11**(4): 448-469.
[26.] Bygrave, W. and C. Hofer (1991). "Theorizing about entrepreneurship." Entrepreneurship Theory and Practice **16**(2): 13-22.
[27.] Casson, M. (1982). The entrepreneur: An economic theory. Oxford, Martin Robertson.
[28.] Amit, R., L. Glosten, et al. (1993). "Challenges to theory development in entrepreneurship research." Journal of Management Studies **30**(5): 815-834.
[29.] Whittaker, D. H., P. Byosiere, et al. (2009). Comparative entrepreneurship: The UK, Japan and the shadow of Silicon Valley. Oxford, Oxford University Press.
[30.] Gaglio, C. M. and J. A. Katz (2001). "The pyschological basis of opportunity identification: Entrepreneurial alertness." Small Business Economics **16**(2): 95-111.
[31.] Plummer, L. A., J. M. Haynie, et al. (2007). "An essay on the origins of entrepreneurial opportunity." Small Business Economics **28**: 363-379.
[32.] Webster's New World Dictionary (1990). New York, NY, Simon & Schuster.
[33.] Alvarez, S. A. and J. B. Barney (2007). "Discovery and creation: Alternative theories of entrepreneurial action." Strategic Entrepreneurship Journal **1**: 11-26.
[34.] Hayek, F. A. (1945). "The use of knowledge in society." The American Economic Review **35**(4): 519-530.
[35.] Kirzner, I. M. (1985). Discovery and the capitalist process. Chicago, The University of Chicago Press.
[36.] Kirzner, I. M. (1992). The meaning of market process: Essays in the development of modern Austrian economics. New York, Routledge.
[37.] Kirzner, I. (1997). "Entrepreneurial discovery and the competitive market processes: An Austrian approach." Journal of Economic Literature **35**: 60-85.
[38.] Endres, A. M. and C. R. Woods (2007). "The case for more "subjectivist" research on how entrepreneurs create opportunities." International Journal of Entrepreneurial Behaviour & Research **13**(4): 223-234.
[39.] Venkataraman, S. (2003). Foreword to a general theory of entrepreneurship: The individual-opportunity nexus. A general theory of entreprneneurship: The individual-opportunity nexus. Cheltenham, U.K., Edward Elgar.
[40.] Lachmann, L. M. (1986). The market as an economic process. Oxford, Blackwell.
[41.] Lachmann, L. M. (1976). "From Mises to Shackle: An essay on Austrian economics and the kaleidic society." Journal of Economic Literature **14**(1): 54-62.
[42.] Lewis, P. and J. Runde (2007). "Subjectivism, social structure and the possibility of socio-economic order: The case of Ludwig Lachmann." Journal of Economic Behavior and Organization **62**: 167-186.
[43.] Lachmann, L. M. (1990). G.L.S. Shackle's place in the history of subjectivist thought. Expectations and the meaning of institutions: Essays in economics by Ludwin Lachmann. D. Lavoie (Ed.). London, Routledge: 241-248.
[44.] Venkataraman, S. and S. D. Sarasvathy (2001). Strategy and entrepreneurship: Outlines of an untold story. Virginia, Social Science Research Network Electronic Paper Collection: 34.
[45.] Buchanan, J. M. and V. Vanberg (1991). "The market as a creative process." Economics and Philosophy **7**(1): 167-186.
[46.] Grant, R. M. (2002). "The resource-based theory of competitive advantage: Implications for strategy formulation." California Management Review **33**(3): 114-134.

[47.] Teece, D. J., G. Pisano, et al. (1997). "Dynamic capabilities and strategic management." Strategic Management Journal **18**(7): 509-533.
[48.] Longnecker, J. G., W. J. Petty, et al. (2010). Small business management: Launching & growing entrepreneurial ventures. Mason, OH, South-Western Cengage Learning.
[49.] Holcombe, R. (2003). "The origins of entrepreneurial opportunities." Review of Austrian economics **16**(1): 25-43.
[50.] Drucker, P. D. (1985). Innovation and entrepreneurship. New York, HarperCollins.
[51.] Chiles, T. H., A. C. Bluedorn, et al. (2007). "Beyond creative destruction and entrepreneurial discovery: A radical Austrian approach to entrepreneurship." Organization Studies **28**(4): 467-493.
[52.] Sarasvathy, S. D. (2001). Effectual reasoning in entrepreneurial decision making: Existence and bounds. Academy of Management Proceedings 2001.
[53.] Carland, J. W. (1982). Entrepreneurship in a small business setting: an exploratory study. Unpublished Ph.D. thesis, University of Georgia.
[54.] Carland, J. W., F. Hoy, et al. (1984). "Differetiating entrepreneurs from small business owners: A conceptualization." Academy of Management Review **9**(2): 354-359.
[55.] Scherer, F. M. (1984). Innovation and growth: Schumpeterian perspectives. Cambridge, M.A., MIT Press.
[56.] Scarborough, N. M., D. L. Wilson, et al. (2009). Effective small business management: An entrepreneurial approach (9th ed.). Upper Saddle River, NJ, Pearson Education.
[57.] Engell, J. (1981). The creative imagination: Enlightenment to romanticism. Cambridge, Massachusetts, Harvard University Press.
[58.] Bandura, A. (1986). The social foundations of thought and action. Englewood Cliffs, Prentice-Hall.
[59.] Lumpkin, G. T. and G. G. Dess (1996). "Clarifying the entrepreneurial orientation construct and linking it to performance." Academy of Management Review **21**: 135-172.
[60.] Baron, R. A. (1999). "Counterfactual thinking and venture formation: The potential effects of thinking about "what might have been"." Journal of Business Venturing **15**: 79-91.
[61.] Johanson, J. and J. E. Vahlne (2006). "Commitment and opportunity development in the internationalization process: A note on the Uppsala internationalization process model." Management International Review **46**(2): 165-178.

AUTHORS & AFFILIATION

MANUEL JOSE OYSON[1],
D. HUGH WHITTAKER[2]

[1, 2.] UNIVERSITY OF AUCKLAND BUSINESS SCHOOL, AUCKLAND, NEW ZEALAND

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

[1.] VIKTORIE KLÍMOVÁ, [2] VLADIMÍR ŽÍTEK

DEVELOPMENT POTENTIAL OF NUTS 2 REGIONS IN THE EUROPEAN UNION

Abstract:
Regions belong to basic component of European Union's economics. The Union spends on enhancement of socio-economic level of regions a lot of financial resources. About one third of Union's budget is determined for the regional policy. For implementation of the regional policy the regions on the level NUTS 2 are important. There are 271 NUTS 2 regions in all 27 member countries of the EU. The article is focused on evaluating of the present position of European NUTS 2 regions in the relation to dynamism of their development. For the purpose of this analysis the authors chose several indicators which are focused especially on such socio-economic characteristics considered to be the key indicators of qualitative development and competitiveness of regions. On the basis of the created synthesis it is possible to accept conclusions relevant to position and development of European regions in general as well as to development of individual NUTS 2 regions.

Keywords:
Analysis, economic level, evaluation, NUTS 2 regions, regional gross domestic product

INTRODUCTION

Among particular regions there are big differences in their socio-economic development. In economic theory these differences are called regional disparities. The term "regional disparity" can be defined as differentness or inequality of characteristics, effects or processes that are clearly territorially located. [1] The basic question that arises in this context is if regional disparities tend to increase or rather decrease. In other words, if there is a tendency towards convergence or rather divergence. However, for viewing the regional disparities also the time period in which convergences or divergences arise is important. The convergent theories usually work with longer time periods that the divergent ones. [2] Nevertheless, according to some authors the theories considering spatial development as divergent are predominating. [1] Besides the time point of view the size of the disparities is important too. The existence of certain differences is desirable and necessary because it stimulates economic and social development. But enormous regional disparities have no stimulating effects and they have serious social and political consequences and so they are more often considered to be a negative phenomenon. [2]

The European Union, especially its policy of economic and social cohesion, deals with the differences among regions as well. The article 158 of the Treaty on European Union says that "in order to strengthen its economic and social cohesion, the Community is to aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favored regions or islands, including rural areas" [3]. The cohesion policy should contribute to the increase of the growth, competitiveness and employment. [4] How should higher competitiveness be reached? Contemporary theories concerned with factors of competitiveness in developed countries connect their competitive advantage primarily with

conditions for development of innovations in businesses. A higher level of innovations also brings a higher added value of products and therefore a higher growth of the living standard. [5] Particularly in the last several decades it has been widely acknowledged that regions are an important element in the transformation to the knowledge society and that they are also a significant driving force for economic growth based on research, technologies and innovations. [6]

While the cohesion policy focuses primarily on reducing the regional disparities (mainly through the support of infrastructure, innovations and knowledge society), the policy of research, development and innovations focuses on creating the conditions that will help regions to reach the knowledge economics. Up-to-date innovation systems leave the linear concept of innovations, where the research and development have to be at the beginning of the innovation process, and convert to interactive concepts of innovations. These new concepts say that innovations are results of interactions among individual participants of the innovation process and new knowledge (research and development) can enter into this process during any of its phases. [7] However, research and development are still important sources of information for launching (especially technical) innovations, and that is why we pay big attention to them in this article.

Research, development and innovations are parts of the priorities of the new strategy Europe 2020 which should replace the Lisbon Strategy for Growth and Jobs from 2000. The new strategy defines five main goals which member states of EU will have to focus on. These goals involve the increase in the investments in research and development, the increase in the employment rate of population aged 20–64, the achievement of the selected climate targets, the decrease in the share of early school leavers and the decrease of the number of people threatened by poverty. In order to meet the above mentioned goals the members of the EU have to accept joint action in such areas as innovations, youth, digital agenda, efficient use of resources, industrial policy, skills and jobs or platform against poverty. [8]

The increase in employment and competitiveness is also closely connected with 'high-tech sector'. High-tech sector is considered to be the key factor for the economic and productivity growth. It is closely related to innovations and it leads to larger market share, creation of new product markets and more efficient use of resources.[9] In accordance with methodology of OECD and Eurostat the individual branches of industry have been divided on the basis of R&D expenditures, added value and total amount of turnovers to four categories: high-tech, medium high-tech, medium low-tech and low-tech manufacturing sector. Services have also been classified in a similar way. The indicators of technology and knowledge-intensive sectors are used not only for the evaluation of the competitiveness of states and regions but also for the evaluation of the utilization of research and development results (or rather the utilization of new knowledge). For the above mentioned reasons we also focus on employment in high-tech and medium high-tech manufacturing sectors and knowledge-intensive services in this article.

METHODOLOGY OF EVALUATION

The aim of this article is to assess the economic performance of 271 regions on the level NUTS 2 in member states of the EU (EU-27). For similar comparisons the indicator of gross domestic product (per capita) is usually used, alternatively this indicator can be complemented by other characteristics. The evaluation presented in this study is based on the synthesis of selected available indicators (excluding GDP) which can be considered the key prerequisites for or aspects of the economic level of the regions and which according to authors emphasize the principles of knowledge economy. (Therefore the indicators have qualitative dimension to a considerable extent.) The source of the data is Eurostat [10].The selected indicators are the following:

- *disposable household income (The wealth of households creates the base of regional development and it is a result of prosperity of economic entities.)*
- *unemployment rate (It is a structural indicator that indirectly corresponds with the economic level of the region.)*
- *expenditures on research and development (As they are related to GDP, it is a common indicator used for comparisons.)*
- *employment in research and development (It complements the previous indicator. The*

share of employment in this sector is the indicator of knowledge economy development.)

- *employment in knowledge-intensive services*
- *employment in high and medium high-technology manufacturing sector (Together with the indicator of employment in knowledge-intensive services it expresses the orientation of economy to perspective and growing sectors with high added value.)*

These selected indicators can be characterized by this way:

- *Expenditures on research and development*

This indicator expresses the total annual expenditures on research and development as a percentage of the gross domestic product (GERD). The expenditures include expenditures of the government, businesses, higher education institutions and private non-profit organizations.

- *Employment in research and development*

The indicator expresses the percentage of the employees in research and development vis-à-vis the total employment. Such employees include both researchers themselves and other employees (technical and economic staff and others) of research institutions.

- *Employment in knowledge-intensive services*

The indicator of the employment in knowledge-intensive services expresses the proportion of employment in these fields to the total employment. The NACE (rev. 1.1) fields which are among the knowledge-intensive services are fields with codes 61, 62, 64, 65, 66, 67, 70, 71, 72, 73, 74, 80, 85 and 92. These are for example water, air and space transport; financial services; telecommunications; activities concerning real estates and computer technology; machinery, equipment and product renting; research and development; education; health and social care; veterinary activities; and recreation, cultural and sporting activities. [11]

- *Employment in high and medium-high technology manufacturing sector*

The data shows the employment in high and medium-high technology manufacturing sectors as a share of total employment. The NACE (rev. 1.1) fields which are among the high or medium-high technology manufacturing sectors are fields with codes 30, 32, 33 or 24, 29, 31, 34, and 35. These are for example the manufacture of pharmaceuticals and chemicals, office machinery and computers, television and communication equipment, aircraft and spacecraft, electrical machinery, motor vehicles or transport equipment. [11]

- *Unemployment rate*

The International Labour Organization (and the Eurostat methodology [12]) defines an unemployed worker as someone who is older than 15, actively seeking work and able to start a job immediately or within 14 days. The unemployment rate is generally the most available indicator, as it is followed closely by all member states. Its static values, and their changes, are interesting not only for research but they are also important for the implementation of an economic policy.

- *Disposable household income*

Eurostat statistics differentiate between two kinds of income – the primary and the disposable income. The disposable income was chosen for the analysis as it more suitably expresses the real purchasing power of the population. The disposable income includes all incomes after taxation and deduction of insurance fees, further it includes accepted social transfers. [13]

We considered adding several other indicators to this analysis (e.g. households with access to the internet at home or students in tertiary education) but these indicators had to be excluded in the end because of non-availability of needed data in all regions.

The above mentioned indicators have been included in the evaluation. Within the framework of the analysis values of each indicator have been divided into five groups (highly above-average, above-average, average, below-average, highly below-average).

Consequently, the synthesis has been carried out. The value of the composite indicator of the j-region (E_j) is determined according to this formula:

$$E_j = \frac{\sum_{i=1}^{6} w_i \cdot F_i}{\sum_{i=1}^{6} w_i},$$

where w_i is weight of the i-indicator (the weight has been set for each indicator) and F_i is value of the i-indicator (1–5).

The evaluation is carried out both as static, when data for 2006 were used, and dynamic, when the change (index) between 1999 an 2006 is calculated. On this basis it is possible to divide the regions in accordance with their economic

development as well as their development trends.
Another important contribution of this article is the linking of the evaluation based on the synthesis of the above mentioned indicators with the values of regional GDP per capita. Besides the elementary calculation of the correlation coefficient it is possible to present the relation of the composite indicator (that which is – as has been said above – based on the qualitative characteristics compatible with knowledge economics) to the economic performance expressed through GDP per capita. Therefore, the regions can be divided according to their economic performance as well as the core of its essence. For the purpose of this comparison all values of indicators on the level NUTS 2 were expressed as percentages of the EU27 average value. Subsequently, the composite indicator E_j is calculated for each region NUTS2 (in %), where F_i is the value of the i-indicator in %.

RESULTS

In accordance with the methodology the data for all NUTS2 regions in the EU27 have been found out. If some data were not available, this fact has been taken into consideration within the calculation of the composite indicator (E_j). After calculating this indicator for each region, it was possible to compare:

- *the position of the individual regions in the context of the static values of the composite indicator (2006) and the dynamic values (change between 2006 and 2000),*
- *the relationship between the values of the composite indicator and regional GDP (both of them were used as a percentage of EU27 average in 2006).*

STATIC AND DYNAMIC VALUE OF THE COMPOSITE INDICATOR OF THE ECONOMIC LEVEL OF REGIONS

On the basis of the above mentioned comparison it is possible to divide the regions into four categories according to their situation (see figure 1):

- *developed regions with a positive developmental trend (the value of the static indicator is between 1.0 and 3.0, the value of the dynamic indicator is between 1.0 and 3.0) – 60 regions,*
- *developed regions with a negative developmental trend (the value of the static indicator is between 1.0 and 3.0, the value of the dynamic indicator is between 3.1 and 5.0) – 56 regions,*
- *underdeveloped regions with a positive developmental trend (the value of the static indicator is between 3.1 and 5.0, the value of the dynamic indicator is between 1.0 and 3.0) – 106 regions,*
- *underdeveloped regions with a negative developmental trend (the value of the static indicator is between 3.1 and 5.0, the value of the dynamic indicator is between 3.1 and 5.0) – 37 regions.*

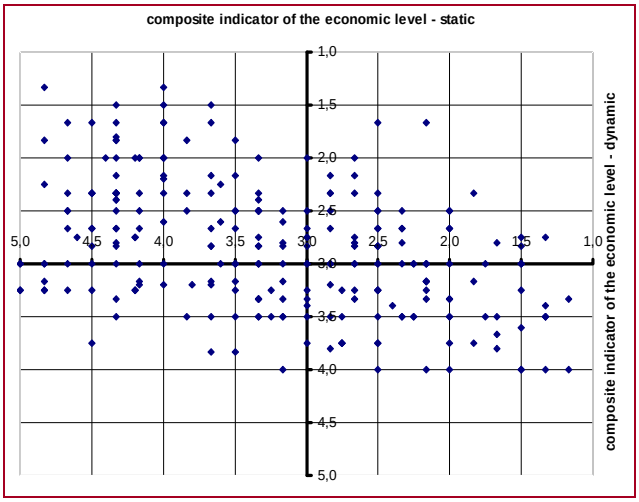


Figure 1 Static and dynamic value of the composite indicator of the economic level of the regions
Source: Eurostat (data), the authors' research (methodology and calculation)

THE RELATIONSHIP BETWEEN THE VALUES OF THE COMPOSITE INDICATOR AND REGIONAL GDP

The correlation analysis confirmed quite a close connection between these two indicators. The correlation coefficient for all regions is 0.73, after elimination of two regions with extreme values (Inner London and Luxembourg) it is even 0.78.
On the basis of the comparison it is possible to divide the regions into four categories according to the essence of their economic level (see figure 2):

- *developed regions with characteristics compatible with knowledge economics (GDP > 100 % and dynamic indicator also > 100 %) – 115 regions,*
- *developed regions without characteristics compatible with knowledge economics (GDP > 100 % and dynamic indicator < 100 %) – 28 regions,*
- *underdeveloped regions with characteristics compatible with knowledge economics (GDP*

< 100 % and dynamic indicator > 100 %) – 10 regions,

- *underdeveloped regions without characteristics compatible with knowledge economics (GDP < 100 % and dynamic indicator also < 100 %) – 114 regions.*

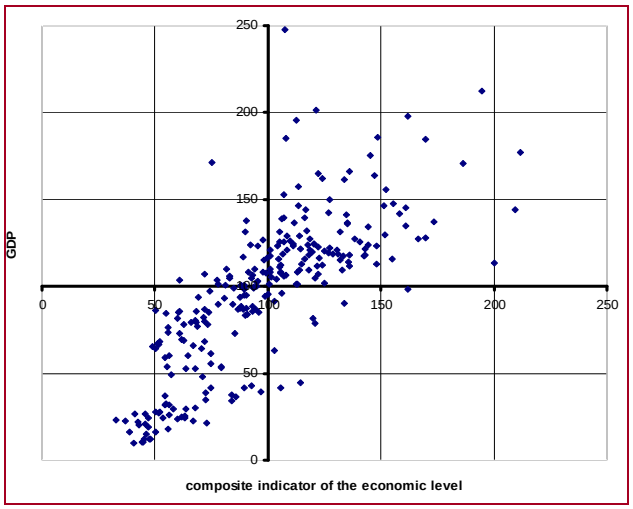


Figure 2 The relationship between the values of the composite indicator and regional GDP (2006)

Note: For better lucidity the regions of Inner London (129.4 %, 382.9 %) and Luxembourg (125.4 %, 305.6 %) were removed from the figure.

Source: Eurostat (data), the authors' research (methodology and calculation)

CONCLUSION

The presented study confirmed the existence of considerable differences in the economic level of NUTS2 regions. It was proved that some regions are in the situation which cannot be called positive from the perspective of the composite indicator. At the same time, it is possible to say that some of them have the right developmental trend.

As regards the evaluation of the relationship between the economic level of regions (expressed by GDP) and the composite indicator (characteristics of knowledge economics) the calculations proved their close connection.

ACKNOWLEDGMENT

Contribution is result of solution the project 1M0524 Research Centre for Competitiveness of Czech Economy.

REFERENCES

[1.] *Composite authors. Teorie, identifikace, klasifikace a hodnocení regionálních disparit. Průběžná výzkumná zpráva. Ostrava: VŠB-Technická univerzita Ostrava, 2008.*

[2.] *BLAŽEK J, UHLÍŘ D. Teorie regionálního rozvoje. Karolinum, Praha 2002. ISBN 80-246-0384-5.*

[3.] *Treaty on European Union. Official Journal C 191 of 29 July 1992.*

[4.] *Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999.*

[5.] *KUČERA Z, PAZOUR M. Srovnání národních inovačních systémů vybraných evropských zemí. ERGO : Analýzy a trendy výzkumu, technologií a inovací. 2009, 04, 02, p. 3-9. ISSN 1802-2170.*

[6.] *SKOKAN K. Konkurenceschopnost, inovace a klastry v regionálním rozvoji. Repronis, Ostrava 2004. ISBN 80-7329-059-6.*

[7.] *LUNDVAL B A. National Innovation Systems: Towards a Theory of Innovation and Interactive Learning. Pinter Publisher, London 1992.*

[8.] *Communication from the Commission Europe 2020 COM(2010) 2020. EUROPE 2020. A strategy for smart, sustainable and inclusive growth .*

[9.] *MERI T. Regional employment in high-tech sectors. Eurostat: Statistics in focus. Science and technology 102/2007. ISSN 1977-0316.*

[10.] *EUROSTAT. Regions and cities statistics. Available on: http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction*

[11.] *EUROSTAT. High-tech industry and knowledge-intensive services. Reference Metadata in Euro SDMX Metadata Structure (ESMS). Available on http://ec.europa.eu/eurostat.*

[12.] *EUROSTAT. Eurostat regional yearbook 2007. Luxembourg: Office for Official Publications of the European Communities, 2007. ISSN 1681-9306.*

[13.] *BEHRENS A. Income of private households and gross domestic product in Europe's regions. Statistics in focus, General statistics, Theme 1–7/2003. ISSN 1561-4875.*

AUTHORS & AFFILIATION

[1.] *VIKTORIE KLÍMOVÁ,*
[2] *VLADIMÍR ŽÍTEK*

[1. 2.] *MASARYK UNIVERSITY, FACULTY OF ECONOMICS AND ADMINISTRATION, BRNO, CZECH REPUBLIC*

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

FACULTY OF ENGINEERING HUNEDOARA
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

ZDENKO KLEPIĆ[1], ARNELA BEVANDA[2], IVAN JURILJ[3]

SUPPORT TO SMEs TROUGH THE INTRODUCTION OF VOUCHER SYSTEM OF TRAINING AND CONSULTANCY SERVICES: A CASE OF THE HERZEGOVINA REGION

Abstract:
The small and medium enterprises, employing almost 70% of the total number of employees which clearly shows the great importance of small and medium enterprises, in Bosnia and Herzegovina small and medium enterprises should be the backbone of development or out of economic crisis, and the generator of new employment and development of the country.
However, the rate of the newly bankrupt companies is extremely high, and in terms of the global economic crisis it is even more pronounced. According to the results of the conducted research in the United States as a fundamental reason for the bankruptcy highlights the lack of knowledge of entrepreneurs and management.
Entrepreneurs and enterprises in Herzegovina, where they are confronted with certain problems often do not seek appropriate help because they do not have the financial resources to pay for this help or think that it is too expensive. Also in business there is a certain distrust of professionals and companies who offer different types consulting and professional services, without having to have to be specially trained and certified.
Based on analysis that showed the current situation in the consulting market and the needs of SMEs for consultations and certain types of training and the need for a unique database of consultants Regional Economic Development Association for Herzegovina (REDAH) has developed a system that includes consultants as accredited provider in the region of Herzegovina.
REDAH provides support to small and medium-sized enterprises through the provision of subsidies to entrepreneurs for counseling by trained and accredited consultants. In addition to consulting, REDAH also provides other support to existing and future entrepreneurs - through information, training and managing the implementation of business ideas.
The research, which will be presented in this paper will show is it and to what extent the voucher system of training and consultancy services help companies in addressing and overcoming their poroblems, ie. survival and development of small and medium enterprises and whether this system has helped in building the confidence of entrepreneurs in the consultants and companies that deal with training and consulting services.

Keywords:
voucher, training, consulting, small and medium enterprises, support

INTRODUCTION

In the developed market economies but also in those economies in transition, a wave of small start-up companies is coming into existence on a daily basis. A relative share of small companies has been steadily increasing in the total number of companies, in the same way as the share of small and medium-sized companies in the total number of companies in the European Union,

with the similar statistics in the USA and other developed contries, and it revolves around 99.7%, 92.30% of which are micro enterprises, 6.53 % small enterprises and 0.95 % middle-sized enterprises. As for the total number of employees, those employed with small and medium-sized companies take up 69.73%, with 39.39% of micro enterprises employees, 17.37 % in small enterprises and 12.96 % in middle-sized enterprises.[1] The aforesaid indicators clearly show a great significance of small and middle-sized companies; as for Bosnia and Herzegovina, small and medium-sized companies should be the backbone of development or better to say a way-out of the economic crisis and new jobs and country development generator.

The analysis of the life cycle of the newly establsihed companies showed that on average 87% of all newly formed companies survive its first year, 68% survive at least three years, and 55% survive 5 years in operation.[2]

These indicators demonstrate that the bankruptcy rate of the newly formed companies is extremely high, which is even more pronounced at the time of global economic crisis. According to the results of analysis made in the USA, the basic reason for bankruptcy was said to be a lack of knowledge with entrepreneurs and management. The needs of entrepreneurs and management for new and additional knowledge is felt at the company's inception phase, i.e. when launching the business enterprise, as well as during the business operations themselves.

When faced with a particular problem, Herzegovina-based entrepreneurs and companies very often fail to seek adequate assistance either because they do not have sufficient assets to cover the costs of such an assistance, or they think such an assistance is too expensive. Also, the entrepreneurs felt some sort of mistrust in experts companies that used to offer different kinds of consultancy or professional services without being properly trained or certified to do so.

As a result of the analysis that reflected the current situation in the consultancy market, as well as the needs of SMEs for consultancy and specific kinds of trainings, and also the need for a single database of consultants, REDAH has developed a system that includes certified consultants as service providers in the Herzegovina Region.[3]

REDAH also offers its support to small and medium-sized companies in providing the entrepreneurs with the subsidized consultancies provided by trained and certified consultants. Along with consultancy, other types of assistance are offered to the existing and future entrepreners - through information dissemination, trainings and guidance to business idea implementation.

RESEARCH METHODOLOGY

Establishment of hypothesis

A great number of small and medium-sized companies going bankrupt indicate that the entrepreneurs, when launching the business enterprise and in the course of operation, face problems they are not capable of resolving, which is even more pronounced at the time of global economic downturn and heavy struggles for market survival. At the both launching phase of their business enterprise and during its implementation, when faced with a particular problem, Herzegovina-based entrepreneurs and companies very often fail to seek adequate assistance either because they do not have sufficient assets to cover the costs of such an assistance, or they think such an assistance is too expensive. Also, the entrepreneurs felt some sort of mistrust in experts companies that used to offer different kinds of consultancy or professional services without being properly trained or certified to do so.

The specified problem determined the goals set in this research, mainly to come to understanding of the level of interest of the consultants as service providers (both individuals and companies) as well as individuals and companies as beneficiaries of this kind of services, whether the beneficiaries managed to resolve the problems they faced in their business operation, i.e. survival and development of small and medium-sized companies thanks to professional assistance rendered by the consultants and REDAH. Also, the goal of this research was to find out if this system (voucher scheme) helped build the trust of the enterpreneurs in consusltants and companies offering trainings and consultancies.

The problem and goals set in this research also predetermined the hypothesis set with regard to this research, namely:

1. *Beneficiaries based in Herzegovina Region managed to resolve their business problems*

for which they sought assistance from consulstants engaged via REDAH;

2. *Voucher system helped build the trust between the consultants as service providers and companies as service beneficiaries, as well as the consultancy market development in the Herzegovina Region.*

Scope of research & methods of data collection

This paper research covered 76 entrepreneurs who used and finished using the assistance services through voucher scheme, as well as 27 certified consultants as service providers. The polling questionnaire was filled out and returned by 22 of 76 companies, which makes up 30% of the total number of companies who used the services, and 17 of 27 consultants, which makes up 63% of those engaged to implement the voucher scheme. The research was carried out in the Herzegovina Region the most beneficiaries are coming from, but also the other parts of BiH the service providers were coming from, given the fact that the service providers were not restricted to the region of Herzegovina. The research was carried out in March 2010 by way of the original polling questionnaire. This research also used the existing voucher scheme project implementation data in the Herzegovina Region available in the REDAH database.

Model of data processing

Polling questionnaire for service providers included four questions the responses to which were classified by intensity from 1 to 5 (Likert scale) and for service beneficiaries, the questionnaire included only two questions, the responses to which were also classified by intensity from 1 to 5. Polling questionnaires also included other questions as required by REDAH, which were not used for the purpose of this paper.

RESEARCH RESULTS

Basic information on the voucher scheme training and consultancy implementation in the Herzegovina Region

In March 2008, REDAH launched the implementation of its project "Voucher training and consultancy schemes for business entities". The project value was 249,800.00 EUR.

This project was financed by the Spanish International Cooperation Agency - AECD with the main goal of enhancing the competitiveness of small and medium-sized companies in the Herzegovina Region by subsidizing entrepreneurs through system of consultations offered by trained and certified consultants. In addition to consultancy, the project also provides for other forms of assistance to the existing and future entrepreneurs - through information dissemination, trainings and guidance to the business ideas implementation. The voucher scheme includes two types of subsidies:

- *100% subsidy for consultancies to the start-up companies (registered over the past two years),*
- *50% subsidy for consultancies to the existing companies (being in business for more than two years from the date of registration).*

Maximum subsidy amounted to 1,500 EUR.

Having in mind the general mistrust in consultancy services, REDAH wanted to set up a single database of certified consultants and consultancy firms through the "Voucher scheme of training and consultancy for business entities" project.

At the inception phase a system of procedures and rules was developed for all participants in the project, within the detailed documents developed by REDAH, Operation manual for the Voucher scheme project, Consultant Certification Guidelines, as well as the Code of Conduct and operation of consultants/service providers.

What followed was the publishing of the Public Call for engagement of the consultants/service providers in the process of consultants certification, which was open by the end of last year. Following the public call, the education and competency evaluation of the applying consultants was done by the Expert Commission composed of the renowned BiH and foreign university professors.

The regional consultancy market situation analysis launched in mid 2008 showed the need for consultancy market. This research included two groups of organizations, namely 22 municipalities of the Herzegovina Region and relevant business-focused institutions like Federal Ministry of Development, Entrepreneurship and Handicraft, Chamber of Commerce and associations and centers for entrepreneurship and employment.

This research was designed to survey the situation of small and medium-sized business, the problems faced by the entrepreneurs, consultancy market in the region and implementation of trainings for business people and their needs within the muncipalities.
The analytical study for SMEs and potential entrepreneurs was designed in late 2008 and early 2009. This analysis also included the information available with all relevant institutions and stakeholders in the Herzegovina Region like cantons, municipalities, statistics agencies, employment bureaus, high-education institutions, as well as more than 200 existing and potential entrepreneurs. The research reflected the start-up companies' ideas, knowledge and skills required for successful establishment of a company and the level of development of business activities of the companies. The findings of the analysis revealed which trainings the entrepreneurs and business entities needed most, and acting in line with these findings, REDAH organized sets of trainings in the fields the business entities showed the greatest interest in and need for.
The trainings organized as workshops covered the representatives of more than 70 small and medium-sized companies.
Based on the analysis that reflected the current situation in the consultancy market and the needs of SMEs for consultations and specific types of trainings as well as the need for a single database of consultants/service providers, REDAH developed a system that included the training and certification of consultants/service providers for business entities in the Herzegovina Region.
A public call was published to consultants (natural and legal persons) which was answered by 84 potential consultants/service providers, or 33 natural persons and 49 legal persons.
Following the training session, consultants/service providers sat the exams where they were tested for specific knowledge in the field of consultancy they applied for, as well as in their understanding of the Voucher scheme and its procedures, the role of consultants in relation to the beneficiaries, as well as the Code of Conduct and work in day-to-day consultancy service provision.
When implementing the Voucher scheme, due to quite a demanding system, specific activities, wide range of actions as well as detailed and precise procedures, REDAH designed a software for detailed monitoring of all voucher issued projects. Voucher scheme software monitors all activities, trainings, vouchers issued as well as financial flows and it contains all information on the beneficiaries and service providers. It is connected to the online database and by using the interface of the www.ric.redah.ba portal, it presents the database of all certified consultants/service providers.

Data of certified service providers

The total of 84 potential consultants/service providers responded to the public call, 33 of which are natural persons and 49 legal persons.
The total of 50 consultants/service providers, which makes up 60% of the total number of applicants, passed the exames and got certified.
The structure of the certified consultants include 15 individuals (natural persons), which makes up 30% of the total number of certified consultants, whereas the remaining 35 are legal persons or companies, which makes up 70% of the total number. 45% of the candidates-consultants have gone through the certification process as natural persons, whereas the companies dealing with the consultancy have been much more successful since 76% of them were successfully certified.
The method of certification made it possible for individuals and companies coming from other regions of Bosnia and Herzegovina to get certified as service providers, which resulted in 40% of the certified individuals outside the Herzegovina Region, with 49% of the legal persons coming from regions other than Herzegovina who got certified.
There is a total of 20 fields of consultancy services the certified consultants/service providers applied and got certified for, the fields that could help the beneficiaries, the region-based business entities. They include: Graphic Design; Marketing Planning and Research; SME Management and Organization; Business Planning; Human Resources Management and Development; Sales and Procurement Management; Technological Support (ICT); Accounting and Financial Consultancy; Taxation Consultancy; Sales and Sales Management; Quality Management; Legal Consultancy; Making Investment Plans; Manufacturing-Technological Consultancy (Wood Processing); Introduction of New Technology - CAD Design;

Web Design; Internet Marketing and Consulting; Product Development; Architect Design Services; Labor and Fire Safety.

Data of beneficiaries

On March 30, 2009, the Public call was announced to grant subsidies to business entities in the Herzegovina Region. The call remained open until February 30, 2009.

The subsequent public call for granting subsidies to the beneficiaries, Herzegovina Region-based business entities was opened in August 2009 and will remain open till the end of 2010. The total budget secured for subsidy grant in the framework of these two calls amounts to 100,000.00 EUR.

In addition to the aforesaid amount, the similar amount was covered by the beneficiaries who had their services partly subsidized and partly paid by themselves.

113 companies applied for vouchers by the end of March 2010, and REDAH carried out the diagnostic procedure with the company representatives (being adequately trained for) so that 87 vouchers have been issued so far.

Out of 87 vouchers issued, 76 of them utilized, i.e. implemented the voucher, finished the consultations and brought the required and approved service to an end, thereby resolving the issue they were engaged for.

The total of 27 consultants (out of 50 consultants successfully certified during the project) worked on and successfully carried out the consultancies or solved the issues the beneficiaries were faced with in those 76 projects.

18 of the total number of companies are small companies (21%), i.e. they employ 10-50 staff members and have a turnover up to 2 million EUR, 69 (79%) are micro companies i.e. they employ less than 10 people and have the turnover of up to 400,000 EUR, 23 of which (26%) are handicraft companies. The following fields of activities have been subsidized: manufacturing 55%, services 32%, agriculture 9% and tourism 4%.

Out of the total number of companies granted a voucher, 51 (59%) are start-up companies, whereas 36 (41%) are the existing companies. These companies received a direct assistance needed and required for proper operations and achieving their goals with regard to total sales, strategic planning, finding new clients, fostering all company's functions as well as strategic profiling and organization.

Details of the service implementation results and the level of satisfaction

The companies who used the consultants' services through voucher system were first asked if and to what extent they managed to resolve the problem they engaged the consultant for. The research showed that 36% of the beneficiaries managed to fully resolve the problem they engaged the consultant for, 50% of them resolved a great deal of the problem, whereas 14% of them partly resolved the problem.

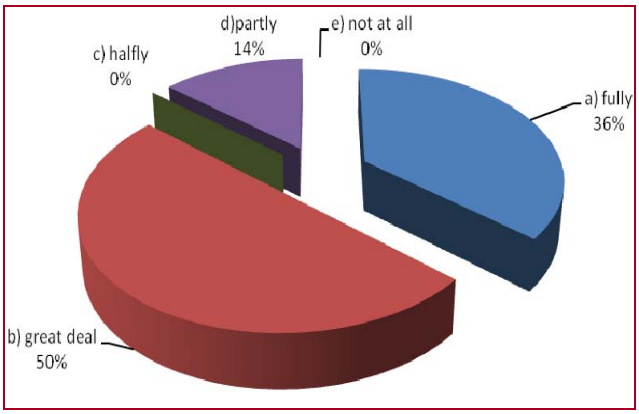


Figure 1 Level of resolution of the problem the consultants were engaged for

The second question in the poling questionnaire was aimed at finding an answer on beneficiary' satisfaction with the service rendered in view of professionalism, attitude toward the client, responsibility etc, which showed that 77% of the beneficiaries were fully satisfied with the service rendered, 18% of them were considerably satisfied, whereas 5% of them were partly satisfied.

Research findings with regard to enhancing the consultancy market building trust between service providers and service beneficiaries

In order to find out whether and to what extent the voucher system helped build the beneficiaries' trust in service providers, and consultancy market development, two questions were asked to service providers and two questions to service beneficiaries.

In addition to problem solving and satisfaction with the service which are also focused on building trust between service providers and beneficiaries, the service beneficiaries were

asked if now, once the service is rendered, they are more confident in external experts' ability to help them resolve the issues. 55% of the beneficiaries responded that now they are fully confident the external experts could help them resolve the problems, 36% of them have more trust than before, whereas 9% of them have the same opinion as before. No company thought the external experts or consultants cannot help them at all, or could help them even less than before.

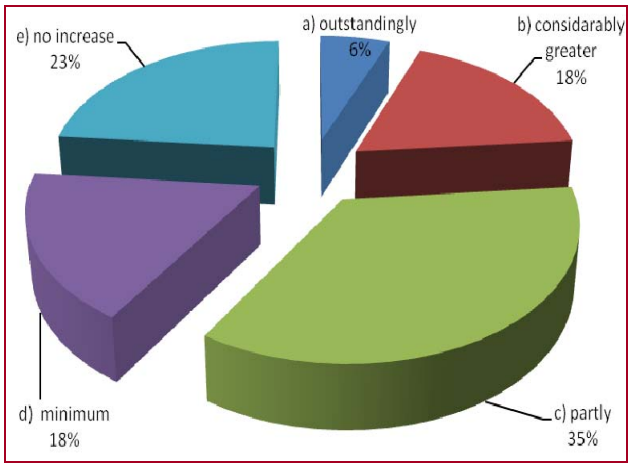


Figure 2 Increase in number of beneficiaries as a result of certification

The following question on trust building between beneficiaries and service providers was if the beneficiaries planned to engage some of the consultants through REDAH or independently if need be in the future. The research findings show that 68% of the beneficiaries would certainly engage a consultant in the future if they need to do so, whereas 32% of them responded they would probably engage a consultant again.

However, to get the full picture on whether the system helped build the trust between consultants as service providers and companies-beneficiaries, as well as the consultancy market development in the Herzegovina Region, two questions were asked to service providers too.

They were firts asked if and to what extent they were contracted again by the company they helped resolve its problem as part of their engagement through REDAH. 12% of the consultants got the full-time consultancy status with the clients whom they helped resolve the problem, whereas 41% of them were engaged again more than once or a number of times. However, there is a great number of those who were never (12%) or almost never (29%) engaged again by those whom they helped resolve the problems.

The question was aimed at getting a comprehensive answer on development of the consultancy market and benefits enjoyed by the certified consultants as a result of their certification and the fact they are included in the REDAH's list.

The question was focused on whether the number of beneficiaries increased following the certification and what was the result of holding the certified consultant license. 24% of the consultants who rendered services subsidized by REDAH has a considerably greater or outstandingly greater number of clients, 35% of them have a partly increased number of clients, whereas 41% of them have minimum or no increase in number of clients to be attributed to the fact of certification or inclusion into the REDAH's list.

CONCLUSION

In the framework of the Voucher scheme project and business entity consultancy implementation, and based on the research findings, REDAH conducted trainings for entrepreneurs in the areas detected in the analysis as those needed by the entrepreneurs. The sets of trainings were attended by 70 entrepreneurs.

The total of 84 potential consultants/service providers responded to the public call, 33 of which are natural persons and 49 legal persons. 50 consultants were successfully certified, 15 of them natural persons and 35 legal persons, which shows a strong interest existing on the part of the service providers.

113 companies applied for support and consultancies, out of which 87 got the vouchers and the chance to use this support following the review made by the REDAH experts, and 76 of them have fully implemented the activities they asked the support for. The total amount of assets spent for subsidizing consultancy services through voucher system is 100,000 EUR, and the maximum amount of subsidy was 3,000 KM (around 1,500 EUR).

The research findings showed that 86% of the beneficiaries fully or mostly resolved the problem they engaged the consultant for, whereas 14% of the companies partly resolved their problem. Also, 95% of the beneficiaries are fully or mostly satisfied with the service rendered. In this view, we can conclude that the

hypothesis H–1: "Beneficiaries based in Herzegovina Region managed to resolve their business problems for which they sought assistance from consultants engaged via REDAH" was hereby well substantiated.
The research also showed that 91% of the beneficiaries, once the service is carried out, demonstrated absolute trust or considerably greater trust than before, and that they are convinced the consultants can help them resolve the problems of their companies, and all beneficiaries are sure they would certainly or most probably engage a consultant again, when in need to do so.
Also, 53% of the consultants who provided services in this project were engaged again by the same companies to solve some other problems and offer specific consultancy services, and 59% of the consultants partly, considerably or largely increased a number of their clients once they got certified and included in the list of certified REDAH's consultants. In this view, we can conclude that the hypothesis H - 2 "Voucher system helped build the trust between the consultants as service providers and companies as service beneficiaries, as well as the consultancy market development in the Herzegovina Region" was hereby well substantiated too.
The prevailing opinion is that these kinds of incentives and subsidies, particularly for the start-up companies should be continued along with finding other sources of finances and incentives from the state to enable the entrepreneurs and companies facing problems to seek and get adequate professional assistance, without having to suffer much of a financial burden..

REFERENCES

[1.] BUBLE,M., KLEPIĆ,Z.: Management of small and medium enterprises - Basic of enterpreneurship, Faculty of economics University of Mostar, Mostar 2007, p. 50
[2.] SIROPOLIS,C.N.: Management of small enterprises, Mate Zagreb, p.18
[3.] KLEPIĆ,Z., SKOKO,B., MABIĆ,M.: Research and analysis the needs of SMEs for training and consultancy servicies, REDAH Mostar, Mostar 2009

AUTHORS & AFFILIATION

ZDENKO KLEPIĆ[1],
ARNELA BEVANDA[2],
IVAN JURILJ[3]

[1] UNIVERSITY OF MOSTAR, FACULTY OF ECONOMICS, MOSTAR, BOSNIA &HERZEGOVINA
[2] UNIVERSITY OF MOSTAR, FACULTY OF ECONOMICS, MOSTAR, BOSNIA & HERZEGOVINA
[3] REGIONAL ECONOMIC DEVELOPMENT ASSOCIATION FOR HERZEGOVINA, MOSTAR, BOSNIA &HERZEGOVINA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ANNALS
of
FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL
JOURNAL of ENGINEERING
ISSN: 1584-2665 [print, online]
ISSN: 1584-2673 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://annals.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

IZTOK PALČIČ[1], JAKA VADNJAL[2], BOJAN LALIČ[3]

INDUSTRIAL CLUSTERS IN SLOVENIA – A SUCCESS STORY?

Abstract:
Slovenia has begun with its national cluster policy in 2001. Industrial clusters have been a prevalent element of Slovenian competitiveness policy for next four years. More than thirty cluster initiatives were born in Slovenia in that period. The authors of this paper have followed the birth, organization and performance of industrial clusters in Slovenia for the period of three years. Based on several in-depth case studies in Slovenia and Austria we have built a cluster development and organization model applicable to smaller (transitional) countries. We have identified factors that have an impact on cluster development and organization at the level of general business environment. At the same time we have identified a government role in fostering clusters. But external factors are not the only factors influencing clusters. There are also internal factors that are in the hands of the cluster actors. These are factors that directly influence cluster development and organization process. We have classified them in four areas and they will be also presented in this paper. We have also identified four stages of cluster birth, organization and growth. The model is highly applicable as it combines research results with best practices based on several case studies.

Keywords:
cluster development, cluster model, cluster organization, industrial clusters, Slovenia

INTRODUCTION – ON INDUSTRIAL CLUSTERS

Various terms and definitions have been used to describe the phenomenon of agglomerations of interlinked firms. [1] provided a solid definition of the term "clusters" that embraces most important elements:
"Clusters are agglomerations of firms in a particular activity, usually with geographical dimension, with horizontal and (preferably also) vertical intra- and (preferably) inter-sectorial linkages in the context of facilitatory socio-institutional setting, which cooperate and compete in (inter)national markets."
Clusters of high-technology firms have become an important source of economic development across the advanced industrial economies, and a central focus of technology policy. Many research studies have provided descriptions of successful technology clusters and the existence of social networks, labor mobility and knowledge availability have been identified as crucial components that make technology clusters relevant for wider technology policy [2].
Although the cluster concept is quite widely recognized today, it is still just a concept rather than being supported by a well-defined body of knowledge. There is a need for research to put flesh onto the concept and establish operating principles and guidelines. There are many open questions concerning the creation and nature of clusters and concerning the operations management of clusters [3].
Hundreds of cluster initiatives have been launched involving virtually all regions in the world and the number is still growing. However, there is surprisingly little systematic knowledge of these initiatives, their structures and their

outcomes. This is a gap in the world literature that should be filled.
This paper presents the cluster policy in Slovenia. The main contribution, however, is a proposed model of cluster development, organisation and growth, especially applicable for smaller, even transition countries.

INDUSTRIAL CLUSTERS IN SLOVENIA

The Slovenian Ministry of Economics started the clustering concept in 2001, as the ministry recognized both the value of industry clusters and the need for greater innovation and networking among Slovenian manufacturers. Quickly industrial clusters became a part of the Programme of measures for fostering entrepreneurship and competitiveness. In 1999 three pilot projects were launched: Toolmakers Cluster of Slovenia (TCS), Slovenian Automotive Cluster (ACS) and Slovenian Transportation-logistic cluster. Since then the number of clusters has been continuously rising. It reached a number around thirty clusters that were successfully operating in Slovenia in the field of automotive industry, tool making industry, transportation, logistics, air conditioning, building construction, plastics, ecology, textile, wood, tourism, catering, hotels, geodesy etc. In the observed period of research (from 2001-2005) the cluster policy presented a pillar of Slovenian Government's industrial policy.
The Slovenian Ministry of Economics spent almost 9 million Euros for establishing and supporting 29 clusters in Slovenia in the period from 2001 until 2004. Majority of the funds was for cluster organizational issues (establishing legal form, promotional activities, joint infrastructure etc.). The analysis of cluster policy measures from 2001-2004 proved positive effects on local economy. The Slovenian Ministry of Economy developed a systematic framework for developing industry clusters and soon it has been widely recognized that cluster policy in Slovenia was among the best in developing countries. It was constantly used as a case study in different publications and presentations (e. g. [4]). In 2006 TCS was named as one of the most innovative cluster in Europe (by EU IRE – Innovative regions). The manager of ACS was recognized as the best cluster-manager in Europe in 2006 by the Europe INNOVA initiative.
Despite all that, in 2005 a new government stopped direct funding of clusters. That was a huge barrier for younger clusters. Many of these clusters lost their starting enthusiasm and simply disappeared. Older and more established clusters continued to exists, but also faced many unexpected problems. Many joint projects were endangered, especially R&D projects. Clusters had to find additional funding elsewhere. Majority of smaller cluster disappeared. The original clusters, namely TCS and ACS still exist and operate. The government did not support cluster R&D projects in preference to other R&D projects. In the period from 2005 to 2009 cluster policy was not the important part of national policy to foster competitiveness and entrepreneurship of Slovenia. Nevertheless, the importance of clusters in neighboring regions continues to grow.

RESEARCH METHODOLOGY

The focus of our research was developing a cluster model in smaller transitional countries. The research has adopted a case study methodology [5] with a significant element of action research [6].
A case study research strategy enabled us to focus on understanding the dynamics of the phenomenon observed. The case study methodology is appropriate when the boundaries between phenomenon and context are not clearly evident. The case study's purpose may be strictly to describe a situation but, more often, it is to understand how or why events occur [7]. We attempted to study a particular process of cluster birth, development, organization and growth and grasp the conditions surrounding the phenomenon to build a plausible explanation or discover a causal relationship that links the antecedents to the result. [48] also argues that case study is an objective, in-depth examination of contemporary phenomenon where the investigator has little control over events. This definition covers several significant points. First, the study typically involves one or more researchers gathering a considerable volume of data from within an organization to develop the clearest possible picture of the phenomenon. The data may come from primary sources (such as direct observation or interviews of people involved). It may examine a single situation or, with multiple-case studies, several related situations. Second, distinct from historical studies, case study research generally focuses on

current conditions, using historical data primarily to understand or substantiate the information gathered about the ongoing situation. Third, the researcher usually has little or no capability of manipulating events (in contrast to action research, where the researcher is involved as a participant and director of events in a natural setting).

Let us take a look how all these points where integrated in our research. The data was gathered in real business environment in specific firms and other organizations. Most of the data was qualitative, but in order to interpret the results additional quantitative data was also used. The authors have used primary and secondary data sources. Direct observations of the events were possible because of the active participation in TCS. The first author had a chance to participate in business meetings. He has also been involved in preparing and managing several TCS projects (e. g. building database of existing and future knowledge and technologies, arranging and conducting business meetings with potential business partners). Active participation in TCS has enabled to gather data that otherwise would not be available. This especially refers to data, gathered through informal contacts with top managers in TCS. The next primary source was interviews with top managers of firms and other relevant informants. The interviews normally lasted 2 hours. They were tape recorded and transcribed in the hours immediately following the interviews.

The secondary sources ware documents, sometimes even classified documents (minutes and notes from meetings, business documentation, reports, newsletters, etc). The first author also kept a diary of relevant events that happened in the period of four years. He also made notes, observations, impressions, ideas and analyzed them accordingly. The use of different data sources improves the validity of the proposed models.

Three case studies have been selected (industrial clusters) that served as a way for data gathering. The most important case study is TCS that has been the most detailed case study and at the same time a place to conduct action research. Two other case studies were ACS and Automotive cluster of Austria (AC Styria) to deepen our understanding of researched phenomenon.

Action research element was extremely important to grasp the dynamics of cooperative activities between members of studied cluster. The first author of this paper was heavily involved in activities of TCS. For example he prepared a catalogue of technologies and knowledge within TCS. This catalogue was also a basis for understanding the relationships between firms with respect to technologies and knowledge. It was a starting point to build technology network. This enabled him to be part of initiated actions and also reflecting on consequences by developing knowledge informative to theory building. The research has focused on current situation in the cluster. Historical events were helping to understand the current situation.

CLUSTER DEVELOPMENT & ORGANISATION MODEL

Custer model

Based on intense studying of theoretical perspectives, domestic and foreign best practices and especially on the research conducted with the appropriate research methodology (case study and action research) we have prepared a model of cluster development and organization process. This model also includes practical experiences with TCS, ACS and AC Styria. Building the cluster development and organization model was the first part; the second part was the identification of factors influencing cluster development and organization process.

We have classified the cluster development and organization process into four stages:

- *Cluster initiative – local economy analysis, governmental approach to cluster;*
- *Cluster definition – the mapping of cluster, cluster definition, setting the leading team, setting a cluster vision, looking for partners, membership analysis, strategic cluster development plan, cluster development structure, cluster project organization;*
- *Cluster development – short-term plans, building trust and networking, cluster informatisation, education and training, cluster promotion, technological development strategy;*
- *Cluster growth and technological development – internationalization strategy, cluster restructuring, cluster monitoring.*

Cluster initiative stage encompasses the analysis of local and national business environment. Basic characteristics of business environment

have to be identified in order to find out the potential for new clusters formation. In this initial phase a governmental role is very important. Government must promote the cluster concept in the region (bottom-up or top-down approach) and help cluster initiatives with advice.

Cluster definition stage comprises several activities, such as cluster mapping, definition of cluster context, setting the leading team, setting the cluster vision, looking for partners, membership analysis, formation of strategic development plan, cluster development structure, cluster project organization. In this stage is important to define cluster context, its core business and members, vision and top management.

After the definition of a cluster it is important that the cluster starts to develop immediately. The starting enthusiasm of the cluster members and particularly cluster top management must be transformed into action. Cluster development stage comprises several activities that differ from one cluster to another. Some of them should be present in each cluster: formation of short-term plans, building trust and networking, cluster informatisation, education and training, cluster promotion and technological development strategy.

The last stage is cluster growth and technological development. Cluster growth is associated with cluster physical growth and cluster competitiveness growth. Physical growth means acquiring new members, growth of existing members, linkages with other networks and clusters, new suppliers, new buyers etc. Clusters have great impact on productivity, innovation activities and formation of new businesses and all of these factors contribute to competitiveness growth of a cluster. At the same time competitiveness depends on new technologies and knowledge – cluster technological development. In this stage clusters go through internationalization activities and organizational restructuring. It is also important that all activities are monitored..

Cluster development and organisation factors

The clusters are at least in their core a part of a national environment. This environment, in which clusters are born and developed, consists of four levels: general business environment, governmental cluster policy, microeconomic business environment (embedded in Porter's diamond model) and clusters. General business environment of the nation consists further of five pillars: national history and culture, geographical position, legal framework and institutions, macroeconomic environment and infrastructure. We will take a look at each of them more in detail. These characteristics of business environment must be taken into account when we start with cluster initiatives.

The factors that have an impact on cluster development and organization at the level of general business environment are:

1. *National history and culture (level of development of market economy, level of experience in competition and cooperation between firms, level of cooperation between industry and R&D institutions, level of firms' acquaintance, level of trust between firms, level of trust in governmental organizations, level of impact of governmental policy in economy, existence of organizations to foster cooperation between private and public sector or to serve as a »glue« in society, social capital in overall society, entrepreneurship climate and culture).*
2. *Geographical position (physical position with infrastructure, natural resources, closeness of countries with developed clusters, geographical closeness of markets and customers).*
3. *The legal framework and institutions (governmental institutions, institutions for cooperation, educational system, intellectual property rights, environmental legal framework, jurisdiction, regional policy).*
4. *Macroeconomics with its goals (a favorable currency exchange, a low inflation rate, a positive balance, appropriate employment rate, a favorable fiscal policy (taxes), monetary policy, a foreign economic policy).*
5. *Infrastructure (local schools, universities, local trading associations, economic development agencies, regional agencies, technology centers, technology parks, business incubators with researchers, roads, railways, ports and airports, garbage disposal, communication linkages).*

The second level is governmental cluster policy. The government has the following roles in dealing with industrial clusters:

- *initiator (public calls, cluster policy),*

- *catalyst (new ideas),*
- *financier (at the beginning of the cluster formation, R&D projects),*
- *stimulator (of all actors in local economy to upgrade business environment, to set local vision),*
- *adviser (expert help with cluster development and organization in initial stage),*
- *linkage (between private and public sector, governmental institutions firms – forums),*
- *caretaker (of favorable business environment, macroeconomic and political stability),*
- *doctor (removing gaps and errors in business environment),*
- *guardian (competitiveness policy, intellectual property rights, legal framework),*
- *tutor and mentor (training cluster managers),*
- *promoter (of the cluster concept home and abroad, new investors, new capital),*
- *agent (for knowledge exchange, R&D),*
- *buyer,*
- *informant (foresight studies, trends),*
- *constructor (infrastructure, physical supporting environment).*

The third level is a step from macro level to micro level, described in Porter's diamond model. This model is used to illustrate the quality of regional business environment and regional productivity. Its four determinants (context for firm strategy and rivalry; factor (input) conditions; demand conditions; related and supporting industries) lead to the occurrence of interdependent competitive sectors in economy – industrial clusters. The cluster development and organization process have already been presented. The micro level ends with a firm, as a central building-block of clusters and national economies.

External factors are coming from cluster business environment and the cluster does not have any impact on them in the beginning. The cluster can influence some of these factors later, when it is formed, developed and a powerful actor in regional and national economy (e.g. lobbying). The clusters can have an impact on legal framework and institutions, infrastructure as well as on future governmental cluster policy. With their business results the clusters can indirectly influence macroeconomics trends (the only condition is a sufficient critical mass of involved actors and many interdependent clusters).

But external factors are not the only factors influencing clusters. There are also internal factors that are in the hands of the cluster actors. These are factors that directly influence the cluster development and organization process. We have classified them in four areas: cluster size and structure; cluster members' enthusiasm; cluster members' leadership capabilities and organizational approaches. Let us have a closer look at each of these areas.

The cluster size and structure that primarily influences cluster organization:

- *Critical mass – the cluster birth is reasonable only if there is enough firms and other organizations;*
- *The size – the higher number of members means more problems with organizational issues and with achieving consensus on what actions to perform. Large clusters are definitely preferable after overcoming these initial organizational problems. This is why it is recommended for a cluster to have just a core of actors at the beginning. This cluster core sets the rules of the game;*
- *SMEs and large firms ratio – there is a place for each and every type and size of firms in a cluster;*
- *Vertical and horizontal relationships ratio in the cluster – each dimension brings different relationships between cluster firms and different means of cooperation and cluster organization;*
- *Presence of leading regional and national firms – these firms have a direct impact on attracting new members and different cluster organization (establishment of internal networks and value chains around these firms);*
- *Geographical diffusion and focus – greater geographical proximity means easier organization;*
- *Structural gaps – identification of gaps in value chains influences the cluster organization (attracting new missing links, outsourcing specific activities).*

Cluster members' enthusiasm primarily influences the:

- *Visionaries – setting the common cluster vision, foreseeing cluster future, setting cluster core competence;*
- *Members' consensus – defined consensus on what actions to perform, common goals, common strategies, help with individual*

cluster members' goals, cooperation on common areas of interest;
- *Willingness to cooperate and to network – the firms must start opening themselves, look for business partners and business opportunities;*
- *Firms' activity – only active and risk taking firms contribute to cluster development;*
- *Energy and enthusiasm of cluster members – a driver for cluster development;*
- *Understanding the essence of cluster and clustering process – this understanding has a direct impact on long-term cluster development process.*

Leadership capabilities:
- *Leadership team – skills to manage network organizations and all the qualities we have mentioned at cluster members' enthusiasm;*
- *Cluster manager – with all characteristics a good leader must possess;*
- *Consultancy help – if there is not enough knowledge for cluster development and organization or to ensure neutrality;*
- *Equality for all cluster members – the feeling of inequality never contributes to cluster development.*

Organizational approaches in cluster:
- *Formal organization with its linking centre;*
- *The use of information and communication technology to connect all cluster members;*
- *Project management – cluster project organization;*
- *Flexible organizational forms – simple organizational adjustments must be possible with cluster growth and new challenges;*
- *Monitoring – periodic cluster performance control (figure 1).*

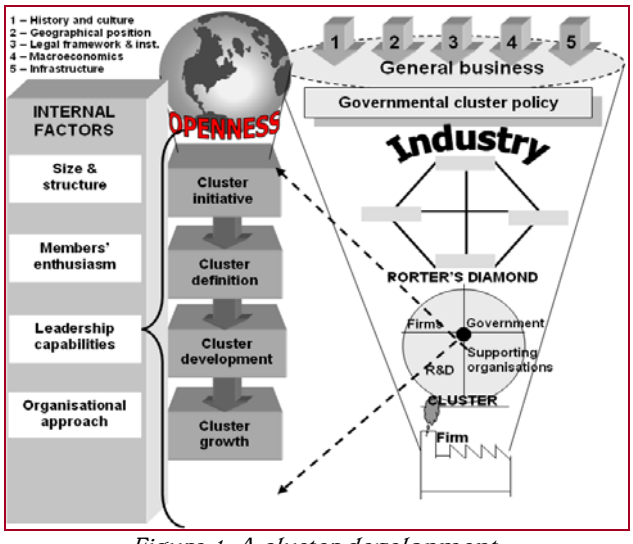


Figure 1. A cluster development and organization model

CONCLUSION

Recent development of industrial clusters shows that it is not enough for clusters to be locally strong. On the contrary, they must tend to be globally strong and dynamic (local dynamism, global attractiveness, global market reach). A strong cluster core with local actors must become a part of international – global business environment and accept foreign influence. With one word, cluster must be open, which means:
- *clusters must allow the entrance of new domestic firms and other organizations,*
- *clusters must welcome also the firms that do not seem to fit in the cluster,*
- *competition must be welcomed and not persecuted,*
- *cluster must welcome foreign firms and other organizations,*
- *cluster must attract foreign direct investments,*
- *cluster must attract as many as possible different financial resources from public and in particularly private sector,*
- *no monopoly, cartels and trusts,*
- *no trading limitations,*
- *no competitiveness protection by the government,*
- *cooperation with other domestic clusters,*
- *cooperation with foreign clusters from the same (similar) or different industries,*
- *cooperation with foreign multi-national firms and other firms and R&D institutions,*
- *more communication between firms and between firms and other organizations,*
- *comparison with other domestic and foreign clusters – benchmarking,*
- *continuous promotion and building of globally recognized cluster trade mark.*

On the final note – are clusters a success story in Slovenia? Although they are not as popular as five years ago they were one of the main reasons that Slovenian firms started to cooperate more openly. A good combination of "top-down" and "bottom-up" approach of the clustering policy made this possible. A new network forms have developed since then, such as technological platforms, living labs etc. A recent study (in 2006 and 2009) performed by the first author of this paper among manufacturing firms in Slovenia provided extremely interesting results. In comparison with several European countries Slovenian manufacturing firms were the ones that had the higher percentage of cooperation

with other firms and R&D institutions. Surprisingly, or not, a part of this fact can be explained by the clustering policy in the first half of past decade.

REFERENCES

[1.] PITELIS C.N. Cluster diagnosis, paper presented at Netwin project in London, 2001.

[2.] CASPER S. How do technology clusters emerge and become sustainable? Social network formation and inter-firm mobility within the San Diego biotechnology cluster. Research Policy 2007; vol. 36, 438–455.

[3.] CARRIE A. S. Integrated clusters – the future basis of competition. International Journal of Agile Management Systems 1999; vol.1, no. 1, 45-50.

[4.] SÖLVELL Ö, LINDQVIST G., KETELS C., PORTER M. The Cluster Initiative Greenbook. Stockholm: Ivory Tower AB, 2003.

[5.] EISENHARD K. M. Building theories from case study research. Academy of Management Rewiev 1989; vol. 14, no. 4, 532-550.

[6.] COUGHLAN P., COGHLAN D. Action research for operations management. International Journal of Operations & Productions Management 2002; vol. 22, no. 2, 220–240.

[7.] YIN R. K. Case Study Research: Design and Methods. London: Sage Publications, 1989

AUTHORS & AFFILIATION

IZTOK PALČIČ[1],
JAKA VADNJAL[2],
BOJAN LALIĆ[3]

[1] UNIVERSITY OF MARIBOR, FACULTY OF MECHANICAL ENGINEERING, MARIBOR, SLOVENIA
[2] GEA COLLEGE OF ENTREPRENEURSHIP, LJUBLJANA, SLOVENIA
[3] UNIVERSITY OF NOVI SAD, FACULTY OF TECHNICAL SCIENCES, NOVI SAD, SERBIA

ACTA TECHNICA CORVINIENSIS – BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ANNALS
of
FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL
JOURNAL of ENGINEERING
ISSN: 1584-2665 [print, online]
ISSN: 1584-2673 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://annals.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

SCIENTIFIC EVENT

INTERNATIONAL SYMPOSIUM on ADVANCED ENGINEERING & APPLIED MANAGEMENT – 40th ANNIVERSARY in HIGHER EDUCATION (1970-2010)

4 – 5 NOVEMBER, 2010
HUNEDOARA, ROMANIA

INVITATION

*It is our privilege and pleasure to extend a cordial invitation to you and your colleagues to attend the **Symposium**, which will ensure an exchange of scientific information and didactical opinions in fields with an impressive dynamic considering the research and the technological progress.*
The Symposium is an open invitation for all specialists, professors, researchers and experts in all scientific fields, who can produce a free presentation of the results in their scientific activities.
*For more information please contact the **Secretary Office of the Organizing Committee**. An e-mail address was be opened to receive your correspondence: symposium@fih.upt.ro*

MAIN TOPICS:

- *MATERIALS SCIENCE & ENGINEERING*
- *ELECTRICAL ENGINEERING & ENERGETICS*
- *INFORMATICS & COMPUTER SCIENCE*
- *MECHANICAL ENGINEERING & DESIGN*
- *MANAGEMENT IMPLEMENT POLICIES & STRATEGIES*
- *ENVIRONMENTAL ENGINEERING & ECOLOGY*

IMPORTANT DATES:

- *The camera-ready manuscript of your paper must be sent to the **Secretary Office** by **01 October 2010.***
- *The final announcement of confirmation for publishing and the day of your paper presentation will be sent by **30 October 2010**.*

SCIENTIFIC COMMITTEE

- *Prof. dr. eng. **Teodor HEPUT***

dean of the Faculty of Engineering – Hunedoara

- *Prof. dr. **Stefan MAKSAY***

scientific secretary of the Faculty of Engineering – Hunedoara

- *Prof. dr. eng. **Francisc WEBER***

head of General Association of the Romanian Engineers (AGIR) – branch of Hunedoara

- *Assoc. Prof. dr. eng. **Ana Virginia SOCALICI***

vice-dean of Faculty of Engineering – Hunedoara

- *Assoc. Prof. dr. eng. **Caius PANOIU***

vice-dean of Faculty of Engineering – Hunedoara

- *Assoc. Prof. dr. eng. **Sorin DIACONU***

head of Electrical Engineering & Industrial Informatics Department

- *Assoc. Prof. dr. eng. **Lucia VILCEANU***

head of Engineering & Management Department

- *Assoc. Prof. dr. eng. **Manuela PANOIU***

head of Life-Long Education Department

- *Assoc. Prof. dr. eng. **Imre KISS***

Romanian Foundry Technical Association (ATTR) – branch of Hunedoara

ORGANIZING COMMITTEE

- *Lect. ec. dr. eng. **Vasile ALEXA***
- *Lect. dr. eng. **Sorin RATIU***
- *Lect. dr. eng. **Gabriel POPA***
- *Lect. dr. eng. **Vasile George CIOATA***
- *Lect. dr. math. **Dan LEMLE***

FACULTY OF ENGINEERING HUNEDOARA
5, Revolutiei,
331128, Hunedoara,
ROMANIA
www.fih.upt.ro

LOGISTICAL SUPPORT:

*All accepted papers of **Symposium** will be published into the Symposium Proceeding. Selected and expanded papers which were orally presented at the Conference will be considered for publication in **ANNALS of F.E.H. – INTERNATIONAL JOURNAL OF ENGINEERING** and **ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING** as full-length research papers after reviewing and appropriate revisions.*
*The logistical support will be assured by the **ANNALS of F.E.H. – INTERNATIONAL JOURNAL OF ENGINEERING** and **ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING** (B+ International Scientific Journals according with the CNCSIS classification, indexed in Index Copernicus, Evisa and JournalSeek Genomics)*

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ANNALS of
FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL JOURNAL of ENGINEERING
ISSN: 1584-2665 [print, online]
ISSN: 1584-2673 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://annals.fih.upt.ro

FOCUSING ON:

- *problems concerning the general field of economics and management, the European Integration of our countries, the differences between the development of the regions from Eastern Europe and the management of diminishing unfavorable differences, including aspects regarding the globalization and economy of small and medium enterprises, human resources, management strategies and organization behavior, provides a leading forum for interaction and research on the competitive strategies of managers and the organizational structure of firms;*
- *the management of the city and on industrial waste materials, debating issues concerning the environmental engineering, the environmental impact analysis and assessment, the industrial and urban environmental management, the cleaning process, pollution agents and pollution sources, water – air – soil quality analysis, the reutilisation of industrial wastes and the diminishing of pollution and the environmental planning and environmental protection in the regions of the Eastern Europe area;*
- *general fields of industry, mining, agriculture, forestry, botany and horticulture, hydrology, biotechnology, material and energetically resources, including energy conservation and planning and alternate energy development, in multidisciplinary studies;*

- *engineering science and practice, covering the full spectrum of engineering theory and practice, including studies involving the application of physical and mathematical techniques to fundamental investigations and emerging areas within the engineering fields, incoming with information from a wide variety of applied science specialties in multidisciplinary studies;*
- *the theory and practice of chemistry and physics, covering the full spectrum of natural sciences in multidisciplinary studies;*

GENERAL GUIDELINES:

The papers of a high scientific level will be presented during the session, while the rest of the papers will have a poster-form presentation.
The papers presented in the session will be collected in the volume of the session, in a CD-Rom form..
The papers will have to frame into topics, to have an interdisciplinary character, and to be at the level of an international session..
There will be oral and poster presentations. Invited speakers will have 20 min, and other participants 10 min (+5 min for discussions). The maximal width of posters is 90 cm, and the length, 140 cm. The boards are of hard wood, adhesive tape and pushpins will be provided.

SECRETARY OFFICE OF THE ORGANIZING COMMITTEE:

*For more information please contact the **Faculty of Engineering – Hunedoara, Secretary Office of the Organizing Committee**. An e-mail address has been opened to receive your correspondence: symposium@fih.upt.ro.*
The organizers look forward to your participation and presentations, and hope that the Symposium will further promote regional cooperation on relationships of multidisciplinary research areas.

INTERNATIONAL SYMPOSIUM
on ADVANCED ENGINEERING
& APPLIED MANAGEMENT
– 40th ANNIVERSARY
in HIGHER EDUCATION
(1970-2010)

UNIVERSITY POLITEHNICA TIMIŞOARA
FACULTY OF ENGINEERING – HUNEDOARA
5, REVOLUTIEI, 331128, HUNEDOARA
phone: + 40 254 207522; fax: + 40 254 207501
e-mail: symposium@fih.upt.ro

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

11TH INTERNATIONAL SYMPOSIUM ON "INTERDISCIPLINARY REGIONAL RESEARCH"

ISIRR 2010

HUNGARY SERBIA ROMANIA

SZEGED, HUNGARY

13-15 October, 2010

CALL FOR PAPERS

The Szeged Regional Committee of the Hungarian Academy of Sciences, the Association for Multidisciplinary Research of the West Zone of Romania (ACM-V)- Timisoara, the Polytechnic University of Timisoara, and the University of Novi Sad will jointly organize the 11th International Symposium "Interdisciplinary Regional Research" in Szeged, Hungary, on ***13-15 October, 2010.***

GENERAL TOPICS

The conference organizers welcome papers and poster presentations from the fields of:

- *MEDICAL SCIENCE,*
- *CHEMISTRY,*
- *BIOLOGY,*
- *AGRICULTURE,*
- *ENGINEERING, and*
- *SOCIOLOGY.*

GENERAL INFORMATIONS

The official language of the conference: English
The length of the presentations: max. 15 minutes, followed by a 5-minute discussion
Size of posters: 90 cm wide x 140 cm long

REFERENCES

Conference participants will receive soft drinks, coffee, lunch and dinner, the printed abstracts and the programme of the conference, as well as an opportunity to have their papers published in academic journals appearing in Szeged.
The abstracts of the papers, which should not exceed 1500 characters, must be submitted by the application date, by way of directly uploading them on the conference website.
We invite with special attention to the conference and wait for those who take part in European Union projects.
The conference application form can be found on the website of the Szeged Regional Committee of HAS. ***www.isirr2010.hu***
Registration for the symposium is by way of the registration form on the website of the Szeged Regional Committee of HAS. We also request that the electronic versions of the abstracts for the papers be submitted by the above deadline in order to ensure that these are available to the participants at the time of the conference.
The participants can reserve accommodation on the undermention website:
[1] http://magyar.szegedhotels.com/index.php/
[2] http://www.iranymagyarorszag.hu/keres/magyarorszag/szallasok-p1/

CONFERENCE FEE

30 EUR, to be paid by bank transfer to the following account number.
Bank account number: 10028007-01738928-000000000
IBAN: HU68 1002 8007 0173 8928 0000 0000
SWIFT: MANEHUHB

LOCATION

REGIONAL COMMITTEE IN SZEGED (RCSz)
H-6720 SZEGED, Somogyi B. u. 7
Phones: 3662/553-910 (main)
3662/553-911
3662/553-913
Chair: IMRE DÉKÁNY, D.Sc.
Vice-chairs: LÁSZLÓ VÉCSEI, D.Sc.
László Vígh, D.Sc.
Secretary: MÁRIA HOMOKI-NAGY, D.Sc.
website of the SZEGED REGIONAL COMMITTEE of HAS. ***www.isirr2010.hu***

ISIRR 2010

HUNGARY ***SERBIA*** ***ROMANIA***

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

SCIENTIFIC EVENT

The XIIth INTERNATIONAL SYMPOSIUM "YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH"

ISYPMR - 2010

11 - 12 NOVEMBER 2010
TIMISOARA, ROMANIA

ANNOUNCEMENT

The SYMPOSIUM will be organised by the NATIONAL R&D INSTITUTE FOR WELDING AND MATERIAL TESTING – ISIM TIMIŞOARA, ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH (ACM-V), UNIVERSITY "POLITEHNICA" OF TIMISOARA under de aegis of MINISTRY OF EDUCATION, RESEARCH AND INNOVATION.
Specialists from SERBIA, HUNGARY and BULGARIA will participate in the SYMPOSIUM together with the ROMANIAN specialists.
You are invited to participate at the XIIth INTERNATIONAL SYMPOSIUM "YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH".

KEYWORDS:

Scientific events, Multidisciplinarity Research, Symposium, Scientific collaborations, Young People

GENERAL INFORMATIONS – AIMS

The aim of the SYMPOSIUM is to create the framework for the presentation, debate and publication of the valuable scientific results obtained by both the young members of ACM-V and from other regions, beside those from SERBIA, HUNGARY and BULGARIA.
The Organization Committee propose that the XIIth SYMPOSIUM to be one of high scientific level and quality.
The criteria for the papers' estimation by the Scientific Committee are:

- *interdisciplinary and multidisciplinary technical – scientific character*
- *high scientific level*
- *contribution brought to the solution of the proposed problem and/or development of the field.*

You are invited to participate at the XIIth INTERNATIONAL SYMPOSIUM "YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH".
The participants are asked to fill-in and mail the Registration form to the Secretariat of the ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH OF THE WEST ZONE OF ROMANIA (ACM-V) located at TIMISOARA, Bv. MIHAI VITEAZUL nr. 30 and also to mail an abstract of the paper in ENGLISH (200 words at the most) specifying the section.

ORGANIZERS

- *NATIONAL R&D INSTITUTE FOR WELDING AND MATERIAL TESTING – ISIM TIMIŞOARA,*
- *ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH (ACM-V),*
- *UNIVERSITY "POLITEHNICA" OF TIMISOARA*
- *BANAT'S UNIVERSITY OF AGRICULTURAL SCIENCES AND VETERINARY MEDICINE – TIMISOARA*
- *THE LOCAL COUNCIL OF TIMISOARA, TIMISOARA CITY HALL*
- *THE COUNTY COUNCIL OF TIMIS*

under de aegis of

- *MINISTRY OF EDUCATION, RESEARCH AND INNOVATION*

MODEL FOR PAPER'S ELABORATION

- *The paper should contain max. 6 pages, size A4 (with figures and tables included in the text, including bibliography), with an even number of pages;*
- *The paper should be edited on computer with Arial font, 12 pt. on size A4 with useful area of 24 cm × 16 cm (left, right and up 2.5 cm, down 3.0 cm);*
- *The pages should be numbered by pencil;*
- *The papers should be written in Word format;*
- *The title of the paper should be written with capital letters (14 pt. - Bold), centred;*
- *The paragraph title should be written with 12 pt. bold fonts and it might be centred.*
- *Graphic materials should be exposed on transparent slides or Power Point presentation,*
- *The presentation should take 10 minutes at the most*

The paper will be transmitted on CD and listed in one copy.
An author can participate with two papers at the most.

TOPICS

The programme of the Symposium contains papers in Plenary Session on the topic: „PRIORITIES OF THE EUROPEAN SCIENTIFIC RESEARCH"
Papers in sections of the XIth INTERNATIONAL SYMPOSIUM "YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH" will on the following topics:

- *TECHNICAL SCIENCES*
- *CHEMISTRY, PHYSICS AND MATHEMATICS*
- *BIOLOGY, AGRICULTURE AND ANIMAL SCIENCE*
- *HEALTH (HUMAN AND VETERINARY)*
- *ECOLOGY AND ENVIRONMENT PROTECTION*
- *SOCIAL AND HUMAN SCIENCES.*
- *ECONOMIC SCIENCES*

INTERNATIONAL SCIENTIFIC COMMITTEE

- *PROF. DR. AVRAM JECU – MEDICINE AND PHARMACEUTICS UNIVERSITY "VICTOR BABEŞ" TIMISOARA - ROMANIA*
- *PROF. DR. ENG. BARTZER ŞTEFAN – "POLITEHNICA" UNIVERSITY OF TIMISOARA - ROMANIA*
- *PROF. DR. BORŢUN CRISTINA – MEDICINE AND PHARMACEUTICS UNIVERSITY "VICTOR BABEŞ" TIMISOARA - ROMANIA*
- *LECT. DR. BUNOIU OCTAVIAN – WEST UNIVERSITY OF TIMISOARA - ROMANIA*
- *PROF. DR. ENG. BUTNARU GALLIA – UNIVERSITY OF AGRICULTURAL SCIENCE AND VETERINARY ACADEMY OF BANAT - USAMVB TIMISOARA - ROMANIA*
- *PROF. DR. ENG. CHIRIAC ADRIAN – WEST UNIVERSITY OF TIMISOARA - ROMANIA*
- *DR. COSTIŞOR OTILIA – INSTITUTE OF CHEMISTRY OF THE ROMANIAN ACADEMY TIMISOARA - ROMANIA*

DEADLINES

The deadline for mailing the abstracts, in which, it will be showed the personal contribution of the authors and the interdisciplinary character: JULY 17TH 2010.
The Scientific Committee will analyse the abstracts and communicate to the authors until the 10th of SEPTEMBER 2010 which are the selected papers, with a view to the final elaboration.
The deadline for mailing of the complete papers, edited according to the annexed model and the CD until: 5TH OCTOBER 2010.
The publication in volume or on CD of the papers will be decided by the Scientific Committee following the analysis of the complete papers mailed in time, if these fulfill the technical-scientific criteria and the elaboration mode.
Any correspondence should be addressed to the secretariat of the SYMPOSIUM, located at the ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH (ACM-V).
Bd. MIHAI VITEAZUL nr. 30, 300222 TIMISOARA, ROMANIA,
Tel. (+40) - 0256 - 491840,
Fax (+40) - 0256 – 499149

INFORMATION – CORRESPONDENCE

Any correspondence should be addressed to the secretariat of the Symposium, located at the ASSOCIATION FOR MULTIDISCIPLINARY RESEARCH (ACM-V).
BD. MIHAI VITEAZUL NR. 30,
300222 TIMISOARA, ROMANIA
Tel. (+40) - 0256 - 491840
Fax (+40) - 0256 - 499149
Contact persons:
Mr. Phys. Nicolae FARBAŞ Ph.D.
E-mail: nfarbas@isim.ro
Dipl. Fiz. Valeria FARBAŞ
Tel. (+40) - 256 - 499149; Mobil (+40) - 0724 314317
E-mail: ACM-V@clicknet.ro
Ş.I. Dr. Ing. Flaviu FRIGURĂ-ILIASA
Tel. (+40) - 256 - 403415; Mobil (+40) - 0744 191533
E-mail: *flaviu@et.upt.ro*
Asist. Dr. Ing. Oana DANCI
Tel. (+40) - 256 - 277021; Mobil (+40) - 0722 601955
E-mail: *oana_research@yahoo.com*

ISYPMR - 2010

The XIIth INTERNATIONAL SYMPOSIUM
"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH"

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

13 TH INTERNATIONAL SCIENTIFIC CONFERENCE MECHANICAL ENGINEERING 2010

ME 2010

70th ANNIVERSARY OF FOUNDING THE FACULTY OF MECHANICAL ENGINEERING SLOVAK UNIVERSITY OF TECHNOLOGY

October 21, 2010
BRATISLAVA, SLOVACIA

INVITATION

The 13th INTERNATIONAL SCIENTIFIC CONFERENCE - MECHANICAL ENGINEERING 2010 on the occasion of the 70th Anniversary of founding the FACULTY OF MECHANICAL ENGINEERING which will take place on October 21, 2010 and is organized under the auspices of His Spectabilis Prof. Ľubomír ŠOOŠ, PhD., the dean of THE FACULTY OF MECHANICAL ENGINEERING, SLOVAK UNIVERSITY OF TECHNOLOGY.

CONFERENCE FOCUS

The conference covers the synergic integration of mechanical engineering with electronics, intelligent control and design and manufacturing of industrial products and processes. Topics of interest include, but not limited to:

- *APPLIED MECHANICS AND MECHATRONICS,*
- *AUTOMATION, MEASUREMENTS AND APPLIED INFORMATICS,*
- *MANUFACTURING SYSTEMS, ENVIRONMENTAL ENGINEERING AND QUALITY MANAGEMENT,*
- *PROCESS, FLUID AND POWER ENGINEERING,*
- *PRODUCTION PROCESSES AND MATERIALS,*
- *TRANSPORTATION TECHNIQUES AND DESIGN.*

IMPORTANT DATES

till September 30, 2010
Covering the conference fee
till September 10, 2010
Sending
till September 20, 2010
Paper reviewing, confirmation of its acceptance and selection of a proper section a conference paper; use an e-mail me2010@sjf.stuba.sk
October 21, 2010
INTERNATIONAL CONFERENCE MECHANICAL ENGINEERING 2010

CONFERENCE FEE

The conference fee is 100,- EUR and 50,- EUR for participants from FME STU. The conference fee is 50,- EUR, for PhD. Students and 30,- EUR for PhD. students from FME STU. The fee covers conference materials, conference proceedings on CD, printed conference proceedings, refreshment during the conference and rental of the conference locations. The fee should be forwarded via bank transfer to the following bank account before July 6, 2010.

INFORMATIONS

Conference proceedings will be issued as scientific proceedings of Faculty of Mechanical Engineering in printed and CR-ROM form with registered ISBN. Paper maximum length should not exceed 8 pages including figures and tables and/or paper file size should not exceed 4 MB.
Preliminary registration form is available at the conference web site. State names of paper authors, paper title in English as well as suggest proper section for the paper. After on-line registration send short abstract in English, use an e-mail me2010@sjf.stuba.sk. Conference program committee decides on acceptance of each paper and its definite section or a poster presentation. Paper acceptance will be announced to authors via e-mail.
Paper presentation within a thematically workshop is restricted to 15 minutes including discussion. Presentation technology will be available – PC with a data projector, overhead projector and slide projector if necessary. Please mark your requirements regarding presentation tools on the final registration form.
*Full texts of papers and abstracts (in English) are to be delivered by authors to the organizers' e-mail address in accordance with the instructions, exclusively in *.pdf or post-script format.*
The conference language will be English.

CORRESPONDENCE ADDRESS - ME 2010 Conference Secretariat

PETER BROKEŠ, Assoc. Prof.
FACULTY OF MECHANICAL ENGINEERING, STU
Nám. slobody 17, 812 31 BRATISLAVA
SLOVAK REPUBLIC
phone: ++421-2-572 96 244
fax: +421-2-529 25 749
e-mail: me2010@sjf.stuba.sk
http://www.kpp.sjf.stuba.sk/me2010

ACTA TECHNICA CORVINIENSIS
BULLETIN OF ENGINEERING

GENERAL GUIDELINES FOR PREPARATION OF MANUSCRIPTS FOR REVIEW IN ACTA TECHNICA CORVINIENSIS – BULLETIN OF ENGINEERING

Abstract:
a maximum 100 words abstract will be written, simple spaced, in ***ENGLISH***

Keywords:
a maximum 10 representative words for the paper

THE TEXT

The submitted manuscript must be content ***INTRODUCTIVE NOTES (INTRODUCTIONS)****, follow by the* ***METHODOLOGY****, the* ***PRELIMINARY RESULTS*** *or the* ***FINAL RESULTS****, and, in final, the* ***CONCLUSIONS*** *about the presented notes.*
Also, the paper included the ***ABSTRACT****,* ***KEYWORDS****, and* ***REFERENCES****.*
The conclusions must be clear, relevant and must be indicate some the empirical, theoretical, methodological or scientific aspects of the research, and the author's contributions, or the future preliminaries of our research. It will publish empirical, theoretical and methodological articles.

THE TABLES, FIGURES, GRAPHS AND EQUATIONS

Tables and Figures should be numbered, titled and the resource should be mentioned below them. Photographs in the text are preferable to be in black and white, but must be clear, with a high contrast. Under each figure there will be typed, centered, "Figure X. Name of the figure".
Tables will be part of the text, designed as "Table y. Name of the table", written above the table, centered.
The equations will be inserted in the text – left aligned – and will be numbered with Arabian figures, in round brackets, right aligned. Before and after the equation a blank line will be left.

SUBMISSION OF MANUSCRIPTS

The original of the technical paper will be sent through e-mail as attaché document (.doc, Windows 95 or higher).*

ACKNOWLEDGMENT

If is necessary, please write yours works based research [Title, Contract no., Team, Year etc]

REFERENCES

[1] AUTHORS. YEAR. TITLE OF REFERENCE, JOURNALS NAME, VOLUME, PAGES
[2] AUTHORS. YEAR. TITLE OF BOOK, EDITING HOUSE
[3] AUTHORS. YEAR. TITLE OF REFERENCE, CONFERENCE NAME, VOLUME OR PROCEEDING, PAGES

AUTHORS & AFFILIATION

[1.] NAME SURNAME
[2.] NAME SURNAME

[1.] DEPARTMENT, FACULTY, UNIVERSITY, COUNTRY
[2.] INSTITUTION OR COMPANY, COUNTRY

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

INDEXES FOR
ACTA TECHNICA CORVINIENSIS
– BULLETIN OF ENGINEERING

ACTA TECHNICA CORVINIENSIS
– BULLETIN OF ENGINEERING

is covered by the following indexes:

INDEX COPERNICUS – JOURNAL MASTER LIST

INDEX COPERNICUS
INTERNATIONAL

http://journals.indexcopernicus.com/

GENAMICS JOURNALSEEK DATABASE

Journal Seek

http://journalseek.net/

EVISA DATABASE

evisa.

http://www.speciation.net/

GOOGLE SCHOLAR

Google Scholar BETA

http://scholar.google.co.in/

DOAJ – DIRECTORY OF OPEN ACCESS JOURNALS

DOAJ DIRECTORY OF OPEN ACCESS JOURNALS

http://www.doaj.org/

ACTA TECHNICA CORVINIENSIS
– BULLETIN of ENGINEERING
ISSN: 2067-3809 [CD-Rom, online]

University Politehnica Timisoara,
Faculty of Engineering Hunedoara,
5, Revolutiei,
331128, Hunedoara,
ROMANIA
http://acta.fih.upt.ro

ACTA TECHNICA CORVINIENSIS
– Bulletin of Engineering

FACULTY OF ENGINEERING HUNEDOARA
5, REVOLUTIEI
331128 – HUNEDOARA
ROMANIA
http://acta.fih.upt.ro

Scientific supplement of
ANNALS of FACULTY ENGINEERING HUNEDOARA
– INTERNATIONAL JOURNAL of ENGINEERING
ISSN: 1584-2665 [print]
ISSN: 1584-2673 [CD-Rom]

FACULTY OF ENGINEERING HUNEDOARA
5, REVOLUTIEI
331128 – HUNEDOARA
ROMANIA
http://annals.fih.upt.ro

ACTA TECHNICA CORVINIENSIS

BULLETIN OF ENGINEERING

ISSN: 2067-3809