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ENTREPRENEURSHIP AND INNOVATION

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Preface

“Your work is going to fill a large part of your life, and the only way to be truly satisfied is to do what you believe is great work. And the only way to do great work is to love what you do. If you haven't found it yet, keep looking, and don't settle. As with all matters of the heart, you'll know when you find it.”
Steve Jobs

We watched world-renowned athletes like Drazen Petrovic, Blanka Vlasic, Goran Ivanisevic, Petra Majdic, Primoz Kozmus, and the Kostelic family sprout up in small countries like Croatia and Slovenia. At first glance one may not see any connection between the said world class athletes and an academic book on entrepreneurship and innovations. Yet, they are profusely intertwined.

Regardless of how great athletes’ enthusiasm and dedication may be, they all need a coach and institutional support. Only those that have it, or may not have it at the beginning but see the obstacles as a challenge on the road to success, do become national champions or even famous worldwide. The story about innovation and entrepreneurship is a story about belief in the future, about recognizing that failure, loneliness and lack of acceptance may be the 'reward' for being an entrepreneur.

Entrepreneurs are an odd lot in that they appear to be equally happy in rough, times when they may hit the bottom, as when they are on the top. This is a story about a thousand entrepreneurs throughout our history whose legacy are products and services, tools and technologies which advanced mankind either on purpose or inadvertently. All of them were visionaries and entrepreneurs but despite their success it is still difficult to say why some people are successful and some are not, how to boost entrepreneurial spirit and creativity, how to preserve and further the legacy of our enterprising ancestors.

We designed this project in an attempt to find some of the answers to the above questions. We put our best effort in researching the topic as it is of high importance to us, our partners and Europe. Highly motivated to pursue answers, we have sought cooperation and partners to jointly communicate our ideas.

In the process of expanding networks and acquiring new knowledge we have invited collaborators who are not our project partners to take part. They share our goal of telling the story of entrepreneurship of today hoping it would be a fraction of someone's future.

Marina Dabic, Vojko Potocan

CHAPTER 1

Marina Dabic[1], Vojko Potocan[2]

How to Improve Innovativeness of Entrepreneurship

"The innovation point is the pivotal moment when talented and motivated people seek the opportunity to act on their ideas and dreams."
W. Arthur Porter

Abstract
From the ancient times innovation and entrepreneurship have fostered growth and have improved quality of life. Researchers are trying to find the best model to explain innovative clustering and the way how to improve innovativeness of the firm and the value chain. Global competition has put investment in R&D and technology in focus. Small countries are attempting to increase their investment in knowledge, which is reflected in an increasing number of entrepreneurs and openness of the economy. The time period form invention to market implementation has shrunk considerably and a systematic approach to the theory of innovations has been introduced. If we want to transform boundaries, we should build networks and foster innovation culture.

Keywords: *Model of innovation, Entrepreneurship, R&D, European Union.*

We are living in a fickle world of systematic turbulences characterised by swift dramatic changes. This is also a world of great opportunities. Through permanent changes and confrontations with countless antitheses, the inherently conflicting development of contemporary societies coerces governments, individuals and enterprises to take the extreme opposing positions with a number of fluid transitions. One group comprises prudent voices that recognise the "crisis curse" which is introduced into their activities by development and which tears the existing systems and ideologies and probes the notion of future as well as their own personal existences. The other group is made up of optimistic voices that even in the fiercest of crises see opportunities for change and progress. Having transformed the fascination with the future and its implicit contradictions into personal professional challenge (and the awareness of implicit contradictions it carries along) and a quest for developmental limitations, they have not been able to shun emersion into the complexity of issues enhanced by innovative development based on knowledge accumulation and its transformation into capital which was defined by Schumpeter as the key challenge and undertaking of the economic theory as far back as at the turn of the century (Schumpeter, 1934, 1939). Entrepreneurship and innovations have facilitated introducing changes into our lives

as well as participating in the society that is entitled to expectations and that needs us. The answer to questions, such as how to protect oneself from ignorance, from knowledge obsolescence, from harmful activities of the ignorants, lies somewhere between innovation and entrepreneurship.

The 21st century is the age of knowledge and information, the age characterised by the capacity to regenerate, develop, employ and protect new and innovative ideas, which particularly comes into play with those industries that base their competitive advantages on advanced technologies. Under the said impacts sciences 'change'; information, innovation and time have become the new factors of development, thus positioning themselves as the source of competitive advantage in a society that depends on the quality of people, their education and creative potentials. Knowledge transfer attainable today by innovation transfer is exceptionally significant for overcoming the development and technology gap. The development of electronic technologies shifts the knowledge gravity centre from manufacturing processes and products to management, information processing and to the development of artificial intelligence. Over two thirds of the total scientific insights the mankind has at disposal have been created since the first electronic computer was manufactured. The first economic revolution promoted the worker as its holder, the second technological revolution brings to light the expert, while the third technological revolution endorses the computer technician/IT expert as the promoter of development in the area of electronics, microprocessors and telematics. The emerging initial phase of the fourth technological revolution, which is symbolized by fotonics, atom fusion, biochip, artificial raw materials, and artificial intelligence, will highlight innovators and great investments that will result in opening up many new areas of human activity.

Real knowledge accumulation processes and the related diversifications of innovation have inexorably led to dislocating the paradigms firstly in the entrepreneurs' consciousnesses and then in the governing administrative structures. The growth of 'strategic' and 'entrepreneurial' thinking is marked by the synthesis of experience and many relevant data from the market. The basic assumption is that knowledge is composed of two components: that which can be codified and that which is tacit. The former comprises information, a patented blueprint, innovation and other coded knowledge. The latter is implied and involves skills, routine, and procedures arising from the learning process (people and their knowledge and experience) that yet needs to be created and enriched. Consequently, knowledge is both contextual and independent, i.e. enterprises have equal capabilities for transforming that knowledge into production capacities.

Time continuity of entrepreneurship, as well as Schumpeterian (1934) and Veblenian theoretic thoughts (Veblen, 1899) which are significantly founded on researching innovation or technological development as the inventive importance of past experiences, are the starting point for the present day acumen of the value of innovation and entrepreneurship. That is what differentiates the long run high-performers from the low-performing and even unsuccessful enterprises – thus paving the way to accepting new tasks. To connect and intertwine the attracting parts or to adapt the existing components of an already created artistry with the aim to make a new achievement or to redesign the existing task with the aim to raise efficiencies while realising it all at lower cost – all that is just a part of the many challenges entrepreneurs are faced with.

Capitalist economies force business enterprises to innovate or die by establishing a competitive marketplace in which the prime weapon of competition is not price but innovation (Baumol, 2002, p. 4). The European Commission on innovation defines innovation as "the successful production, assimilation and exploitation of novelty in the economic and social spheres". In order to identify the innovative models an innovation hyper cube model is used as a form of innovation clustering, particularly within the system/chain of values which are thus reinterpreted as innovation systems/chains of values. The innovation hyper cube (Afuah & Bahram, 1992) is based on frequent categorisation of innovation as a) radical b) incremental, c) architectural modular and d) innovation niches founded on effects they have on competences, other products and investment decisions of the innovating entity. This breakdown is usually appended by another division into (1) productive (object) and (2) process innovation. In addition, it is necessary to differentiate

(1) macro innovation, (2) fundamental innovation and (3) improvement innovation as the foothold for differentiating between macro and incremental innovations, between fundamental and improvement innovations, between product and process innovations, and, finally, between technology and cosmetic innovations. The hyper cube innovation concept is mostly applied to products, and is particularly effective when analysing more complex products which generate positive network externalities.

There are four possible explanations for the growing role of R&D or technology: the global competition hypothesis, the crisis and recession hypothesis, the search for new insights and the sustainable progress hypothesis. If crisis is the indicator of the requirements for larger changes in constituting the existing production system, then the increased investment in R&D can be understood as an attempt to fundamentally regenerate the existing 'crisis-ridden' production system. It is noteworthy to observe that the commercialisation period of a discovery has been getting shorter and shorter up to the present moment. However, this approach is subject to serious objections. Namely, many of the existing technologies' makeup represent complex combinations of science and technology, which makes the possibility to discover the 'source' of the first discovery increasingly difficult and remote. Moreover, one technology leads to another down the path usually identified as 'the avalanche effect'. This is linked to the fact that corporations have been undertaking a growing share of total investigations, thus significantly reducing the time span between invention and commercialisation by internalising R&D processes. Kondratiev's and Schumpeter's long economic cycles confirm that, as well as Vernon's assumptions of the existence of lifecycles in the whole technical system. Transitions from the existing to the new, with the increased investments into R&D, are mainly funnelled into developing the technologies that are of essential significance for the new (resulting) technological system (Fukuda &Watanabe, 2008).

The global economic entity is part of the world characterised by insecurity, complexity and velocity of changes and by reduction of the time span required for the (a) discovery of a fundamental process to be implemented and commercialised – the process (is) becoming a foothold of 'sustainable development'. It took 120 years to implement the understanding of the physical phenomena in photography, 65 years to harness electrical energy, 56 years for the telephone to be widely used, 32 years for the radio, 18 for the X-ray, 12 years for the TV sets, 12 years for the radar, 10 years for the nuclear reactor and Human Genome Project (Constable & Somerville, 2003), 5 years for the IBM researcher Benoit Mandelbrot to conceive fractal geometry – the concept that seemingly irregular shapes can have identical structure at all scales and which makes it possible to describe mathematically the kinds of irregularities existing in the nature. Fractals later made a great impact on engineering, economics, metallurgy, art and health sciences, and are also applied in the field of computer graphics and animation. A systematic approach introduces new elements into the theory of innovation as there is no longer a *unified knowledge base for many key technologies*. In other words, technologies are developed as 'systems built by system builders' (product manufacturers are turned into system managers whose competencies are mostly reliant on the ability to specify the different inputs); while enterprises are limited by their own knowledge horizons, their *areas of current or technological skills and knowledge constrained by experience and resources intended for research.* Innovation is the factor influencing the majority of development aspects of an enterprise, and its impact should be respected in all phases of the strategic process in an enterprise (creation, implementation, control). The impact of innovation is essential for strategic orientation, as well as in the period of implementing strategic segmentation, i.e. when strategic business units are identified and installed. True competitive advantage can only be gained if the focus is placed on developing never-before-seen products which provide consumers with completely new perceived benefits.

More often than not, however, innovation translates into two types of products:

- enhanced versions of existing products (»me-too products«) and
- products based on fashionable trends, such as »natural« products, »single-serving« sizes, trendy colours and popular flavours.

Likewise, innovation makes an impact on the values adhered to by given groups in an enterprise and eventually on the entire corporate culture as well as on the key forces that form the competition structure. These innovations become prominent as the obvious significance factor in moulding an enterprise's competitive advantage. The technology and innovation base, and particularly innovative competencies as a part of an enterprise's carrying competencies essential for its sustainability, growth and development, play the most radical role in those enterprises whose developmental momentum is explicitly based on innovative trajectory and whose development strategy is identified by innovative technology clusters. Thus, innovation influences the whole environment of business operations.

As enterprises/entrepreneurs are the primary carriers of innovative processes in an economy it is apparent that the process of their reconstitution (resource recombination) is of crucial importance for the reconstruction of innovative activities in transitional countries in particular as well as in the EU in order to keep developmental pace with Japan, Asian tigers and the USA (Christensen & Raynor, 2003; Christensen & Lundvall, 2004; Dan, Chieh Hang, 2011; Linton, 2009; Lorenz & Lundvall, 2006; Lundvall et. al 2006; Kirchhoff, 1991). That is why in the very world which constantly assesses and evaluates their work neither entrepreneurs nor innovators can afford to stop learning for they may lose their edge – without upgrading their power weakens. The nature of the future job will be determined by innovators and the speed by which a society is ready to proceed and make further discoveries, to learn and use the acquired knowledge to transmit visions and values. Interdisciplinary and multidisciplinary cooperation in diverse professions is an important factor of development, labour and operations. Education is the basic support for becoming part of the new "learning generation" that will primarily be determined by a knowledge oriented culture that permanently incites and rewards both innovations and achievements as well as the entrepreneurs. The notion of the national innovation system has been defined as "the cluster of institutions, policies, and practices that determine an industry or nation's capacity to generate and apply innovations" (Steil et al., 2002, p. 3). Two new recommendations for economic development have emerged recently: new age founded on ancient eastern wisdoms, or humanisation based on neglected European traditions. The differences between them are negligible if we focus on the common premise: improvement of the quality of living through innovation and entrepreneurial activity that implements it. The importance of technologies and technological advancement can be illustrated by the trends in financing R&D, from financing at the national levels, to financing of the so-called industrial R&D that reflects an enterprise's allocations to R&D. The research community has strenuously advocated for the maximum funding allocations to scientific research. The linear model of innovation and its progeny go so far as to suggest that all downstream socio-economic value from development and production is determined by the level of funding for research and by purposeful R&D for creating appropriate disruptive technologies to address such high-growth but price-sensitive growth markets (Lindsay & Hopkins, 2010). Two models of technology trayectories can be singled out: (i) linear scientific-push model and (ii) the Abernathy-Utterback cycle of product-process. Even though the power of the market demand to convert R&D into socio-economic benefits is widely recognized, innovation theories and models continue to be governed by "supply push" thinking (Godin & Lane, 2011).

The speed-up tendency of allocation to R&D seems to be indisputable, which is evident from the fact that the Japanese firms allocate relatively superior resources to the said assignments in comparison to the American and European firms, and that their structure and composition seem to be much more adapted to generating and commercialisation of the new R&D outcomes than is the case in the so-called transitional countries. Europe 2020 strategy has been proclaimed as Europe's growth strategy by EU heads of state and government (Lundvall et al., 2003). It is regarded as a comprehensive response to the challenges Europe is facing. Boosting innovation, research and development through the Innovation Union flagship is one of the targets of Europe 2020. It is emphasised that Europe needs to increase its ability to convert good research into innovative products and services that respond to market demands. Most recent reports reveal that the European Commission is meeting its objectives when it comes to research funding for Small- and Medium Enterprises (SMEs). SMEs stand to receive 15.3% (€2.4 billion) of the €16.3 billion allocated so far under the Cooperation part of the Seventh Framework Programme (FP7). The figures override the goal of 15% established by the European Parliament and European Council. SME funding under the Cooperation Programme is expected to remain above 15% for the rest

of FP7, which means that SMEs will receive at least €4.8 billion of the €32 billion available under the Cooperation programme. On the whole, approximately €7 billion of the FP7 budget of €55 billion should be granted to ca 17,000 SMEs (http://europa.eu/legislation_summaries/other/n26021_en.htm).

The key role in facilitating innovation, developing innovation cultures and strengthening the research capacities of the Euroregion lies in the hands of people, their knowledge, skills and entrepreneurial spirit, i.e. in the human capital. If the future belongs to those who are able to transform boundaries, then the participants in these communities of practice may represent the leadership of tomorrow.

Endnotes

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CHAPTER 2

Juan A. Martínez-Román[1], Francisco Liñán[2]

Ranking the Innovative Behavior of Firms: The Case of Low-tech Local Economies

Abstract

This research aims at developing an analytical approach to improve our knowledge of the characteristics of innovative firms. This knowledge will be especially beneficial for application in areas with lower levels of technological development, where traditional R&D indicators are of little use. In this vein, this chapter presents a model of innovative behavior of firms consistent with the interactive approaches to innovation. Results suggest the existence of a strong hierarchy of firms in this territory that favor an interactive approach to their innovation. This distinction is based on what may be called "the pyramid of innovative behavior", which is based on three elements: Quality, Innovative Capability, and Customers (QUICC). The model presented, the findings and the resulting typology provide useful guiding principles for decision making both in regional economic policy and in business strategy. When applied to Seville (Southern Spain), Quality, Innovative Capability, and orientation to Customers are found to be the key variables that single them out.

Keywords: *Innovation, Innovative behavior, Innovative capability.*

Introduction

The Knowledge-based Economy is set to become the new paradigm of economic development in the new century. Within this framework, innovation — the process of knowledge enhancement — is the main source of competitive advantage for countries. The belief in the importance and the immanent unfolding of the Knowledge-based Economy is widely held among the academic and institutional worlds, and recent evolution of trends in the world economy tends to endorse this view. Similarly, there has also been a considerable impact of this global scenario on the competitiveness of local business communities around the world. This has raised the importance of innovation within the firm, to make it the basis of the competitive strategy of the most successful and better-prospect firms. In this context, the European Union has established innovation as a key driving element in its declared policy, and is the backbone of all policies related to economic development. Several European and national programs have been implemented with the ambitious goal of not only contributing to improve R & D & I outcomes, but also of seeking to achieve a genuine change in the pattern of economic development of the territories that make up the European Union.

Nevertheless, innovation is a complex concept and not easy to comprehend. Several different behaviors may qualify as innovative. However, there is no direct linear relationship between resources devoted to innovation, or behaviors performed, and actual results obtained. This is of high concern for policy-makers, which would like to find a way to assess the effectiveness of promotional measures. Therefore, the design of policies to encourage innovation requires the prior development of measurement instruments and an analysis of the initial situation. Similarly, the components that make up the innovation system and, especially, the innovative company as the main innovating agent also need to be studied.

The need for a better understanding of innovation in the region has been highlighted in a recent report by the European Commission (European Commission, 2009). This study shows that innovation is the key factor in reducing the negative effects of the current economic crisis in the European regions. It also highlights the gap in the yield of innovation between some of these regions and stresses the need for policies to reflect regional contexts to improve the performance of the lagging economies. It concludes by stating that »understanding the sources and patterns of innovative activity in the economy is fundamental to develop better policies« (European Commission, 2009, p. 6).

In spite of this, there is a lack of empirical instruments and tools that allow measurement and thus provide a deeper understanding of the working of innovative firms. The current view of innovation demands instruments to fully gauge the complexity of innovation rather than simply assessing the inputs to encourage innovation and the outputs of innovation-boosting actions. In particular, if these simple methods are applied in traditional non-technological regional economies, the absence of large firms with in-company R&D expenditures may lead to the conclusions that there is no innovation at all in these economies. In contrast, the assessment of the firms' innovative behavior is a valid solution, consistent with the interactive approach as shown in the literature. However, it has hardly been used in empirical research due to the practical impediments associated with this type of measurement.

The purpose of this research is to contribute to the development of an analytical approach and to reach a better understanding of the innovative firm. In particular, the methodology developed here should be useful to study SMEs in low-technology sectors and economies. In this study the methodology being developed is used to describe and classify the innovative performance of SMEs in the province of Seville, a local low-technology economy in southern Spain. To do this, a conceptual model for the innovative behavior of firms has been developed, based on three categories of variables: innovative capability, contextual factors, and competitive environment. This model exhibits a considerable explanatory power when applied to identify the most significant features of highly innovative companies in our sample. Although the general applicability of these results is yet to be proven, we are confident the model and methodology may be adapted to the study of innovative behavior in other local/micro-regional economies. Finally, our study has permitted the drawing of conclusions about the promotion of innovative activity in the province of Seville.

After this introduction, the chapter contains five more sections. The background section below identifies relevant theoretical contributions in the field. The third section presents the conceptual model being used. Section four describes the empirical analysis and the results obtained. The fifth section discusses the key variables differentiating firms' innovation level. The chapter ends by summarizing the most important conclusions derived in section six.

Background

The important role of innovation in the knowledge economy has created a growing interest in parallel of the (workings of the) innovative company. Schumpeterian theory attributes to companies the ability to transform the economy by generating innovations, placing these firms at the core of the innovation process (Schumpeter, 1934). Neo-Schumpeterian economists stress the great influence of the innovative activity of enterprises on the aggregate level of innovation in the economy. Thus, they call for greater attention to be paid to the process of business innovation.

Within this line of research, evolutionism explains the economic processes of generation and dissemination of innovations through the relationships between the productive and the institutional structures (Freeman, 1982). In this sense, it emphasizes the relevance of the innovative firm in both economic processes and stresses the need to further improve scientific knowledge about this type of organization (Freeman, 1982; Nelson & Winter, 1982).

A major contribution of evolutionism to microeconomic analysis is the interactive approach, the foundation of the current view on innovation. In this approach, innovation is conceived as a complex process based on routines and on organizational learning in all functional areas. This process is subject to business decisions and is context-dependent (Kline, 1985; Nelson & Winter, 1982; Rothwell & Gardiner, 1985). Innovation cannot be determined only by R&D intensity (of spending and activity) in a specific department. Similarly, traditional indicators related to research activities, such as spending on R&D, as proposed by the classical or linear approach, are not enough either. By contrast, innovation appears as the result of an organizational capability that is manifested in the satisfactory synchronization of functions located in different areas of the company. The nexus between these functions is the creation and transmission of organizational knowledge. These assumptions bring the scientific analysis closer to the actual phenomenon. Besides, they involve a comprehensive study of innovation, thus enabling the analysis of non-technological innovation, which has been considered so important for the competitiveness of companies and economies (OECD, 2005). This new approach lays the groundwork for a much better understanding of business innovation in all kinds of organizations. If this approach has not been sufficiently explored in empirical research before, it is undoubtedly due to the practical difficulties involved in its implementation.

Innovation is an activity integral to the company, with deep strategic and organizational implications (Abernathy & Clark, 1985; Arend, 1999; Drazin & Schoonhoven, 1996; Kline, 1985). This goes beyond the current linear perspective, in which R&D is the origin (input) of a sequential process that engages different functional areas to conclude with the successful introduction of the innovation (output). The interactive approach, in turn, requires an analysis of the internal transformation process generating the innovative output. To achieve this goal we must focus on organizational behavior (Nelson & Winter, 1982; Schumpeter, 1976; Wakelin 1998). Despite a certain amount of theoretical consensus on the usefulness of this interactive approach towards innovation, very few empirical studies have actually applied it in practice. Several studies have made significant progress in characterizing innovative companies. However, they are mostly based on the traditional indicators of inputs and outputs related to technological innovation (R&D expenditure, number of patents, etc.). In contrast, very little research considers other variables related to the internal transformation process (Buesa & Molero, 1998; Furman et al., 2002).

The limitations of the linear approach are more evident when the context is dominated by small production units and non-industrial activities, with very little (or no) R&D expenditure. This is the case of the majority of the regions in Europe. In particular, in the case of Spain, only the most advanced regions (Madrid, Catalonia, Navarra, Basque country, and Valencia, out of 17 regions overall) would be the exceptions. The rest of the country may be considered as low-tech local economies, where the traditional linear view is of no use. In this sense, the province of Seville, with 1.9 million inhabitants, is one clear example of low-tech economy. Seville is the capital city of Andalusia, one of the most backward regions in Spain. Income per capita is around 75% of the national average, and the industrial sector represents less than 10% of the economy. Traditional activities dominate its economy. For instance, tourism and construction represent nearly 30% of total GDP. It is evident that innovative companies in the region cannot be identified by their R&D expenditure. For just such situations this paper is establishing the applicability of an interactive approach to characterise the innovative behavior of firms in a low-tech local economy.

Measuring behavior is not easy in general and even less so at the aggregate level for a very diverse set of businesses. The innovative behavior is a complex and cumulative process, conditioned by internal and external factors which are difficult to assess in practice. But, at the same time, it is also a major explanatory factor of the firm's innovative

trajectory (Caloghirou et al., 2004; Galende & De la Fuente, 2003; Romijn & Albaladejo, 2002). One of the major drivers of this behavior is the innovative capability (Amit & Schoemaker, 1993; Baden-Fuller & Pitt, 1996; Boynton & Victor, 1991; Cohen & Levinthal, 1990; Koschatzky, 1998; Prahalad & Hamel, 1990; Roussel et al., 1991). To build this capability, the organization must adapt to the needs of the innovation process (Mintzberg, 1990; Nonaka & Takeuchi, 1995). Therefore, any feasible solution, to be consistent with the interactive approach, should seek to analyze the organization's innovative capability. Additionally, other variables related to the organizational context and to the environment may also play a relevant role, as highlighted by the literature. The procedure followed in this chapter deals with innovative capability, contextual factors, and competitive environment as the three sets of relevant variables.

Conceptual Model

As indicated above, the present analysis of innovative behavior will be based on a conceptual model characterized by three categories of explanatory variables: innovation capability (the essential core element of innovative behavior), contextual factors, and competitive environment. Figure 1 is a representation of the model used in this study.

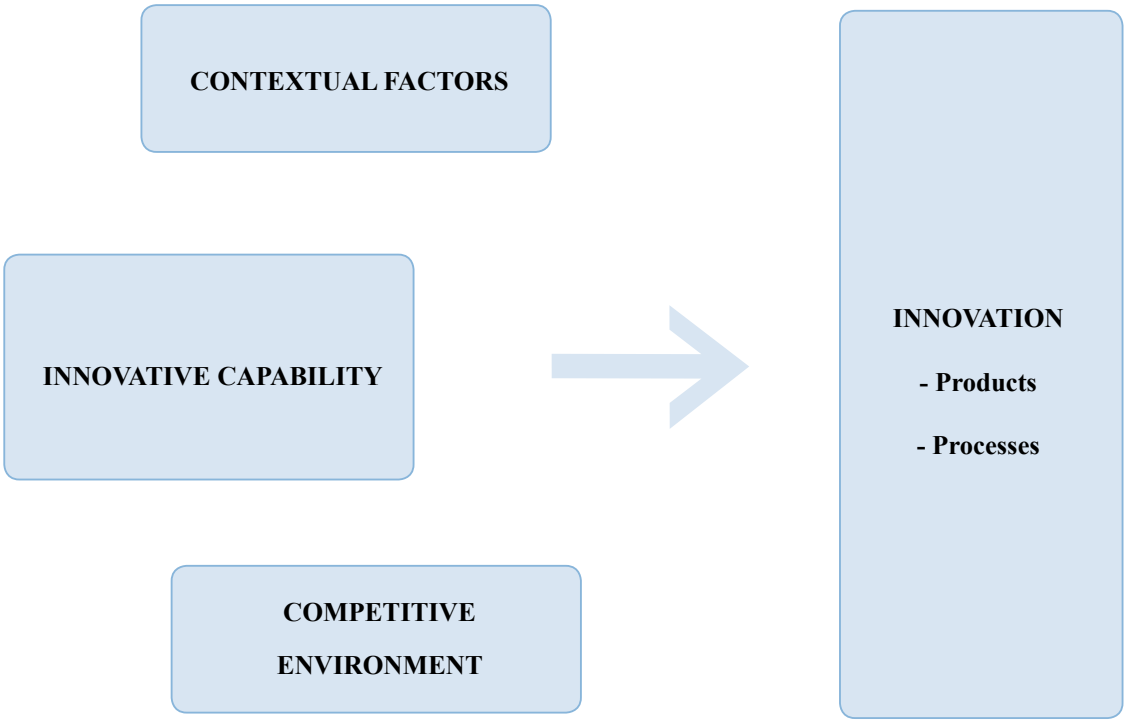

Figure 1. Conceptual Model.

The innovative capability is the central basis of the proposed model. However, it is a multidimensional variable comprised of several different elements within the company. The contributions of Baden-Fuller and Pitt (1996) and Nueno (1998) suggest the existence of three basic dimensions of the innovative capability concept. *Knowledge* (is the first of them) since assimilation of available technologies or imitation of competitors require a sufficiently wide knowledge base for innovation to follow. Secondly, the *Organization* should be mentioned, since an organizational structure suited to the functional needs of the innovation process is needed. And the third key element is the *Human Factor*: the management style, training and attitude of staff and organizational culture, all of them may notably condition

the company's innovative activity. This simple scheme constitutes a synthesis of the vast literature on the subject. It will, thus, serve to identify a number of basic categories of explanatory variables associated with each dimension. Along these three dimensions, a number of variables related to innovation management in enterprises have also been considered (Hurley & Hult, 1998; Russel, 1990).

The different studies about the innovation patterns in the territory/region have led to the inclusion — together with the innovative capability — of two additional sets of explanatory variables. The first of them relates to the characteristics of the context in which the company operates (Buesa & Molero, 1998; Furman et al., 2002; Galende & De la Fuente, 2003). These would include structural variables (age, size, branch of activity, sources of finance), innovative strategy (knowledge base, R&D effort, mode of knowledge appropriation), and competitive strategy (cooperation and internationalization). The second set of variables relates to the environment (level of rivalry, institutional support). In this sense, the major categories of variables proposed in the model are described with greater detail below:

Innovative capability. Empirical evidence confirms the association between innovative output and certain variables related to the creation and appropriation of organizational knowledge. Thus, the *incorporation of new members* into the organization is an important variable as an external source of knowledge for innovation (Cohen & Levinthal, 1990; Feldman, 1995; Nonaka & Takeuchi, 1995). Other variables related to internal organizational knowledge creation, such as *learning and training processes* (Damanpour, 1991; Hull & Covin, 2010; Nonaka & Takeuchi, 1995; Davenport & Prusak, 1998; Freel, 2005) and *research and development* activities (Furman et al., 2002; OECD, 2005; Puranam et al., 2009; Quintana & Benavides, 2008; Romijn & Albaladejo, 2002), have also been identified as directly influencing innovation.

The literature provides several contributions supporting the existence of a relationship between innovation and both human resources and organizational culture of companies. Thus, a number of variables empirically associated with innovative performance have been identified, such as training and attitude of staff, the promotion and rewards criteria and risk taking[3]. This also applies to other variables that characterize the management and organization styles of enterprises, such as autonomy (level of decentralization), *linking and communication devices* (*working groups*), the *power of the hierarchy* (*level of supervision and control*) and *market focus*[4].

Contextual factors. *Age* and *size* are basic descriptors with a strong relation to innovation, especially with regard to size (Buesa & Molero, 1998a; Schumpeter, 1934). Other contextual factors are also associated with innovation in the literature. These include financial resources (Furman et al., 2002). Research has indicated the existence of a positive association between *self-financing* and innovative behaviors and outcomes (Galende & De la Fuente, 2003). On the other hand, results have not been equally conclusive for *external financing* (Giudici % Paleari, 2000). *Inter-firm cooperation* (Dodgson & Rothwell, 1994; Jarrillo, 1988; Tsai, 2001) and *quality* (Cho & Pucik, 2005; Cooper & Kleinschmidt, 1987; Rucci et al., 1998) are additional contextual factors which have frequently been empirically related to innovation as well.

Competitive environment. Specific environmental characteristics, and in particular market conditions, have shown a clear effect on the innovative activity and intensity of companies (de Caloghirou et al., 2004; Romijn & Albaladejo, 2002; Yam et al., 2011). The *dynamism of competitors and level of competition* (Nelson & Winter, 1982; Pavitt, 1984; Abernathy & Clark; 1985; Dosi et al., 1990; Mintzberg, 1979; Malerba & Orsenigo, 1995), together with *institutional support* (Acs et al., 1992; Edquist, 1997; Furman et al., 2002; Koschatzky, 1998) are contextual variables related to innovation which has been tested in empirical research.

The analysis of these three groups of variables promises to explain not only the amount of innovative activities and outcomes, but also the kind of innovative process undertaken by each individual company.

Innovative Performance. (About innovation in products and processes). The intensity of innovation may be assessed/gauged through the radicalism of novelties. In this sense, some authors consider disruptive or breaking new knowledge as the essence of innovation (Schumpeter, 1934; Nonaka & Takeuchi, 1995; Baden-Fuller & Pitt, 1996; Wakelin, 1998). Therefore, in the present study, the innovative radicalism of the firm is to be assessed in its specific environment, and by screening all the functional areas of the company (Romijn & Albaladejo, 2002).

Empirical Research

Data Collection

The literature indicates the need to study innovation at regional and local levels where there are significant economic and technological differences within a nation (Audretsch, 1998; Cooke et al., 1997; Porter & Stern, 2001). This is the case in Spain, where economic and technological inequalities between northern and southern regions of the country are evident. In our case, the empirical study was carried out in Seville, capital of Andalusia, the most important region in southern Spain. Andalusia displays a significant gap on innovative levels when compared with the national average and, especially, with regards to the country's most prosperous regions.

Data for this empirical study come from structured interviews with entrepreneurs and CEOs of 80 leading companies in the different productive sectors in the province of Seville. The firms were selected from a database of the Confederation of Seville's Businesses (Confederación Empresarial Sevillana, CES), the main employers' organization in the province. The companies were selected among the most important organizations in each sector, to help make this exploratory analysis adequately representative. In this way, the companies studied are those largely setting the market conditions and intensity of competition in their respective sectors. This type of approach is common in exploratory empirical studies contrasting hypotheses and trying to explain the innovative behavior of firms in specific contexts (Marcati et al., 2008; Martínez-Román et al., 2011; Montalvo, 2006).

When the sample is analyzed by sector (Table 1) we can see a greater presence of manufacturing firms in the sample when compared to the official business registry (DIRCE, 2004). This is by choice and has been done to accentuate the importance of this sector in the development of new technology and innovation. Meanwhile, the service sector participation in the data is smaller. The most widespread service activities in Seville (such as retail trade) are very weak in terms of innovation. Finally, agriculture, hunting and related services are activities not covered by official statistics (DIRCE, 2004), but included in the study due to its importance in the provincial economy. These activities have a relevant impact on the agricultural processing industry in the province, hence the positive difference that appears in Table 1.

As may be seen in Table 1, underrepresentation affects some specific activities and also certain size groups. In particular, Construction, Retail Trade and Land transport are clearly underrepresented in the sample. As indicated above, these are activities where innovation is relatively less important. The same may be said, to a lesser extent, of other service activities, such as real estate agents, education, recreational, cultural and sporting, and others; all of these are slightly underrepresented in the sample. On the other hand, the remaining activity branches are relatively overrepresented, but with small differences from DIRCE data. Only the branch "Other business services" presents a notably larger sample size.

If we consider size, it has been established that the innovative activity of small companies is lower and, even when they do innovate, the impact on the local and regional economies is weak (Buesa & Molero, 1998a). Therefore, the sample used here strongly under represents smaller companies. In particular, those with up to 5 employees are only 10% of the sample, whereas they are 76.7% of Seville companies according to official statistics (DIRCE). All other size groups are overrepresented in the sample, especially those having over 20 employees.

Table 1. Sample characteristics.

Productive sectors	DIRCE (1)	SAMPLE (2)	Difference (2)-(1)
Agriculture	0.00%	3.75%	3.75%
Manufacturing	10.04%	25.00%	14.96%
Construction	11.25%	6.25%	-5.00%
Services	78.71%	65.00%	-13.71%
Activities (NACE-93)*			
01 Agriculture, hunting and related services		3.75%	3.75%
15 Manufacture of food products and beverages	1.75%	3.75%	2.00%
18 Manufacture of wearing apparel and fur	0.50%	2.50%	2.00%
22 Publishing, printing and reproduction of recorded media	0.79%	3.75%	2.96%
24 Chemical industry	0.27%	2.50%	2.23%
27 Metallurgy	0.06%	1.25%	1.19%
28 Manufacture of metal products, except machinery and equipment	2.10%	3.75%	1.65%
29 manufacture of machinery and mechanical equipment	0.56%	1.25%	0.69%
30 Manufacture of office machinery and computers	0.07%	1.25%	1.18%
32 Manufacture of electronic, radio and TV equipment	0.03%	1.25%	1.22%
34 Manufacture of motor vehicles and trailers	0.08%	1.25%	1.17%
36 Manufacture of furniture, other related industries	1.16%	1.25%	0.09%
37 Recycling	0.00%	1.25%	1.25%
45 Construction	11.25%	6.25%	-5.00%
50 Sale, maintenance and repair of vehicles	4.10%	5.00%	0.90%
51 Wholesale trade, except motor vehicles	8.40%	11.25%	2.85%
52 Retail trade, except motor vehicles	21.57%	5.00%	-16.57%
55 Hotels and restaurants	9.07%	10.00%	0.93%
60 Land transport, transport via pipelines	5.33%	1.25%	-4.08%
63 auxiliary transport activities; travel agencies	1.15%	2.50%	1.35%
64 Post and telecommunications	0.31%	2.50%	2.19%
67 Activities auxiliary to financial intermediation	0.94%	1.25%	0.31%
70 Real estate activities	3.22%	2.50%	-0.72%
72 Computer Services	0.70%	3.75%	3.05%
73 Research and development	0.13%	1.25%	1.12%
74 Other business services	8.94%	15.00%	6.06%
80 Education	2.50%	1.25%	-1.25%
92 Recreational, cultural and sporting activities	2.15%	1.25%	-0.90%
93 Other service activities	2.25%	1.25%	-1.00%
Firm size			
% firms from 1 to 5 employees	76.73%	10.00%	-66.73%
% firms from 6 to 9 employees	10.23%	16.25%	6.02%
% firms from 10 to 19 employees	7.56%	16.25%	8.69%
% firms from 20 to 49 employees	3.78%	21.25%	17.47%
% firms from 50 to 99 employees	0.99%	21.25%	20.26%
% firms with 100 or more employees	0.72%	15.00%	14.28%

** NACE= European classification of economic activities*

Finally, it may be mentioned that companies active at higher technology level are also overrepresented. These higher-technology firms represent 2.42% of total number of companies in Seville, according to DIRCE data. In contrast, the proportion of these companies in the sample represented 15.58%. In this way, data selection favored some of the most dynamic and innovative companies in the province.

Variables

Following the categorization derived in the theory section, a total of 33 explanatory variables were selected in this study. They are all listed in Table 2.

Table 2. Explanatory variables.

Categories			Description	Variables
Innovative Capability	Knowledge	Incorporation of new members	Change in workforce (previous 3 years, % total workforce)	ordinal
			Estimated change in the next 3 years (% total workforce)	ordinal
		Learning and training processes	Value of learning achieved through tasks: managers	ordinal
			Value of learning achieved through tasks: non-managers	ordinal
			Technological autonomy level of the company	ordinal
		Research and development activities	Total expenditure on R & D	%
			Possession of official patents (or pending registration)	dichotomous
	Human resources	Training and attitude of staff	% managers with university degree	ordinal
			% non-managers with university degree	ordinal
			Importance of intrinsic motivation in the workforce	ordinal
		Promotion and rewards criteria	Importance of creativity in the promotion / reward. managers	ordinal
			Importance of creativity in the promotion / reward. non-managers	ordinal
		Risk taking	Ability to assume failure of the innovation process	ordinal
	Organization	Autonomy (decentralization)	Decisional autonomy level of managers	ordinal
			Decisional autonomy level of non-managers	ordinal
		Linking and communication devices	Existence of specialized problem-solving groups	dichotomous
			Existence of permanent working groups	dichotomous
		Hierarchy power	Level of supervision and hierarchical control	ordinal
		Market focus	Degree of collaboration with key customers	ordinal

Contextual factors	Age	Number of years since its establishment	number
	Size	Number of employees	number
	Financing	Self-financing growth	ordinal
		Self-financing to reduce financial costs	ordinal
		Self-financing: importance in planning	ordinal
		Easiness of external financing (short term)	ordinal
		Easiness of external financing (middle term)	ordinal
		Easiness of external financing (long term)	ordinal
	Cooperation	Formal inter-firm cooperation agreements	dichotomous
	Quality	Possession of an official Quality certificate	dichotomous
Environment	Dynamism and competition levels	Level of competitive rivalry in the market	ordinal
		Expected evolution of the competitive rivalry	ordinal
		Fast competitive changes (complexity)	ordinal
	Institutional support	Support received from public bodies	ordinal

Similarly, the dependent variable (Innovation Construct) has been built as an aggregation of four indicators related to the radicalism of innovation in products and processes (see Table 3).

Table 3. Innovation intensity (degree of radicalism in products and processes).

Categories		**Description**	**Variables**
Innovation Construct	Product Innovation	Degree of radicalism in product innovation (previous 3 years)	ordinal
		Degree of radicalism in product innovation (expected next 3 years)	ordinal
	Process Innovation	Degree of radicalism in process innovation (previous 3 years)	ordinal
		Degree of radicalism in process innovation (expected next 3 years)	ordinal

To build the Innovation Construct, four independent variables have been included. Past innovation has been weighted twice as much as planned innovation. In this way, actual behavior is considered more important than planned behavior (which may or may not become a reality). Additionally, innovation in products is weighted double than innovation in processes, since this latter concept is more diffuse and there is more room for "wishful thinking" on the part of the interviewee.

Results

As indicated above, a linear regression analysis has been carried out. A previous examination of the skewness and kurtosis of the variables showed that in all cases the shape is reasonable and normality may be assumed. The only exceptions are age and size, where a log-normal distribution appears. For this reason, a logarithmic transformation has been performed in both cases. Similarly, no evidence of co linearity between the explanatory variables was found. The multiple linear regression fit for the 33 explanatory variables (with the reported logarithmic transformations) on the innovation construct (IC) yielded a R^2 of 0.556, with a p-value = 0.047 (Snedecor's F = 1.707, with 33 and 46 degrees of freedom). Thus, the proposed model is statistically validated.

The innovative behavior of firms is ranked by using the set of variables specified in the model. When applied to the sample of Seville companies, these 33 variables together explain 55% of the variance in the innovation construct. Nevertheless, since the dependent variable is the degree of radicalism of innovations, it may present to a different degree for each of the surveyed companies. For the purposes of this analysis, it is not sufficient to establish the overall explanatory power of the whole set of independent variables. A much more useful result would be the identification of key variables that explain (at least in this local economy) the differences in the degree of innovation of firms. This would allow the establishment of a company profile in each case.

The most salient differentiating features will depend largely on the degree of innovation that discriminates between innovative and non-innovative companies. In this sense, it is very difficult to identify an objective and preferred level of innovation. For this reason, firms in the survey have been ranked according to the value of the dependent variable (innovation construct). The designation of the relative level chosen must be supported by statistical criteria to ensure that the chosen categories are representative.

The methodology used in this work has been the formation of two groups of companies, the innovative and the non innovative, taking the more innovative p% as the first category, and the least innovative p% as the second category (percentiles p% and 100% -p%). The classification is carried out for all values p% = 1%, 2% ... 50%. For each of the resulting classification, the Student's t-test for mean differences has been applied to the 33 explanatory variables in the model. In this way, we have sequentially obtained the most significant differentiating variables for a greater number of classifications (p% values) (Martínez-Román et al., 2011).

The result of this process is reflected in Figure 2, where variables are represented by their maximum significance level in all percentiles. The vertical axis represents a value Z_0 such that the p-value equals the standard normal probability that $|Z| > Z_0$. Thus, for Z values > 1.96, p-value < 5% (significant); and if Z > 2.58, p-value < 1% (highly significant). As may be observed, there are 6 significant variables across all percentiles: Official Quality certificate, Risk Taking, Connection with main customers, Inter-firm cooperation, Specialized Groups in problem resolution, and Staff Growth in the past.

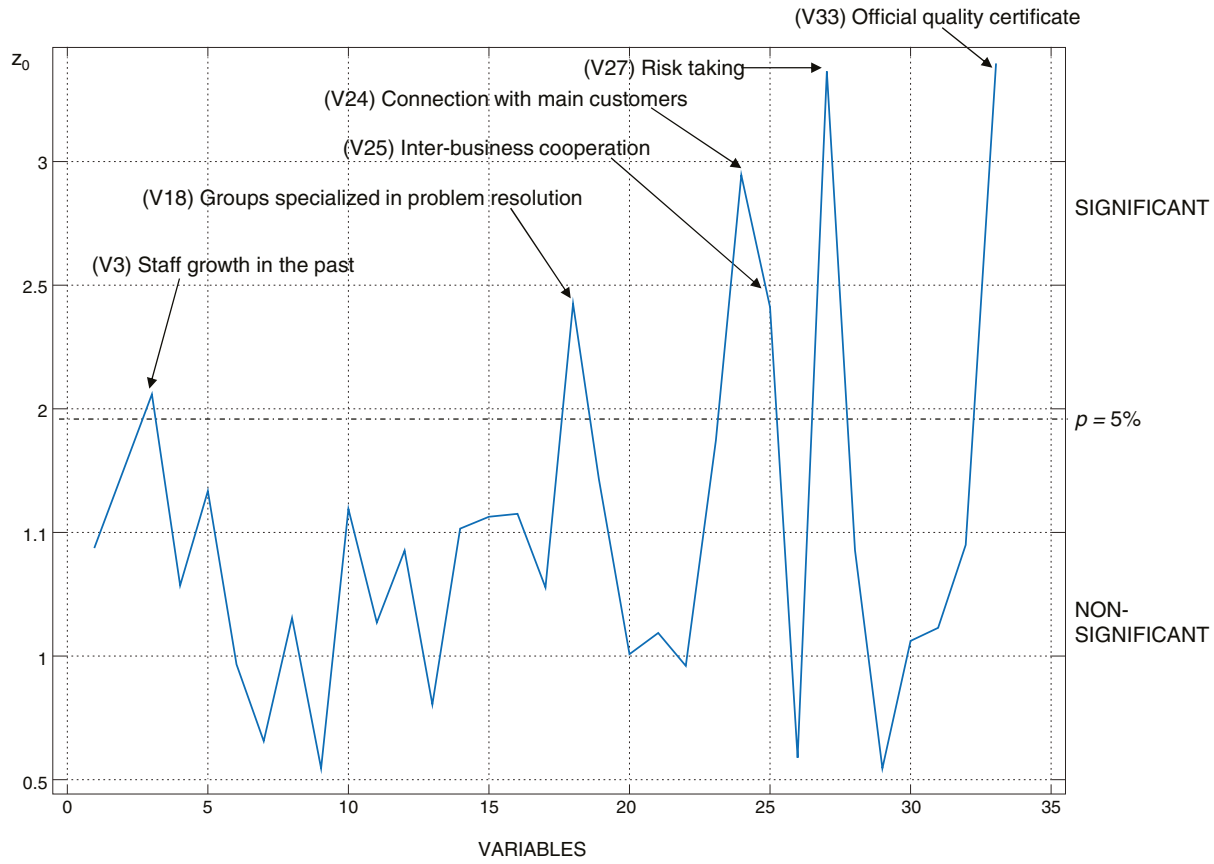

Figure 2. Most significant variables in all quintiles.

Adding for each percentile (1% ... 50%) the significance levels of all variables, it has been possible to distinguish between innovative and non-innovative groups of firms in the sample. The significant variables identified above exert the highest influence in distinguishing between innovative and non-innovative firms. The signs of the correlation coefficients will show the kind of influence these variables exert (direct *positive* or reversed *negative* influence). The total correlations of each of these significant variables of the linear model with the Innovation construct are as follows:

Official Quality certificate:	0.243
Risk Taking:	0.220
Connection with main customers:	0.017
Inter-firm cooperation:	-0.260
Specialized Groups in problem resolution:	-0.274
Staff Growth in the past:	-0.045

As may be seen, holding an Official Quality certificate and the ability to assume failure (risk taking) are both positively and moderately related to Innovation. Conversely, creating ad hoc groups for problem-solving or having signed formal cooperation agreements with other firms are both negatively and moderately related to innovation. Finally, although significant, the correlation of staff growth and connection with customers is small. In particular, when we classify innovative companies in three different levels, the most significant variables vary in each case (See Figure 3).

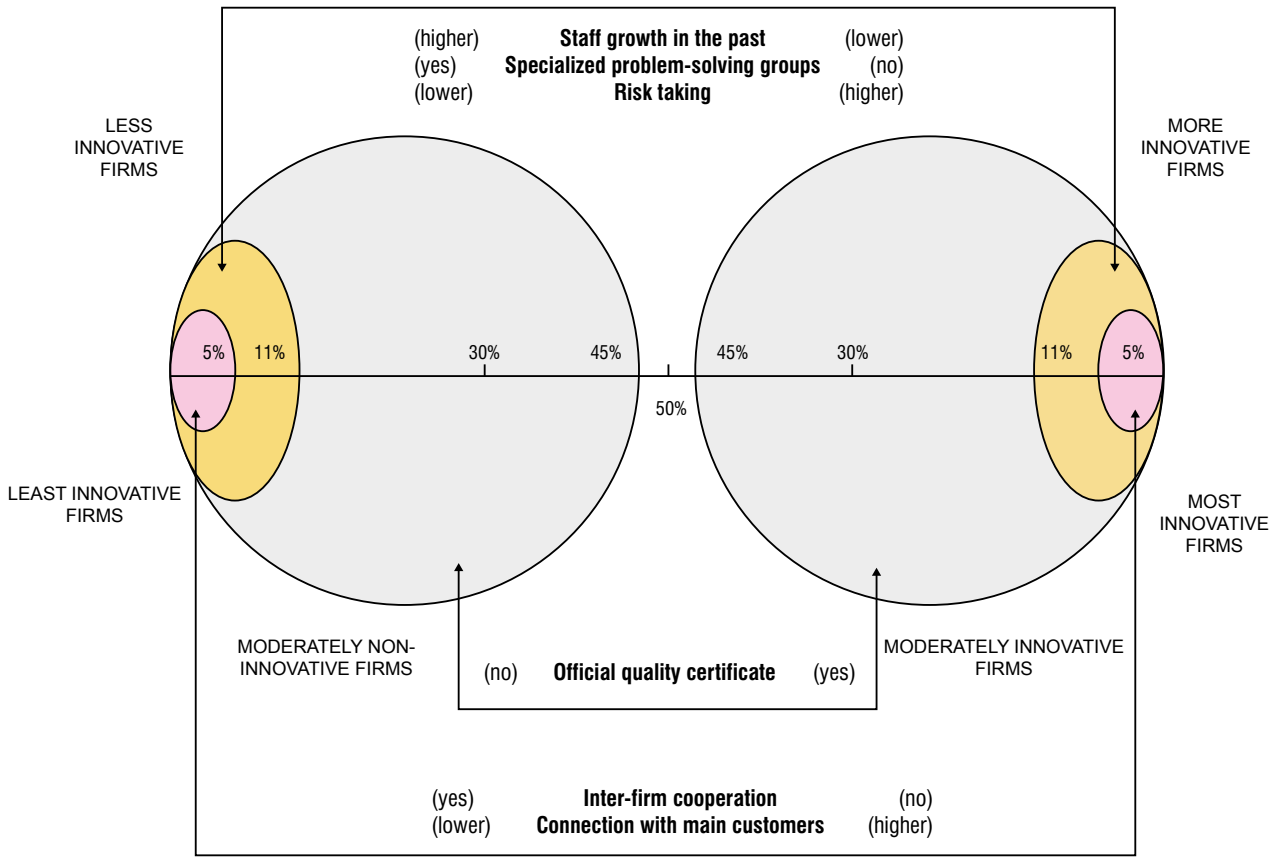

Figure 3. Innovative profiles of Seville firms.

Moderately innovative firms (between 30% and 45% of the sample, equivalent to 24-36 companies): the most significant classifying variable is the possession of an Official Quality Certificate, which has a positive sign.

More innovative companies (between 10% and 11% of sample, equivalent to 8-9 companies), display three significant variables: Staff Growth in the past, with a negative sign, Specialized problem-solving groups, also negative, and Risk taking, with a positive sign.

Very highly innovative firms (5% of sample, equivalent to 4 companies): Inter-firm cooperation is a significant variable with a negative sign, i.e. an inverse relationship occurs between innovation and cooperation. Most innovative companies (2.5% of the sample, equivalent to 2 companies): the most significant variable is Connection with main customers, with a positive sign, which means a direct relationship between connection and innovation.

Discussion

One of the characteristics of the methodology developed is offering insight into the process by which innovation is generated. It allows one to better understand what makes the difference in the level of innovativeness. The fact that we were able to apply the methodology successfully to the local economy of Seville has confirmed its usefulness. Thus, when different levels of innovation are considered, the key differentiating variables do change. This leads us to establish the following classification of companies:

Type I: moderately innovative vs. moderately non-innovative companies (30-45% at each end of the sample). Quality is the most significant feature to distinguish innovative from non-innovative companies. The results show that many more innovative companies hold an official quality certificate. Meanwhile, among non-innovative firms, this certification is usually absent. This positive relationship between quality and innovation may be due to several causes, and would deserve further research in the future. One possibility, with respect to process innovation, is that the quality certificate involves the adoption of specific rules and processes. This would favor internal communications, availability of organizational resources, provision of new technical solutions (in production, management, sales, etc.) and generate a dynamic process of continuous improvement in various functional areas of the organization. In the case of product innovation, the official quality certification may help reduce doubts and uncertainties of consumers towards the new products launched into the market. In both cases, it does not seem easy to achieve success in innovation without adopting quality systems in the enterprise.

Type II: more innovative vs. less innovative firms (10-11% at each end of the sample). The significant variables here refer to the importance of innovative capability as differentiating element. According to our model, the innovative capability was comprised of three categories of variables (knowledge, human resources and organization). It is interesting to note that one variable from each category are found to be significant here. Growth in staff over the past 3 years (knowledge category) displayed a negative relationship which suggests that the creation of new knowledge does not arise primarily from bringing in new qualified staff. The second significant variable is risk tolerance (human resources category). Managers and staff in more innovative firms deal with risk inherent in innovation. Since they are willing to take the risk, they take innovative decisions and produce innovative output (products and services). On the other hand, those companies in which the uncertainty and risk linked to innovation are considered untenable, do not innovate. Finally, the existence of specialized problem-solving groups (organization category) is negatively related to innovation. Rather these working groups seem to be effective in dealing with routine tasks but they do not lead to innovation—at least in Seville companies. In innovative companies, therefore, these non-routine decisions seem to be taken individually. Individual decisions provide flexibility, in many cases, but they are not without limitations. In particular, there are gaps in the flow of information when the staff is unaware of the reasons behind important decisions (Von Krogh et al., 1994; Nonaka and Takeuchi, 1995). In summary, it may be said that the move to a higher level of innovation is associated with the generation of innovative capability in enterprises.

Type III: most innovative vs. least innovative companies (2.5-5% at each end of the sample). The most innovative companies are characterized by the lack of formal cooperation agreements with other companies. On the other hand, they tend to collaborate closely with major customers in the development of innovations. In this latter case, it is probably an informal cooperation. This contact may be oriented to the participation of certain customers in the design, development and testing of new-product prototypes, which, more often than not, are inspired by ideas from the customers themselves. This collaboration facilitates adapting the innovation to the needs of customers. In this way, the time and cost of the trial and error phase is notably reduced. In contrast, least innovative companies have no such contacts with customers. Therefore, the customer is the main contributor to the innovative excellence of Seville companies. However, this situation may be a cause of vulnerability if it limits the autonomy of the company in the design of their innovation strategy.

Conclusion

This paper presents a diagnostic tool to analyze the foundations of innovative behavior, following the interactive approach to innovation. Although the literature stresses the need to understand organizational behavior to better explain the business innovation process, simplistic linear analyses remain dominant in empirical research. This paper tries to contribute to the search for a more feasible solution by proposing a model of innovative behavior based on the organizational bases of the innovative capability of enterprises. In this sense, a theoretical study of the different dimensions that would be generating that innovative capability has been carried out.

The theoretical model developed has been used in one specific low-tech local economy: the province of Seville in southern Spain. Since Seville is characterized by relatively low levels of innovation and technology development, traditional linear indicators (such as R&D expenditure) are of little or no use. The methodology has identified the most significant variables across all quantiles in this local economy; that is, the variables most often significant in distinguishing between innovative and non-innovative companies have been identified.

At the same time, results have also shown that, at least in Seville, up to three levels of innovative firms may be identified. The empirically derived profiles for these three groups suggest the existence of a conceptual scale of innovative behavior in Seville. Thus, each stage would involve higher innovative activity. At each level of innovative activity new organizational features are found that boosted the degree of innovation of the enterprises. Based on this research we can present a hierarchy of innovative behavior in Figure 4.

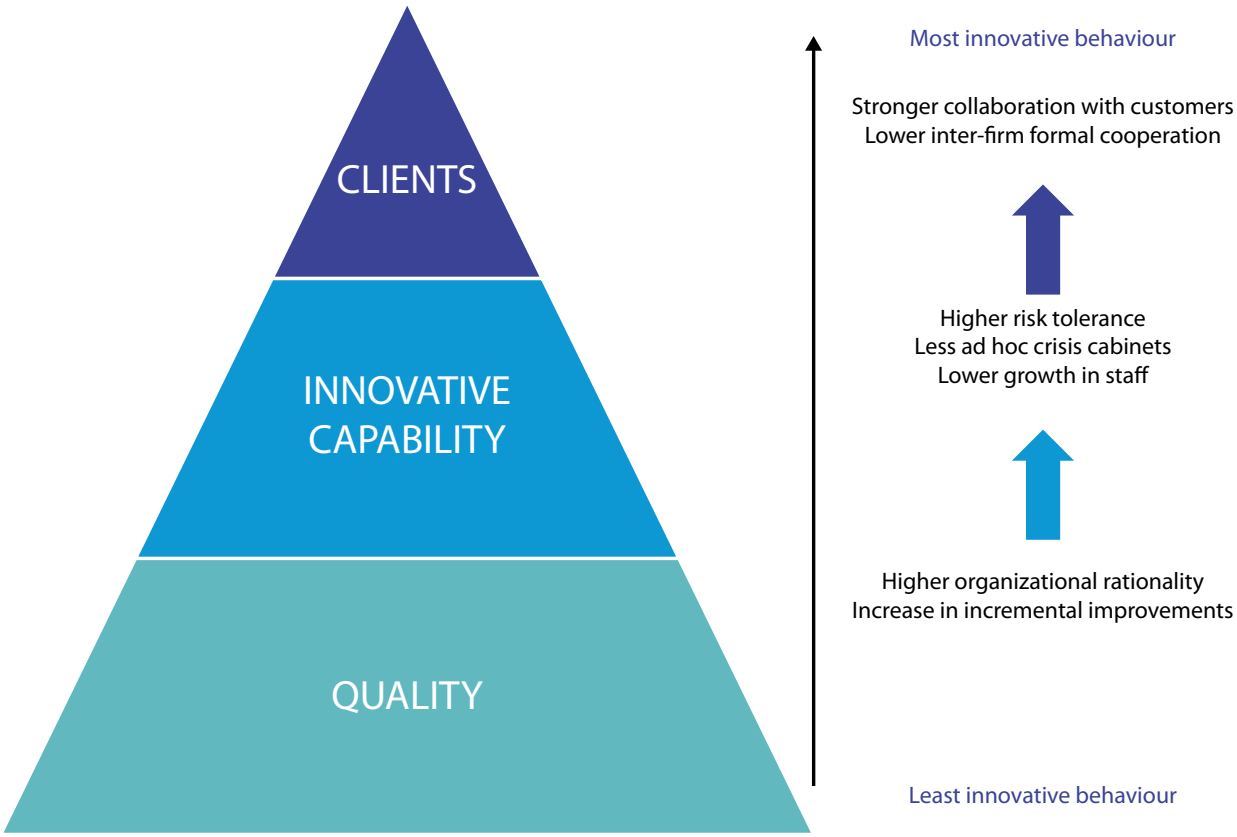

Figure 4. The pyramid of innovation.

As figure 4 suggests, a way to improve the innovative performance of a firm would be by gradually progressing upward through the three stages: **Qu**ality, **I**nnovative **C**apability, and **C**ustomers (QUICC). In this way, the successive overlap of the QUICC characteristics at each category over those of the previous level proceeds to improve the behavior and the innovative performance of firms.

In this empirical study, the classification of innovative companies carried out suggests Quality as the most representative feature at the first stage of the innovative behavior of firms. That is, the concern with quality in products and processes is the first key element that innovative companies do take into account, and would therefore be a basic requirement of innovative behavior. This concern about quality may be taken for granted in most advanced and high-tech economies, but in the case of low-tech local economies, it seems to be one very relevant stepping stone.

Firms reach the second level on this scale of innovativeness when they develop their actual innovative capability. In this sense, each of the representative characteristics of more innovative companies in the sample belongs to one of the basic dimensions that comprise the innovative capability (knowledge, human resources and organization). Therefore, this second stage of innovative behavior is indeed characterized by the ability to innovate.

The innovative apex is comprised of firms that, besides their concern for quality and their innovative capability, have also been able to interact appropriately with their environment. This "efficiency" towards their external environment is reflected in a closed connection with key customers in order to drive the innovation process further. In contrast, permanent cooperation agreements are avoided, probably to prevent knowledge leakage to potential competitors.

The hierarchy of innovative behavior thus developed, the QUICC model, is a useful tool for the design and implementation of innovation policies. In the case of Seville companies, the main measures suggested by the analysis are: support for obtaining the official quality certificates, innovative capability building, and outreach to key customers to make them co-participants in the innovative process of the company. Public decision-makers in industry and technology departments should help develop this behavior not only through specialized agents, subsidies or tax reductions, but also through raising of awareness.

Finally, the study offers new avenues of research. At the theoretical level, the results justify the study of the innovative enterprise in space via increasingly sophisticated models which may explore each of the dimensional axes and categories of innovativeness. Empirically, the model and methodology used here may be applied to other regions, thus making possible further comparative studies between different geographical areas or sectors.

Endnotes

[1] University of Seville, Spain

[2] University of Seville, Spain

[3] Several works may be cited with respect to training and attitude of staff (Damanpour, 1991; Freel, 2005; Hurley & Hult, 1998; Kroll & Schiller, 2010; Nonaka & Takeuchi, 1995; Pearce, 1993), to promotion and rewards criteria (Amabile, 1998; Chen & Yang, 2009; Mintzberg, 1979; Nonaka & Takeuchi, 1995) and also to risk taking (Hull & Covin, 2010; Hurley & Hult, 1998; Jaworski & Kohli, 1993; Mintzberg, 1979; Brockman & Morgan, 2003).

[4] With regards to the organization styles of enterprises, some relevant contribution about autonomy (level of decentralization) (Damanpour, 1991; Hull & Covin, 2010; Mintzberg, 1979; Nonaka & Takeuchi, 1995; Russell, 1990), linking and communication devices (working groups) (Brockman & Morgan, 2003; Cohen & Levinthal, 1990; Li & Kozhikode, 2009; Mintzberg, 1979), the power of the hierarchy (level of supervision and control) (Bulent & Seigyoung, 2010; Chandler et al., 2000; Mintzberg, 1990) and market focus (Hurley & Hult, 1998; Jaworski & Kohli, 1993; Kroll & Schiller, 2010), may be cited.

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CHAPTER 3

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Employee's Innovativeness and Personal Values: A Case of Slovenia

Abstract
This contribution deals with the impact of employees' personal values on their innovativeness. In that framework theoretical part deals with the role of innovativeness for business systems, the role of personal values for people's innovativeness and link between innovativeness and personal values. For personal values, assumed to have strongest impact on people's innovativeness, we outlined trends about their importance, based on observations at five different time periods. For that purpose we conducted a survey on a sample of employees in Slovenian business systems and business students as future employees. Based on outlined trends for both samples we discuss the state of selected values for both samples, important consequences of the state of values on level of innovativeness, recommendations for enhancing innovativeness through personal values, and possible future research.

Keywords: *Innovation, Innovativeness, Personal values, Values.*

Introduction

Economic and other development-related literature offers us a plethora of reasons why differences exist in country's development (Mulej, 1987; Svejnar, 2000). Based on GDP authors find that gap between least and most developed countries is becoming greater and greater, from 3:1 in 1870 to 500 :1 nowadays (Mulej, 1995; Mulej, 2007; Eurostat, 2009).

In management literature researchers consider innovations as a core pre-requisite for business systems (BSs) development and development on others levels (Bucar & Stare, 2002; Collins & Porras, 2002; Rogers, 2003; Gloor, 2006; Potocan & Mulej, 2007; Skarzyinski & Gibson, 2008; Nedelko, 2011). In Slovenian economy comparative analysis helps detect causes of their problems. But economic indicators explain less than 50 % of economic reality (Svejnar, 2000; Marangos, 2004) consequently we need to put our focus on subjective factors of businesses' working and behavior.

Considering the role and importance of BSs in society (i.e., microeconomic perspective), it is evident that the discrepancy is due to the lack of innovativeness on the level of society as a whole, in business systems and especially at individual level. This is an especially big problem for BSs that operate in less developed countries, and need to redesign their operations and behavior.

BSs in modern global environment are constantly faced with fierce competition. This triggers continuous need for improving their working and behavior. Within limited resources for improving effectiveness of BS, innovating represents an important possible solution (Hage & Dewar, 1973; Schumpeter, 1991; Collins, 2001; Potocan & Mulej, 2007; Nedelko, 2011).

In modern business environment innovativeness has become a core strategic possibility for development of organizations on all levels of society (Afuah, 1998; Collins, 2001; Skarzynski & Gibson, 2008) and especially SMEs (Mulej 2006). Innovating is therefore especially important in current economic conditions where BSs do not have abundance of resources for improving their operations, but have people with their "innovative capacity" on their payroll.

Among different "hard" and "soft" factors that influence people's innovativeness, we focus in this contribution on the impact of one among most important "soft factor"– in literature often neglected or given only marginal importance – people's personal values (Barnard, 1938; Hage & Dewar, 1973; England, 1976; Hambrick & Mason, 1984; Daft, 2000; Hughes et al., 2009; Posner, 2010; Nedelko, 2011). In that framework we will examine the impact of selected peoples' personal values on most important characteristics of innovativeness, i.e., innovative working and behavior.

From psychological perspective, values can be most generally defined as an attitudes that importantly influence or guide people's behavior (Rokeach, 1973; Schwartz & Bilsky, 1987; Musek, 2000). In that framework primary function of values are (Becker & McClintock, 1967; Rokeach, 1973, pp. 12–17; Schwartz & Bilsky, 1990; Musek, 1993, pp. 72–73; Schwartz, 1994; Musek, 2000): (1) directing people's behavior, (2) solving conflicts and decision making, and (3) motivation function.

People usually have the same (or at least very similar) entity of small number of values, which are organized in value system, whereas everyone determine the importance of each value in his/her value system. Different value priorities results in different hierarchical values systems of people. Based on different priorities people have different behavior.

Based on cognitions of different researchers of personal values (Kluckhohn & Strodtbeck, 1961; Rokeach, 1973; Hofstede, 1980; Schwartz & Bilsky, 1987; Musek, 2000; Fisher & Lovell, 2006; Haslam, 2007) we can summarize that people's personal values importantly influence their behavior.

In literature different theories of values are known. For the purpose of our discussion and research we adopted Schwartz Value Survey Questionnaire, which is widely used worldwide (Schwartz, 1992, 1994; see also Schwartz & Bilsky, 1987, 1990).

Based on the above presented general cognitions about the impact of people's personal values on their behavior we can argue that people's personal values importantly influence their working and behavior when they are in BSs (Hofstede, 1980; Nedelko, 2011). For dealing with specific situations, it is necessary to determine the importance and role of single values for a person's working and behavior (Fisher & Lovel, 2006, p. 152, 155). In that framework, in line with our aim, we will determine important personal values that influence people's working and behavior, regarding their innovativeness.

Literature Review

Experiences from BSs in modern innovative societies confirm the importance of innovations for economic development and international competitiveness and emphasize the complexity of innovation activities, its establishment and executing (Aghion et al., 2002; Potocan & Mulej, 2007). Innovativeness is therefore a crucial success factor in modern business environment (Kuczmarski, 1996; Furman et al., 2002; Brown & Ulijn, 2004; Skarzynski & Gibson, 2008).

BSs that lag behind can importantly reduce their gap, in comparison to innovative BSs, by designing innovative working and behavior (Bucar & Stare, 2002; Nedelko, 2011). Those BSs are characterised by the tendency to preserve old, i.e., traditional routine working and behavior and by a lack of innovative work/activities (Dyck & Mulej, 1998; Bucar & Stare, 2002; Mulej, 2006). This is primarily the problem of BSs which operate in transition economies, those that used to operate as part of the socialist system. Those organizations lag behind due to the slow process of changing from routine towards innovative working and behavior (Mulej & Kajzer, 1998; Newman & Nollen, 1998; Mulej, 2006).

Therefore a great challenge for BSs is to shift from routine towards innovative working and behavior. In that framework one among first steps is to make a shift in thinking of all employees in organizations, from an outdated pattern towards "innovative pattern". Changes are outlined in Table 1.

Table 1. Shift in understanding working and behavior in BSs.

Thinking in routine working environment	Thinking in innovative environment
Independency, self-sufficiency	Interdependency
Harmony	Partial harmony, partial diversity
Not being able to change	Constant change
Partial change	Radical change

In the framework of proposed changes, we can outline the role and importance of innovating in low innovative and high innovative BSs. Findings are summarized in Table 2.

Table 2. Non-innovative and innovative BSs.

Low innovative BSs	High innovative BSs
– a lot of opportunities for rationalization of working and behavior of organization – prevalence of routine thinking and working – prevalent values, culture, ethics, norms (VCEN) of employees is in favor of preserving current state (e.g. processes) – environment does not execute pressure on BSs to be more innovative, while employees do not make pressure – lack of collaboration between BSs and research institutions – employees and their knowledge, experiences, and creativity are not most important assets of BSs – narrow understanding of innovations, often as technology innovations	– a very few opportunities for operations rationalization – prevalence of innovative thinking – working and behavior is based on the motto "work smarter, not harder" – environment creates pressure, which stimulates innovativeness – striving to create a lot of inventions, which are the basis for development of very few innovations – employees and their knowledge, experiences, and creativity are the most valuable assets of BSs – intensive collaboration and transference of knowledge and experiences, between BSs and research institutions – holistic/broad understanding of innovations

In literature a range of definitions exist about general terms regarding innovative working and behavior (Dyck & Mulej, 1998; Afuah, 2003; Mulej, 2007). In the official international definition innovation is defined as every novelty which is considered beneficial by its users (EU, 2000; p. 4). The official definition of innovation, proposed by the European Union in the framework of Lisbon strategy is, therefore, very broad. It encompasses new products and services; new methods of productions, procurement and distribution; changes in leadership style, organization of work and work conditions; and changes regarding capabilities of work force, etc. (see: Bucar & Stare, 2003, p. 15).

On the other hand, Mulej (1994) offers a very general and broad definition of innovation, where innovation is every beneficial novelty for its users, in practice. Based on the broad understating of innovations, Mulej proposed a typology that included 32 basic types of inventions, suggestions, potential innovations, and innovations (Mulej, 1994; Mulej et al., 2010). A comprehensive typology of innovations is outlined in Table 3.

Table 3. 32 basic types of inventions, suggestions, potential innovations, and innovations.

'Innovation is every (!) novelty, once its users (!) find it beneficial (!) in practice (!)'.				
Three networked criteria of inventions, suggestions, potential innovations, and innovations	(2) Consequences of innovations		(3) On-job-duty to create inventions, suggestions, potential innovations, and innovations	
(1) Content of inventions, suggestions, potential innovations, and innovations	1. Radical	2. Incremental	1. Duty exists	2. No duty
1. Business program items	1.1.	1.2.	1.3.	1.4.
2. Technology (products, processes, ..)	2.1.	2.2.	2.3.	2.4.
3. Organization	3.1.	3.2.	3.3.	3.4.
4. Managerial style	4.1.	4.2.	4.3.	4.4.
5. Methods of leading, working and co-working	5.1.	5.2.	5.3.	5.4.
6. Business style	6.1.	6.2.	6.3.	6.4.
7. Governance & management process	7.1.	7.2.	7.3.	7.4.
8. VCEN	8.1.	8.2.	8.3.	8.4.

Based on above cognitions we can outline following typical characteristics of innovative BSs working and behavior (Mulej et al., 2000; Collins & Porras, 2002; Bucar & Stare, 2003; Potocan & Mulej, 2007; Mulej, 2007; Skarzynski & Gibson, 2008):

- BSs is based on continuous innovating process,
- Using achievements of modern society development,
- Quickly adopts own and others innovations,
- Supplement own knowledge with other's knowledge in order to create synergies in improve operations,
- Inventiveness and innovativeness are highly valuable,
- Creative employees are most important BSs asset,
- Design entrepreneurial circumstances for working and behavior,
- Modern understanding of innovations (e.g., types of innovations),
- High innovative capacity of employees in BSs,
- Holistic, system thinking and cooperation between employees in BSs.

Innovativeness of organizations is dependent upon entity of different factors, like strategy and goals, owner's preferences, management, different stakeholders, values/culture/ethics/norms (VCEN) in environment and employees' VCEN (Mulej, 1994; Nussbaum et al., 2005; Huston & Sakkab, 2006; Meyer, 2008).

Schumpeter's cognitions about innovativeness reveal that innovative entrepreneurial thinking is influenced especially by radical changes and crisis (Schumpeter, 1968; Mulej, 2007). In that frame the current economic environments represent very favorable conditions for innovating activities in BS. On the other hand, Mintzberg (1973) in his work about manager roles emphasizes the entrepreneurial role of manager, which pertains to the initiation of change, as one among ten most important managerial roles in BSs.

Due to the high importance of innovativeness for BSs and its potential to influence on results of BSs, several studies have been conducted in order to outline the core factors of innovativeness in organizations (Wheelwright & Clark, 1995; Drazin & Schoonhoven, 1996; Slappendel, 1996; Tushmen & O'Reilly, 1997; Hurley & Hult, 1998). In the last decade the focus has been put especially on the role and importance of VCEN for employee innovativeness (Afuah, 1998; Christiansen, 2000; Lemon & Sahota, 2004; Chesbrough et al. 2006; Potocan & Mulej, 2007).

Based on different prior studies, experiences from business practice and our own research we can most generally conclude that innovativeness of people in BSs is influenced by an interrelated set of factors including goals of organizations, stakeholder claims, VCEN, knowledge, etc. (Afuah, 1998; Mulej et al., 2000; Collins & Porras, 2002; Lester & Prior, 2004; Skarzynski & Gibson, 2008; Chesbrough, 2009; Nedelko, 2011).

Most commonly emphasized factors that influence employee's innovativeness are:

- Stimulation for creativity,
- Openness for new ideas and other's knowledge,
- Benevolence to change,
- Perception of risk,
- Innovativeness as a value,
- Industry in which the BS is,
- Nature of work,
- Current economic conditions,
- Characteristics of management,
- Leadership style,
- BSs organization,
- Prevalent VCEN in BSs environment,
- Other characteristic of environment,

On the other hand, the main obstacles for development of innovative working and behavior of BSs and its employees in BSs are often related to (Newman & Nollen, 1998; Bucar & Stare, 2002; Mulej, 2007; Potocan & Mulej, 2007):

- Outdated VCEN of employees in BSs,
- Weak innovative culture,
- Negative attitudes towards accepting risk,
- Narrow understanding of innovations, often only as technology innovations,
- Low efficiency of investments in research and development,
- Weak link between economy and research institutions,
- Managers and owners do not see entrepreneurial activities as an opportunity for BS development.

Among possible obstacles that hinder innovative activities in BSs the narrow understanding of innovations is among most frequently emphasized, whereas innovations are often limited only to technology innovations. At the same time narrow understanding of innovations is of huge importance in BSs in (former) transition countries (Potocan & Mulej, 2007; Nedelko, 2011).

In line with aims of our paper we are focusing on the examination of the role of people's personal values for their innovativeness.

Based on literature about innovativeness (Amabile, 1988; O'Reilly et al., 1991; DeBono, 1992; Russell & Russell, 1992; Rogers, 2003; Katz, 2003; Lester & Priore, 2004; Gloor, 2006; Conway & Steward, 2009) we can outline the following basic characteristics of innovative employees. Consequently those employees are/should be:

- creative,
- accepting and testing new ideas, also from their co-workers,
- tolerant towards errors, due to the innovative work and activities,
- encouraging organizational learning,
- accepting risk,
- against abundant documentation (like standard operating procedures for "everything") since it hinder innovations,
- comfortable with trial and error method.

Above outlined characteristics of innovative BSs and innovative employees represent a base for defining the relationships between employees' innovativeness and their personal values. Majority researches in this field are focused on examination of single characteristics of innovativeness, but separately from their personal values (McGourthy et al., 1996; Collins & Porras, 2002; Kovac et al., 2004; Mulej, 2006; Potocan & Mulej, 2007).

Based on presented cognitions we can most generally presuppose that selected single items of employee's innovativeness could be linked with selected employee's personal values (Hage & Dewar, 1973; O'Reilly et al., 1991; Russell & Russell, 1992; Afuah, 1998; Mulej et al., 2000; Collins, 2001; Collins & Porras, 2002; Rogers, 2003; Lester & Prior, 2004; Fagerberg et al., 2006; Mulej, 2006; Potocan & Mulej, 2007; Skarzynski & Gibson, 2008; Chesbrough, 2009; Conway & Steward, 2009; Nedelko, 2011).

Based on characteristics of innovative BSs and innovative employees, we can argue that following personal values most importantly influence on the level of employees' innovativeness, namely: (1) exciting life, (2) creativity, (3) dynamic life, (4) ambition, (5) broad-mindedness, (6) daring, (7) curiosity, (8) success. Defining of all possible relations between the above listed features of employee innovativeness and individual personal values exceeds the scope of our paper. Selected relations are briefly outlined in the frame of results presentation.

In accordance with paper's aim we next turn our attention to the importance of specific personal values for employees in Slovenia's BSs and business students at the Faculty of Economics and Business between years 2002 and 2010. Based on the results of survey we can discuss possible influence of personal values on people's innovativeness and business students, as future employees, possible recommendations, and future research.

Research

The main purpose of our statistical research is to outline trends in personal values, that seem to most significantly influence peoples' innovativeness. For that purpose we will use a sample of employees and business students at five different time periods, i.e., 2002, 2004, 2006, 2008, and 2010. A comparison of trends for employees and business students will allow us to argue about the future generations of employees as well. In the interest of space we will present just trends for selected personal values for both samples. Other results are not included in this contribution.

Our sample consists of data collected at five different time periods, from 2002 until 2010, every two years. The addressed Slovenian organizations, and their employees, make a representative sample of all organizations in Slovenia (i.e., a relatively representative regional coverage; the basic-activity structure of organizations in a country, with a good fit to the industry-based structure of the national economy).

In 2002 we received 200 employees' answers, in 2004 199 answers, in 2006 200 answers, in 2008 176 answers, and in 2010 132 answers. Altogether we have 907 usable employee's answers obtained in Slovenian organizations. An average response rate during these years was little below 20 %, since approached altogether 5 000 potential respondents, some via questionnaires, others via telephone or online web survey tool; 1 000 in each period.

For the same years we also collected answer from business students. The participating students were enrolled at the Faculty of Economics and Business, University of Maribor, Slovenia, in last year of undergraduate program. The majority of them were enrolled in programs related to management and organization. In 2002 we had 100 answers, in 2004 101, in 2006 100, in 2008 83, and in 2010 120 answers. Those surveys were conducted during the semester, and students participated voluntarily.

For measuring personal values we used Schwartz Value Survey (Schwartz, 1992; 1994). Participants in the survey rated each personal value using a 9-point Likert-type scale, ranging from "opposed to my values" (-1) to "of supreme importance" (7).
We start our presentation with a comparison of trends for the importance of single personal values for employees and business students between years 2002 and 2010. In figures we used the following abbreviations; "BS" stands for business students and "E" for employees.

First we turn our attention to the value labeled exciting life. A higher importance of the value exciting life could mean that people are more prone to accept challenges which are unavoidably associated with innovativeness or at least accept changes of a current pattern, and vice versa. This makes space for new opportunities and ideas to be created. Exciting life is in every time period on average more important for business students than for employees. It is evident that the importance of exciting life for business students has been rising lately, while for employees the importance has become lower in last three periods. The trends are outlined in Figure 1.

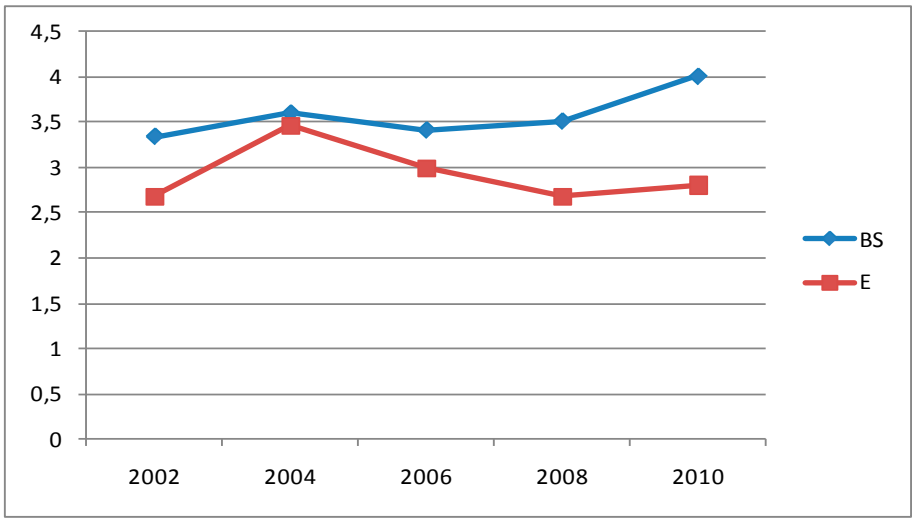

Figure 1. Exciting life – trends for employees and business students.

Creativity could be related to people's willingness and/or desire to create new ideas and knowledge. Therefore a higher importance of the measure of creativity could signify that people are more prone to create new ideas, knowledge, opportunities, etc, and vice versa. Looking overall the importance of creativity has fallen for both samples in the last couple of years. It is evident that creativity has been more important for employees than for business students in the observed period. The trends are outlined in Figure 2.

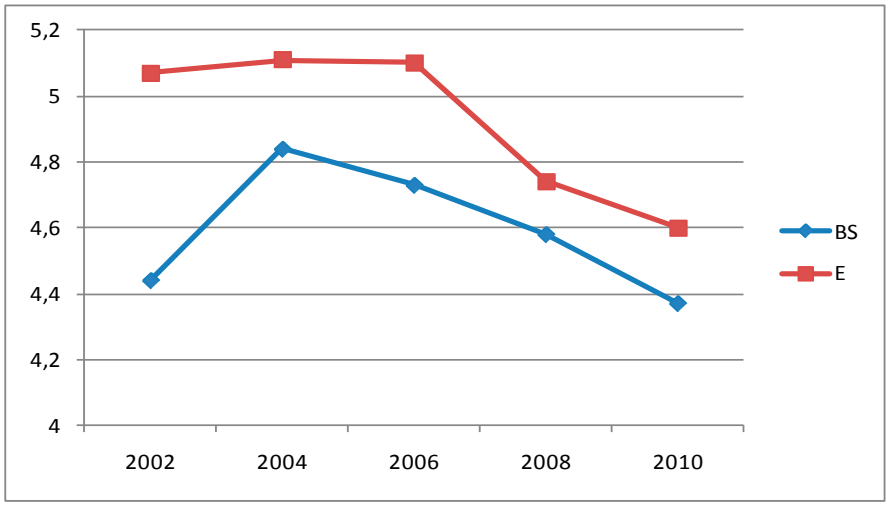

Figure 2. Creativity – trends for employees and business students.

Dynamic life could be related to people's attitudes towards having a dynamic life fulfilled with challenges, novelties, different situations, events, etc., which results in a diverse life. A higher importance of the measure of dynamic life could result in people's stronger willingness to accept new ideas, challenges, etc, and vice versa. It is evident that at the beginning of the century the importance of dynamic life was growing both for employees and for business students. Afterwards, the importance of leading a dynamic life for business students drops, and goes up again. While the importance of dynamic life for employees has been staying on a lower level than in previous years, the importance for business students has been rising. The rends are outlined in Figure 3.

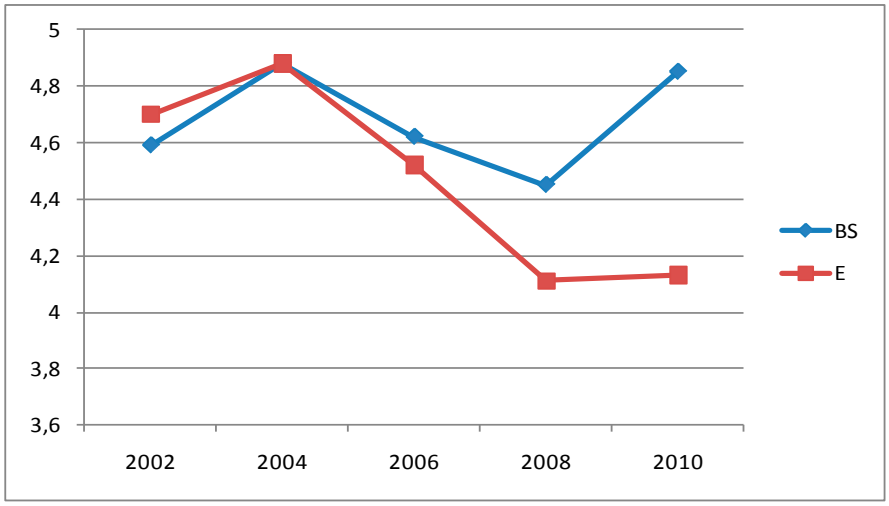

Figure 3. Dynamic life – trends for employees and business students.

Ambitions could be related to people's desire to achieve personal or organizational goals. Therefore a higher importance of ambitions could result in more willingness to achieve goals, and vice versa. On the other hand, innovations are needed in order to obtain goals. It is evident that ambition, as a value, has recently become significantly more important for business students, than for employees. In the recent years the importance of ambition has declined for employees, while it remained constant for business students. The trends are outlined in Figure 4.

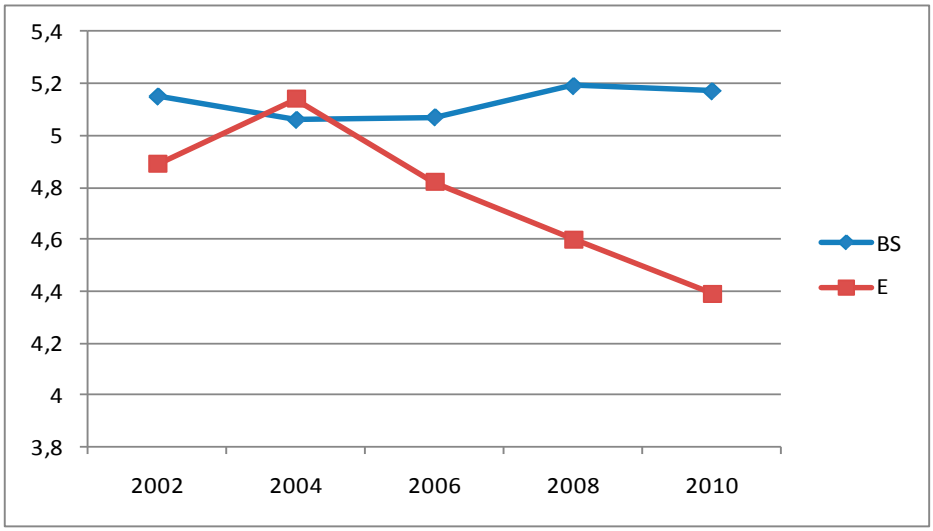

Figure 4. Ambitious – trends for employees and business students.

Broad-mindedness could be related to people's view about accepting ideas and knowledge of others. This is especially important in innovation activities, since sharing and accepting ideas is crucial for innovating. Thus, a higher importance for the measure of broad-mindedness could result in the higher readiness of people to accept ideas and knowledge of others. It is evident that the importance of broad-mindedness is declining in last observations, for both samples. Broad-mindedness is more important to business students. The trends are outlined in Figure 5.

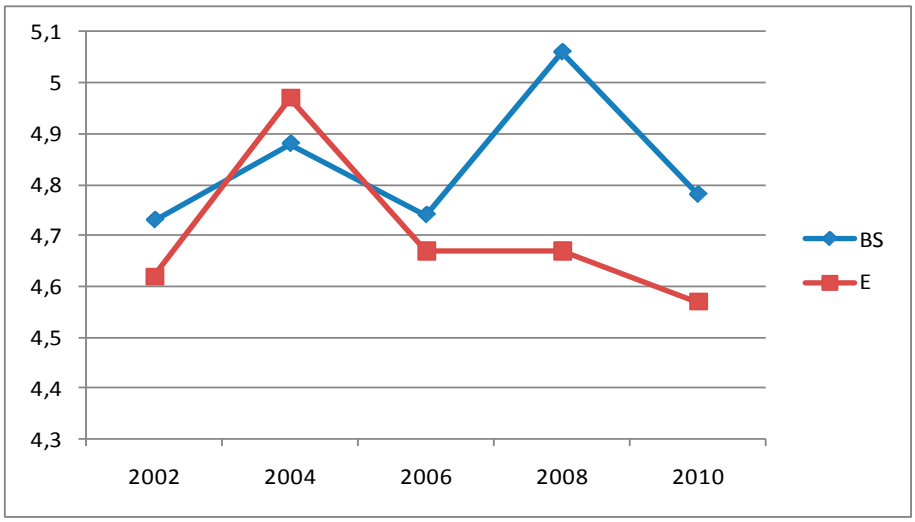

Figure 5. Broad-minded – trends for employees and business students.

Daring could be related to people's willingness to take a risk, which is on the other hand a basic prerequisite for innovating and all other innovativeness related activities. Thus, a higher importance of value daring, could result in higher people's willingness to take a risk, and vice versa. It is evident that that importance of daring as a value, is very similar for both samples, while some differences appear in the last observation: it is more important for business students than for employees. The trends are outlined in Figure 6.

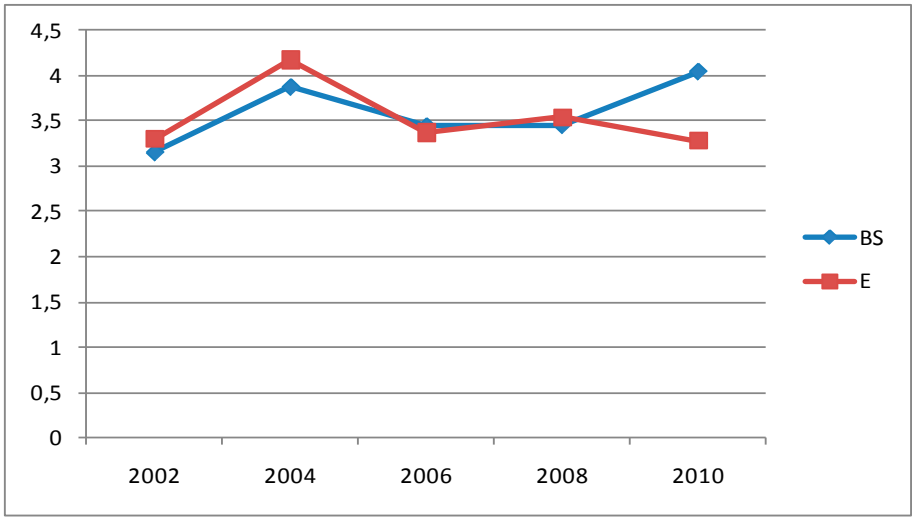

Figure 6. Daring – trends for employees and business students.

Another value which could importantly affect people's attitudes towards innovativeness is curiosity, which could make people to strive for novelties, which in turn trigger for example, accepting risk, testing new ideas, experimenting, etc. Thus, a higher importance of value curiosity could results in higher willingness of people to strive for novelties. The importance of curiosity is getting lower recently for both samples, but in last observation there are some signs of recovery. The trends are outlined in Figure 7.

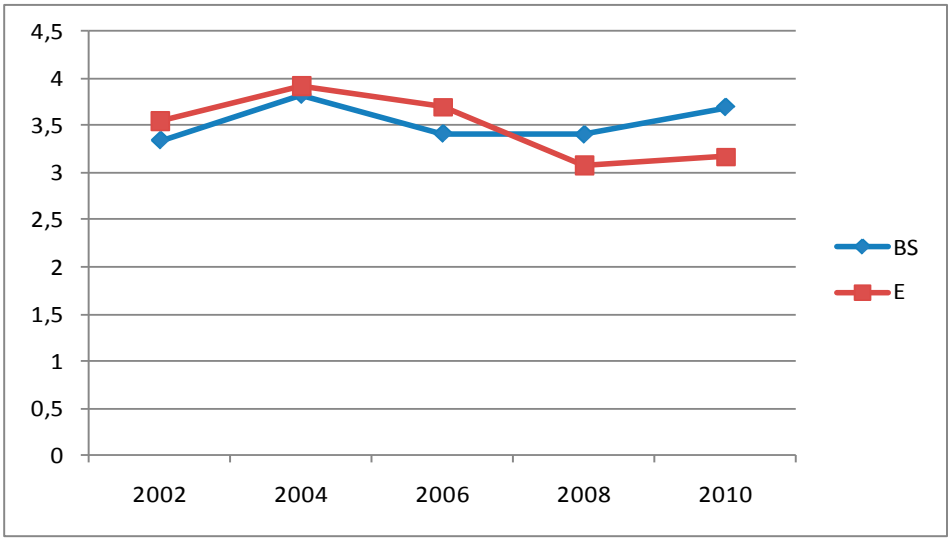

Figure 7. Curiosity – trends for employees and business students.

The last personal value we present is success. In the modern business environment success is closely related to innovative working and behavior of all employees as well as BSs as a whole. Thus, a higher importance of value success could result in higher people's appreciation of innovative activities, and vice versa. It is evident that success is more important for business students, with steady difference, while the most recently collected data reveal the biggest gap. The trends are outlined in Figure 8.

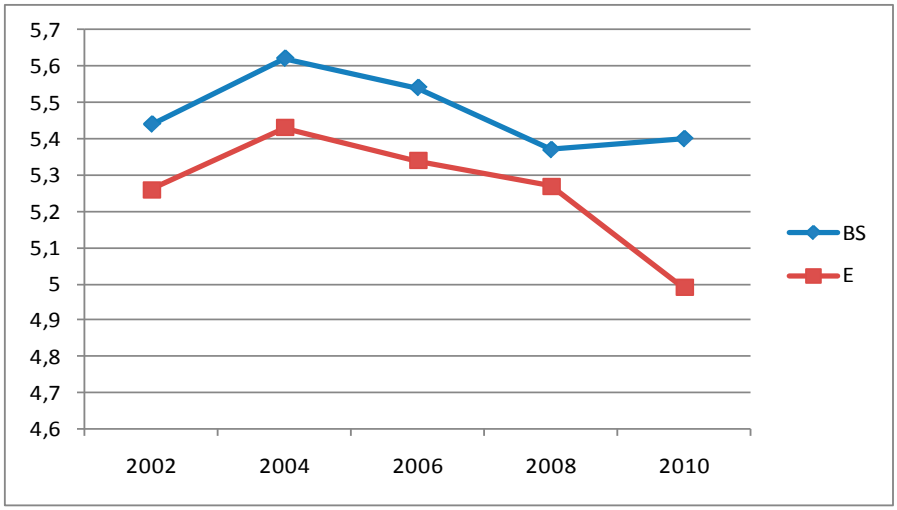

Figure 8. Success – trends for employees and business students.

Next we turn out attention towards importance of selected personal values separately for employees and business students.

Regarding the importance of values for employees it is evident that the most important value during the observed years is success, followed by creativity. To the group of relatively important values we can also add broad-mindedness, ambition, and dynamic life. On the other hand, the relatively less important values for employees are daring, curiosity and exciting life. Throughout the research period exciting life has been the least important value for employees. Trends are outlined in Figure 9.

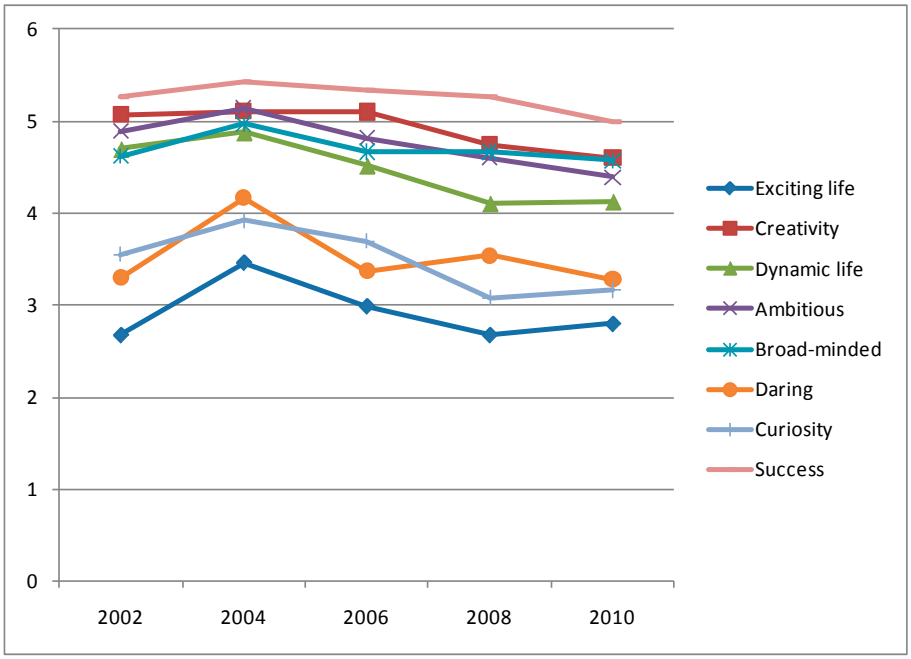

Figure 9. Importance of values for employees – 2002 – 2010.

As regards business students, we can observe that success is the most important value for business students during the observation period, followed by ambition. In the group of more important values we can also place broad-mindedness, and dynamic life. On the other hand ,relatively less important for business students are daring, curiosity, and exciting life. The trends are outlined in Figure 10.

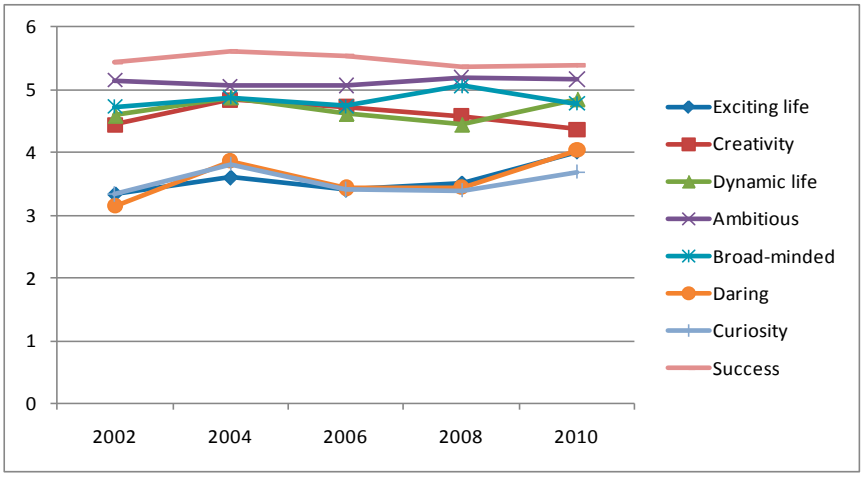

Figure 10. Importance of values for business students – 2002 – 2010.

Finally, we will outline a comparison of importance of values, associated with innovativeness, for employees and business students, for selected periods of time. The trends are outlined in Figure 11.

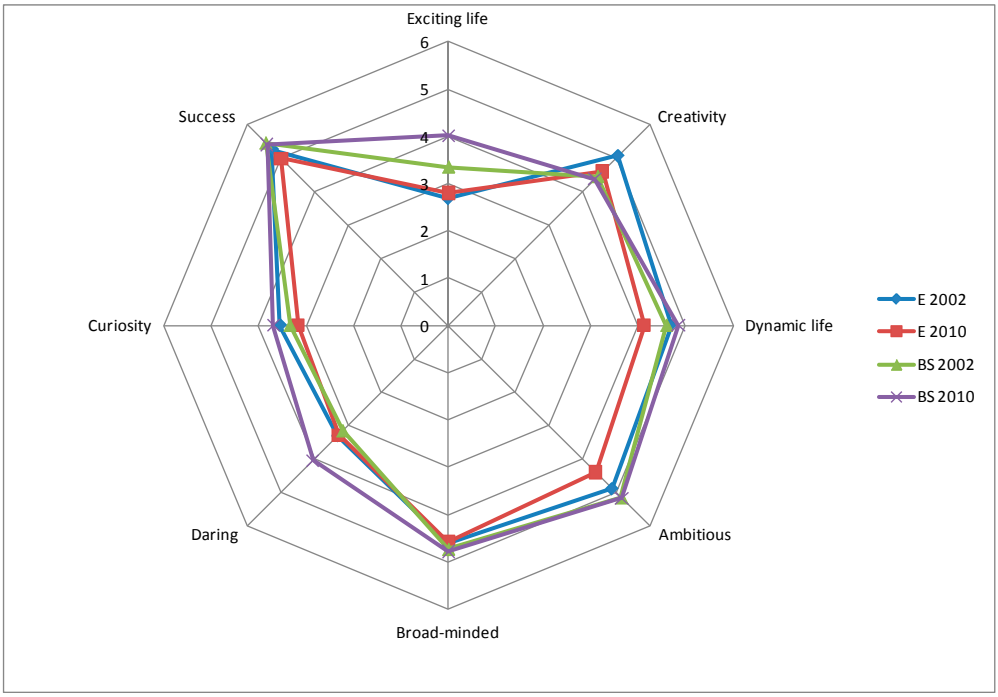

Figure 11. Employees' and business students' values in year 2002 and 2010.

Based on a comparison of trends in values assumed to most significantly influence innovativeness of employees and business students between 2002 and 2010, it is evident that for employees the importance of the majority of values declined, while exciting life became more important; on the other hand, the importance of the majority of values for business students has increased, with the exception of "success" and "creativity," which decreased.

Discussion

At first glance it is evident that there exist differences in importance of values related to innovativeness between employees and businesses students. The greatest differences in importance of values between employees and students are found in their valuation of 'dynamic life', 'ambition', 'broad-mindedness', and 'success'. The values about which employees and students agree and for which we observe very similar trends are 'exciting life', 'creativity', 'daring', and 'curiosity'.

Based on value priorities for employees it is evident on one hand that they especially crave 'success' and 'achievement'. Valuing 'success', coupled with high creativity represents a good starting point for performing innovative acts. But on the other hand 'daring' (for example see Nedelko, 2011) which importantly influences the perception of risk, is relatively low. Also 'curiosity' and 'exciting life' both of which make people more keen to strive for novelty, are of low importance. The low importance of these values for employees can hamper innovative activity in BSs. The overall tendency of the importance of those values has on average declined during the last three observations.

Business students especially value 'success' and 'ambition'. High importance of those values, coupled with a rising trend in the importance of values linked to risk-taking, presents a fertile ground for innovation. But on the other hand what is of concern is the steady decline in the importance of the value of creativity, since besides being willing to take a risk people must also be creative in order to innovate.

A comparison of importance of values for employees and business students reveals that the pattern regarding the importance of single values is very similar for both samples. The pattern is similar also in terms of the magnitude of importance. Therefore, both samples give priority to success while lower priority is put on values that influence the risk, and consequently for taking more (that is higher levels of) risk, and a higher level of risk-taking is a prerequisite for innovativeness. The main difference between those two samples is that for employees there is a tendency for the importance of values to decrease, while the business student sample shows a tendency to assign increasing importance to values associated with taking risk.

Recognized differences in trends and consequently relative importance of single values for employees and business students in the period studied lead us to more detailed investigation of the differences. A comparison reveals, that in year 2002 four values were more important for business students than for employees (i.e., exciting life, ambitions, broad mindedness, success), while for employees 'creativity', 'dynamic life', 'daring' and 'curiosity' were more important than for business students. On the other hand, 8 years later, in the year 2010, seven of eight values (i.e., exciting life, dynamic life, ambitions, broad-mindedness, daring, curiosity, success) were more important for business students than for employees, while only 'creativity' was more important for employees than for business students.

A comparison of importance of single personal value for employees and business students reveals that in the last observation seven out of eight personal values related to innovativeness are more important for business students than for employees. On the other hand, in 2002 four values were more important for employees than business students, and four were more important for business students.

Looking from the perspective of literature dealing with psychological determination (i.e., measuring importance of values) we can ascertain several deviations, from cognitions about the general finding about changing value priorities and about changing value priority during different stages of peoples' lives (Rokeach, 1973; Schwartz, 1992; 1994; Musek, 1993; 2000).

We encounter the following deviations, related to these values:

- 'Creativity' – this value is more important for employees than business students, in year 2002 as well as in year 2010;
- 'Dynamic life' – this value is more important for employees than business students in year 2002, while in 2010 it is more important for business students;
- 'Broad-mindedness' – this value is more important for business students than employees in 2002 as well as in 2010;
- 'Daring' – this value is more important for employees than business students in year 2002, while in 2010 it is more important for business students;
- 'Success' – this value is more important for employees than business students in year 2002, while in 2010 this value has become more important for business students.

Based on these results it is evident that a discrepancy is still to be found in their valuation of 'creativity' and 'broad-mindedness', while the values 'dynamic life', 'daring', and 'curiosity' in 2010 are more important for business students than for employees. No new discrepancies appear in year 2010.

Looking from the perspective of creating entrepreneurial BSs we can conclude somewhat tentatively that the actual state of values does enable innovative activities, resulting in more entrepreneurial BSs. In the observed period two discrepancies vanish, since 'daring' and 'curiosity' are now more important for business students. While on the other hand 'creativity' and 'broad-mindedness' are still more important for employees.

A higher importance of 'creativity' for employees in comparison to that of business students, could be attributed to several causes, like higher motivation to work while part of a BS, the effect (and strength of) direction and aims of the BSs, etc. On the other hand, the higher importance of 'broad-mindedness' for business students than employees could for example be attributed to a greater exposure to "internet and social networks", to travel, studying abroad, etc. – which can make students more broad-minded early in their lives. It follows of course that if an employee's level of 'broad-mindedness' is lower, it could result in difficulties in accepting ideas and knowledge from others.

From the perspective of future innovativeness and creating entrepreneurial BSs, we can argue that the overall outlook is good, with creativity being the only exception. This is a problem as creativity is strongly associated with creating innovations based on new ideas (Potocan & Nedelko, no date.; Nedelko, 2011). Still, during the observation period the importance of this aspect did rise slightly and remained more important for employees. This finding raises a question: "It is possible to be innovative, without being highly creative?", since future generations of employees (i.e., the present business students) do place creativity among their most important values. Similarly it is evident that business students value 'broad-mindedness' highly, which could result in their high willingness to accept ideas and knowledge from others (e.g., employees, people outside BS).

What is more positive is that values associated with accepting risk, have been becoming more important for business students in recent periods. But being willing to take a risk, when it does not go hand in hand with high creativity, is not an optimal solution for being highly innovative and consequently successful.

In examining the reasons for the current state of value importance for employees and business students it is possible to identify a set of interrelated factors. In our discussion we will deal with the possible impact of current economic conditions and the issue of institutional vs. legal transition in Slovenia.

Majority trends about value importance are in line with findings from researchers in psychological investigation of values and their developmental pattern – they find changing priorities due to the different reasons (e.g., age, economic situation). Some priorities are not changing. For example, the economic crisis triggered changes in the economic and political spheres, while the economic crisis also triggered psychological changes at the same time. If we turn our attention to the economic crisis we can argue that such changes also impact on the ideological platform – on value orientation and value priorities.

For the purpose of our discussion we can argue tentatively that the economic crisis demarcated two periods: (1) those global economic conditions as we knew them prior to the recession – low unemployment, stability, constant growth, and so forth, and (2) the period of less favorable global economic conditions after the recession – high unemployment, uncertainty, weak economic growth and similar. In that framework it is evident that the global economic conditions familiar to us before the recession have vanished. Therefore, we can see that the economic crisis could have brought about a change in value priorities.

Based on psychological theories (Rokeach, 1973; Musek, 1993) and experiences from business practice it is expected that people will give priority to the values linked to their survival, their security, and the preservation of the status quo, while they will give low priority to values regarding changes, dynamics, etc. But, in line with theories and experiences, a crisis offers great opportunities for change in direction. It can kick-start innovation; we can expect that values regarding change, dynamism, and creativity will gain in importance, while the importance of values related to security and stability will decline (Rokeach, 1973; Musek, 2000). Due to the relatively stable nature of personal values a time lag before actual change kicks in is to be expected.

Next we turn our attention to issues related to institutional transition (i.e., legal-official aspect of transition) vs. real transition (i.e., changing VCEN of people at all levels of society, which is especially important for BSs). From the institutional viewpoint Slovenia completed its transition upon entering the European Union. But from the viewpoint of people's readiness for working and behaving in modern (also innovative) society the transition of VCEN of the people is not yet complete. Therefore we can argue that the importance of some values could be a result of past patterns of behavior, when there was very little need for innovation, change, creativity, etc.

Conclusion

We can conclude that people's personal values represent an important factor influencing their innovativeness. In the chosen framework personal values importantly influence the level of innovativeness. We suppose that the following values, namely an 'exciting life', 'creativity', a 'dynamic life', 'ambition', 'broad-mindedness', 'daring', 'curiosity', and 'success' have the strongest impact on people's innovativeness.

Based on our findings and from the perspective of the importance of personal values it is evident that business students have on average better predispositions to be innovative. Today's business students are the future employees (and managers). Overall state and trends in personal values related to 'dynamic' and 'exciting' life are satisfying, whereas values underlying creativity and willingness to take risk are of lower importance. These are the values related to innovativeness. In that framework we can emphasize that importance of creativity is decreasing, while on the other hand values related to willingness to take a risk are on the increase.

Based on theoretical cognitions, experiences from business practice and a proposed typology of innovation it is evident that an acceptable state of personal values and a holistic understanding of innovation are two core pre-requisites for creating entrepreneurial BSs. From the Slovenian viewpoint it is especially important to complete the real transition in order that people will be prepared – in terms of their VCEN, for working and behaving in modern (innovative) BSs.

Future Research Directions

Further research should investigate the relationships between people's personal values and selected aspects of their innovativeness. Research in such areas will offer us a more reliable guide to the impact (and also magnitude) of particular personal values on single characteristics of innovativeness. In order to holistically examine these relationships a multi-regression analysis should be conducted. A next step in this research will be to examine the impact of a whole list of personal values (i.e., choosing just one list, or even comparing different lists of personal values) on people's innovativeness.

Another area of research could investigate the differences in people's value priorities due to the impact of different macroeconomic conditions (e.g., environmental regulations, VCEN of environment). In that framework an important direction of future research in this field will be the examination of the change of people's value priorities in periods before, during, and after crises. Such investigation will enable us to determine the impact of economic conditions on the developmental pattern of personal values.

Endnotes

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CHAPTER 4

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Innovativeness and Innovation Results

Abstract

This paper focuses on the relationship between product-process innovation, management innovation, and the innovation results of the firm. A literature review of the innovation phenomenon (in general) was conducted from which the conclusion was drawn that terminological confusion exists with the innovation concept definition; occasionally the term innovation is used as the adoption of an idea or behaviour new to the organization and at times the measuring of innovation adoption is seen as the innovation itself. This research proposes a conceptual model that links innovativeness and the Innovation Results, and was tested on 68 firms within the auto components sector, established in Northern Spain and Northern Portugal. It was found that innovativeness has two main dimensions: product-process innovation and management innovation; and suggests that product-process innovativeness is relevant to product innovation results and that management innovativeness is related to Management and Process Innovative Results. These results highlight the different character of product-process innovation and management innovativeness and the relation to innovation results.

Keywords: *Innovation, Innovativeness, Innovation results, Innovation capacity.*

Introduction

The mysticism associated with the creation and adoption of something new promoted scientific research in various areas. This research fertility added complexity and confusion to the study of innovation because of the various forms it is defined as (Gopalakrishnan & Damanpour, 1997). Derived from this, some authors believe that terminological confusion with the innovation concept definition exists; at times the term innovation is used as the adoption of an idea or behaviour new to the organization, and at other times the measuring of innovation adoption is seen as the innovation itself (Ravichandran, 2000).

Ravichandran (2000) further contends that the majority of studies that research the phenomenon of innovation, actually only study the adoption of innovations. Shading between organizational innovation and the adoption of innovation exists. The crucial difference lies in the creative source that is the site where the change occurs in the company. The main variables of innovativeness and innovative output considered in the literature are listed below:

Innovativeness: Product Innovation / Process Innovation / Management / Organizational Innovation / Social Innovation

Innovative Results: Innovation Adoption Activity / Innovation Creation Activity / Type of Innovation Adopted / Type of Innovation Created

A company is considered innovative if it adopts and / or generates innovation (Gopalakrishnan & Damanpour, 1997) of a product, process or management. As the innovativeness (innovative capacity) is associated with something new and / or an improved product that contributes to creating value for the company, we have two fundamental considerations: (i) Innovative Capacity focused on the type of innovation (product, process or management) in the company; (ii) The innovative result focused on the adoption and / or generation of the innovation of product, process or management. This approach is not exempt from criticism, however, it may present a solution to the eclectic and divergent considerations of innovativeness and innovation results.

Innovativeness and Innovation Results

To be effective as a management process, innovation it requires specific tools and management systems. When the engines of innovation in the company work affectively, it becomes a source of constant value, but a series of isolated events (Shelton, Davila, & Brown, 2005). It is a mechanism for responding to the events of the environment to ensure the survival of the organization, and is considered an organizational resource that can inspire management choices (Gopalakrishnan & Damanpour, 1997).

Innovation studies can be classified according to objectives and approaches, usually is considered that exist two types of models (Ravichandran, 2000):

1. Regulatory models, which make requirements for situations in which organizations can become more innovative, some based on empirical and theoretical studies, others regulatory in nature;
2. Descriptive models, which summarize the observed characteristics of innovative organizations, such as organizational structure, processes, etc.

With regards to the level of analysis of innovation studies, three levels are used:

1. Individual: looking for the relationship between innovation and individual characteristics that foster innovation;
2. Group: searching for relationships within and between groups of companies that foster innovation;
3. Organizational: searching for the characteristics of the most innovative companies.

It is believed that innovation can arise in several ways (OCDE/UE, 2005):

1. Invention: emerges in laboratory research, which generates flows and technological concepts or renewing the pool of technical skills;
2. Taking the idea from another sector: seeking inspiration in another business sector innovation and adapting it to its own production process or your industry;
3. Seeking to exploit new markets: using innovation or reconfiguration of existing products and services and applying those to new markets;
4. A new approach: introduction of a unique and innovative new approach in business.

New ideas are the basis of innovation and these may arise from:

1. Basic research, derived from experimental or theoretical work undertaken to acquire new knowledge without a particular application or use;
2. Applied research, original research undertaken to acquire new knowledge on a practical matter or specific objective;
3. Experimental development, systematic work, based on existing knowledge (achieved through research and / or practical experience) that is intended to produce new materials, products, devices, installation processes, systems and services, or to substantially improve those already produced or installed.

In addition to these approaches, we must distinguish concepts that are closely connected and sometimes confused: invention, creativity and innovation. Invention is the brainchild of an idea, concept or new road, which is motivated by the desire or need to solve a problem, or provide a new capability to the company.

Creativity and innovation are also often confused, but creativity is the generation of new ideas and innovation is the value that they can generate. Being creative is not the same as being innovative; innovation is applied creativity. To be creative and innovative is necessary to go beyond the creative process and technical innovation is directly related to the implementation of something new. Innovation is related to the act or effect of innovation, introduction of any new developments in government, administration, arts, innovation, and renewal. Implicit is the idea of something new or renewed or as a:

- Result: a new product, process or management system that resulted from the process of creating or adopting innovations;
- Process: contextual conditions, structural and process on which organizations innovate and determine how innovation emerges, develops and becomes part of the routines of the company.

As for the types of innovation, researchers have divided the concept into different categories: process versus product innovation, technical innovation versus administrative or management and incremental versus radical innovation. Some authors contend that these are not different types of innovation, but are innovation attributes (Downs & Mohr, 1976). The Oslo Manual (2005) defines four types of innovations that encompass a wide range of changes in firms: product innovations, process innovations, organizational innovations, and marketing innovations. Product innovation is the actual innovation output, this may be a product or service designed to benefit the customer or market, to benefit new customers, or to create new markets. Process innovations are the tools and knowledge used between the input and output of the company. In other words, they are new or improved production methods to produce new products or services.

Daft (1978) proposed another typology, one based on the contribution of Evan (1966), the “dual core model of innovation”, which classifies innovations as technical and administrative innovations. Technical innovation is “an idea for a new product, process or service” (Daft, 1978, p. 197) these are usually related to technology. The administrative or management innovation, “are the recruitment policies and resource allocation, structuring tasks, authority and reward” (Daft, 1978, p. 198). This kind of innovation is related to the social structure of the organization. Creative effort is the result of innovative managers and is “the implementation of new practices, processes and management structures that represent a significant departure from common rules” (Birkinshaw & Mol, 2006, p. 81) with the aim of improving the work internal to the company.

Radical innovation presupposes substantial changes in the activities of the enterprise or industry, representing a profound departure from current practices, in addition, radical innovation can even lead to a profound alteration of the company or industry (Ettlie, Bridges, & O’Keefe, 1984). Incremental innovation presupposes slight changes in the activities of the enterprise or industry, not away from current practices, basically aiming to strengthen the capacities of the company (Ettlie, et al., 1984; Subramaniam & Youndt, 2005).These latter two types are more similar to a ranking of the change to innovation than an additional type of innovation.

The advantage of each type of innovation differs depending on the type of business or industry. Innovation is only of strategic importance if it influences the performance of the company in the relevant variables for the success of the business, thereby strengthening their competitiveness. The consideration of many different strands of analysis is often seen as an obstacle to advancing research, as the results may be different and non-comparable.

The Oslo Manual (1992) attempts to systematize research in the area of innovation, and is the conceptual basis for innovation studies carried out by EUROSTAT (Sanchez, Chaminade, & Olea, 2000). This contribution introduces some systematic research, but primarily emphasizes technological innovation with organizational innovation being considered as "other" innovation, which in essence does not correspond to reality. At the OECD group meeting: NESTI (National Experts in Science and Technology Indicators) in June 2000, a proposal was made to eliminate the word "Technology" attached to innovation proposed by the Oslo Manual (Sanchez, et al., 2000).

Since this continues to be accepted and used, the general definition of innovation is seen as the result of a set of activities that transform an idea or an invention in a product, service or process that is marketable, and involves improving the existing supply. Innovation, a key element of the current competitiveness, should be oriented to, and by, the market. Generally, it is linked only by mobilizing the technological frontiers, a task almost exclusively of large companies through their investment capacity and accumulated knowledge. Innovation, however, includes the ability to understand the requirements of users, and is the proximity to the client, providing the necessary information of knowing what, where, when and how to create customer value, change the rules, develop new products and combinations, change markets and their segments, transform the structure of production, logistics and distribution.

The capacity for innovation (also call innovativeness), growth condition, is rewarded by the market and is developed from the willingness to take risks and accept unconventional ideas, intuition and creativity and even the acceptance of learning from failure. Innovation in the company, given its potential, is a central theme today, and the ability to innovate is seen as a strategic resource (Gopalakrishnan & Damanpour, 1997). Subramanian and Nilakanta (1996) and Wolfe (1994) contend that business innovation research follows two lines, one focused on the innovation process, another on innovative capacity. The innovative process approach focuses on:

1. Dissemination of innovation is the dispersion of innovative output by potential adopters, or attempt to explain or predict the adoption of innovations in time and space (Wolfe, 1994);
2. Process of innovation, attempts to systematize the process by which innovation occurs in firms. They focus on how and why innovation occurs, how it develops, grows and ends (if applicable). By having a focus on the stages of the innovation process has a stable character, simple and even static.

Innovative capacity focuses on:

1. Determinants of innovation for the determinants of innovativeness of the company;
2. Business performance, connecting the innovative capacity with business results.

Another important aspect in the study of innovation within the enterprise is the wave of innovations that has to do with the decision-making and problem solving in the development of new products or processes (Gopalakrishnan & Damanpour, 1997). There are several models that explain the generation of innovation processes; the most accepted is divided into 5 stages: idea generation, project definition, problem solving, design and development, and marketing.

Innovative capacity is normally regarded as a key factor in organizational performance, although Cho and Pucik (2005) conclude that the innovative capacity, by itself, is not sufficient to improve the profitability of the organization, suggesting that a balance is required between innovation and quality. Roos et al. (1997, p. 39) defined organizational innovation as "the ability to generate new knowledge on previous knowledge.

This ability is essential for the renewal of the company and is key to creating sustainable success". Several authors point out that innovation is the creation of a product, service or process that is new to the business unit.

Relative to the search for the relation between innovative capacity and innovation results, the fundamental issue is that there are no consistent results that explain the innovative behaviour of the organization in a decisive and complete way. Several studies are not conclusive or consistent in their explanations essentially due to a lack of consistency in the research methodology on the determinants of innovative capacity, for example, the factors considered important in one study may not be considered in the same way in another similar study. This makes it almost impossible to confirm or systematize the results and analysis methodologies. The research focused mainly on issues such as the influence of individual, organization or bound in the innovative capacity, although prevailing research focused on structural variables of the firm (Gopalakrishnan & Damanpour, 1997).

Regarding the methodology used to study innovation many authors believe that innovativeness is a one-dimensional phenomenon (Wilson & Nystrorn, 1999), i.e. it is dependent on technological aspects, or behavioural aspects. This approach is sometimes considered the trigger for the inconsistent results (Subramanian, 1996). However, few authors consider innovativeness as a multidimensional phenomenon (Subramanian, 1996; Wilson & Nystrorn, 1999). In this regard, Santos-Rodrigues et al. (2011) also considered innovativeness as a multidimensional phenomenon and found a relation between the Intellectual Capital elements and innovativeness of the firm.

An innovative firm is one that has implemented an innovation (product, process, marketing or organizational innovation) during the period under review (OCDE/UE, 2005), as such, Innovativeness is the firm's capacity to engage innovation; that is, the capacity to introduce new processes, products, and management or market ideas into the organization. This capacity to innovate is one of the most important factors that have an impact on business performance. The firms' innovativeness constitutes an antecedent of the innovative activity (Hurley & Hult, 1998). For example, the capability to develop new products and processes rapidly and efficiently is a powerful source of gaining a competitive advantage (Wheelwright & Clark, 1994).

In several industries, the innovation effort is still undertaken by firms themselves, but it is often assumed that individual firms are rarely capable of innovating independently and firms that involve external partners in their innovation process depend on their own internal knowledge. An innovation "is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations"(OCDE/UE, 2005, p. 33).

When analysing the impact of innovation within the company, it is not uncommon for researchers to resort to measures of organizational performance however, the problem remains that any measure of performance achieved can't cover all aspects of organizational performance, and researchers use multiple measures of performance. For example, Santos Rodrigues (2008; 2010) linked product-process and management innovativeness with creation and innovative adoption results, and found that product-process innovativeness is positively related with product innovation results and that management innovativeness is positively related with management and process innovation results (Adopted and Created).

Additionally, in the field of strategic management, several studies examine the indirect impact of innovation on business performance. Companies that are considered the fastest / early innovators are those who are more likely to achieve true and lasting competitive advantage (for example, see Birkinshaw & Mol, (2006)). Although the issue of time is relative, the speed depends on the type of innovation being considered (incremental or radical) and the economic and social space where it occurs. There are also limitations to the findings on timing which should be noted, as the speed of adoption of an innovation does not mean that it happens at the same speed to all kinds of innovations, for example Avlonitis et al. (1994) considered that the adoption timing of an innovation may be influenced or determined by forces outside the organization, such as suppliers.

The process of innovation adoption is a process that directly affects the technical and social system of the organization and consists of initiation and implementation of innovations within the firm. The successful adoption depends on the successful integration of innovation and its contribution to the development and results of the company. The adoption of an innovation is a multidimensional phenomenon that is affected by several factors and dimensions such as those arising from the environment, the context, the individual and the company adopting the innovation (Wolfe, 1994). Previous studies, however, typically considered one-dimensional factors (such as factors connected with the characteristics of the company) as the most decisive for the adoption of innovation (Subramanian & Nilakanta, 1996; Wolfe, 1994).

Some authors consider that a measure based on critical variables to innovation will be a measure of the degree of innovativeness within the company (Ravichandran, 2000). Hii and Neely (2000) proposed that the answer to the problem of why some firms are more innovative than others, lies in the "Innovative Capacity" (or innovativeness) or the inner potential to generate new ideas, identify market opportunities and tradable innovations to leverage existing resources and capabilities. It depends largely on a set of components and factors that together create an environment conducive to adopt or create an innovation, among them are efforts to create new products, to improve existing production processes, the ability of its workforce and its ability to learn.

The company's innovative capacity also depends on the overall environment in which the company operates (Papaconstantinou, 1997) and the sector in which the company is inserted (Avlonitis, et al., 1994) for example, the case of the automobile industry, which determines the innovativeness of organizations (Robertson & Gatignon, 1986; Santos-Rodrigues, et al., 2011). The biggest problem with innovation research is the validity and generalization (Ravichandran, 2000) due to the lack of uniformity of the research.

Several research studies consider organizational innovation as a dependent variable of a number of innovations adopted by the organization (Wolfe, 1994), yet others focus on product innovation capacity and considers the innovative capacity as a dependent variable (Salavou, 2004). There are results that suggest that process and product innovation influence each other, that one type of innovation may lead to the other (Santos-Rodrigues, et al., 2011), or that the different types of innovation may occur sequentially or simultaneously.

This behavior was examined in the case of the adoption of administrative and technical innovations, for example, Damanpour and Evan (1984) verified that the adoption of administrative innovations in a given period, led to the adoption of technical innovations in the subsequent period. Santos-Rodrigues et al. (2011) found that product-process innovativeness lead to product innovation results.

Innovative capacity is usually treated as the dependent variable, the number of innovations adopted by the organization, time-dependent of innovation adoption. The number of innovations adopted by the company, regardless of the time of adoption of each innovation, makes it difficult to differentiate between companies in terms of readiness or propensity to innovate. Some authors consider that companies' that are faster / early innovators are those who are more likely to achieve real competitive advantage.

Other authors recommend that the time of adoption of an innovation determines how innovative the company is (Utterback, 1974), although the question of the adoption time is relative. The speed of adoption depends on the type of innovation considered (those considered fast for a particular type of innovation can be considered slow for other types of innovation), or it can depend on the economic and social space considered, as the speed may be considered fast in a particular country or city, but slow in another territorial space. Another limitation is that studies typically consider a given time point and assume that this is indicative of their innovative behavior. However, the reality is that organizational behavior adapts to the environment by making internal changes, and therefore detailed analysis using this measure cannot be understood as the true image of the company's innovative performance (Subramanian, 1996).

Midgley and Dowling (1978) used two reasons to support the use of measurement focused on the number of innovations adopted:

- It covers a large number of innovations which is less subject to questions regarding the product or the specific situation;
- In terms of studies that include the adoption of multiple innovations over time, this consideration, has a better perception of the company's innovation (Subramanian, 1996)

This consideration is not exempt of criticism: firstly, it is a criterion based on the analysis of a single innovation and might not be representative of the organizational behaviour generally, and secondly, studies that include multiple innovations assume, inappropriately, that those innovations are all homogeneous (Downs & Mohr, 1976). Additionally, the industry to which the company belongs may determine the innovative behaviour (Avlonitis, et al., 1994).

The innovative result is the final output; this may result from the adoption or internal creation of something new for the company in the form of product, process or management innovation. The innovative organization is typically one that generates innovation, or creates new products, processes or management methods, or is adopting innovations (new products, processes and management methods) (Subramanian, 1996). Daft (1978) considers the adopters of product and process innovations as innovative, and the non-adopters as non-innovators.

The adoption of different types of innovation requires different types of capabilities, for example, product innovation requires that the company identify the customer's needs, and process innovation requires attention to the demands of internal efficiency (Ettlie, et al., 1984). The adoption of innovations is the implementation of an innovation, created earlier, somewhere, that displayed a significant advantage relative to its predecessors, with one or more values for general use, bought / purchased by the organization (Ravichandran, 2000). This implies that the innovation is new to the adopting unit and can be considered new for an individual, group, company, industry or an entire society (Gopalakrishnan & Damanpour, 1997). Innovative processes within a company varies considerably depending on the type of innovation (Elenkov, Judge, & Wright, 2005). The research revealed that companies adopt product innovations quicker than they do management innovations (Damanpour & Evan, 1984).

Solutions and Recommendations

Considering the complexity inherent to the innovation phenomenon, we propose that both innovativeness and innovation results, should be treated as multidimensional constructs within research investigations, addressing issues of innovativeness and innovation results. This implies that there is a need to establish a series of constructs to measure these. As there are no valid universal scales, we propose that investigations should focus on three performance measures of innovativeness: product, process and management innovation (Ahuja, 2000; Davenport, Prusak, & Wilson, 2003; Ravichandran, 2000; Santos-Rodrigues, et al., 2011). Product innovation can be considered as the introduction of a new product / good (Cilleruelo, 2007; Gupta, 2009; OCDE/UE, 2005) into a market, as the development of a new use for a product (Gupta, 2009; OCDE/UE, 2005), only requiring minor modifications to the technical specifications , or as a development of small modifications to the technical specifications of a product. As for innovative results, the variable should seek to represent whether the innovation occur as a result of adoption or internal generation of the innovations in question. This approach results in a conceptual model as depicted in the figure below:

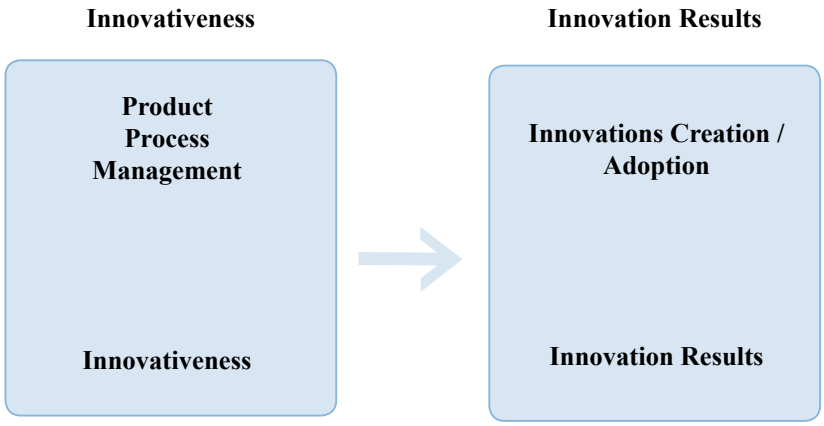

Figure 1. Conceptual Model.

This research model was obtained from the relations found in the literature, and was validated by the set of data collected in companies producing components for the automotive sector, in particular those located in Galicia and northern Portugal, where we found that there are two types of innovative capabilities clearly differentiated, on the one hand, the product and process innovativeness and on the other, management innovativeness, resulting in the following model:

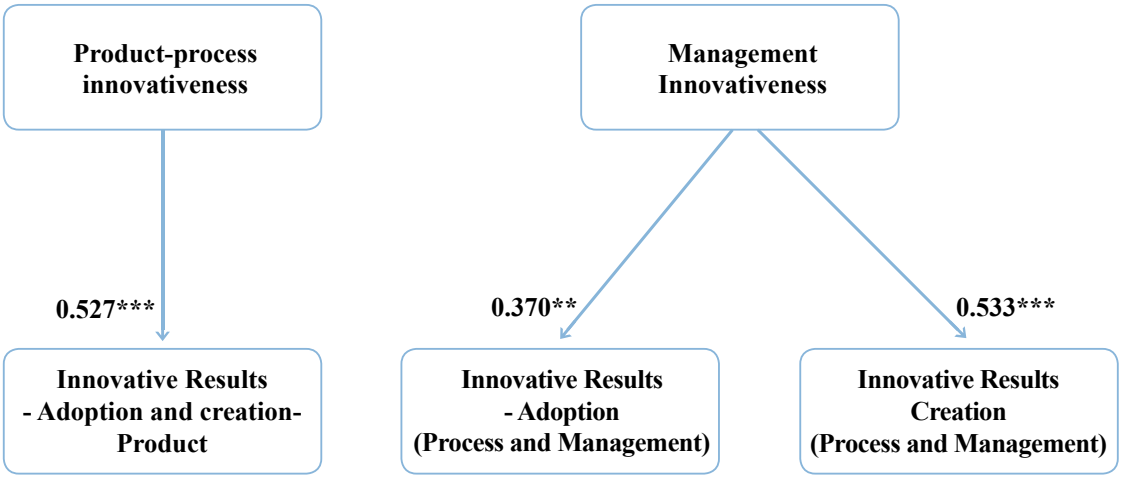

Figure 2. Investigation Model.

This research suggests that innovative results requires different innovative capabilities. The research further suggests that product and process innovativeness is relevant to the product innovative results, and management innovativeness is crucial to process management innovative results. Finally, the research also concludes that innovation is a multidimensional phenomenon, as proposed by several authors (Cho & Pucik, 2005; Costa, 2010; Santos-Rodrigues, et al., 2011; Wolfe, 1994).

Product and process innovativeness, are the most studied and exploited by companies. However, management innovation has a particular strategic importance, derived from the impact it has on "management practices" established in business under the use of tradition and industry. In fact there is an enormous added value when more efficient ways are found to

manage a company. An example of this is the automotive industry, a pragmatic example of management innovation, mass production driven by Henry Ford in the early twentieth century, which profoundly changed the way companies were managed, as well as the structural form of the industry itself. Another example is the Lean Production or Just in Time practices, which allowed companies to achieve extraordinary levels of differentiation and leadership over their competitors.

Conclusions and Future Research Directions

WA review of the theoretical complexity surrounding the innovation concept, revealed the importance and urgency to achieve a better understanding of the innovation phenomenon. This research proposes a model to analyse the innovativeness and its relationship with innovation results.

Innovation is crucial for the development of economies and the growth of companies however, it is a complex issue that is treated in various ways, and is a phenomenon endogenous to the companies, which makes it difficult to establish a pattern and a path. This supports our proposal of using the conceptual model proposed by this research, which has been tested and the conclusions reached identify the determinants of the innovativeness of the company. However, the empirical evaluation of the model was done in only one activity sector, relevant but peculiar and therefore, the generalization of the results should be done with caution. This supports the suggestion that the assumptions and hypotheses of our theoretical model might be validated in contexts, sectors, industries, countries or cultures different from this study. It would therefore be useful to replicate this research, mutatis mutandis, to other sectors, e.g. services or other industries, such as the pharmaceutical industry or ICT industry, as these industries are knowledge-intensive and can include profitable innovations.

Finally, we propose to replicate this work in cadenced time intervals in the same companies and to interview the person that occupies the same position, or if this is not possible, to include a person with the same level. This analysis will reveal the evolution from the perspective of the company's directors on the subject under investigation. The data was collected through a questionnaire conducted in a single time period, in accordance with the research proposal however, innovativeness is a dynamic process and is a longitudinal process. It is possible to collect information through observation or interviews, which can be used individually or as a complement to the questionnaire. However, these methods of data collection are easier to apply "case studies", in which a small number of companies are usually involved. Also noteworthy is the fact that the survey has been conducted in a particular zone, the euro Galicia region in northern Portugal in particular, which limits the extrapolation of findings to other territories.

Endnotes

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CHAPTER 5

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An Analysis of Research and Innovation in Croatia

Abstract

Science and innovation are key drivers of economic growth, primarily through the improvements they generate in productivity as a result of technological progress. In this context technological progress refers to both the invention of new or better products and improvements in physical and human capital. Indeed, in the long run, technological progress has been the most important determinant of growth in economies such as Croatia, for which the scope to increase the competitiveness is limited. Consequently, investments in science and innovation underpin technological progress and provide the supply of skills necessary to understand and apply new advances. For small countries like Croatia government policies play a direct role in fostering innovation across the public investment in science and innovation research. In general, Croatia is still in the process of transition, industrial restructuring and integration into the EU economy. Getting closer to the existing European frontiers in terms of technology, R&D and innovation became quite challenging at the national level. In order to track the performance on science, technology and innovation of Croatia a number of indicators are used from domains of research and development (R&D), innovation, human resources in science and technology, across countries and sectors. In this chapter we examine the impact of science and innovation on growth in Croatia. We screen and analyze the volume of financial resources allocated to R&D as an indicator of the level of commitment to the production and exploitation of new knowledge, as well as an indirect measure of a country's innovation capacity. In the last part we discuss the influence of investing in R&D on macroeconomic and microeconomic performance in the recent years and this serves as a base to understanding economic progress in the future.

Keywords: *Science and research, Croatia, Research funding, Competitiveness, Innovation performance.*

Introduction

The leading countries are active creators of global competition and these are the countries that increase awareness of global energy consumption, environmental and food problems. They participate in activities that concern global and human issues by promoting scientific and technological policy towards ensuring competitive advantage, employment and better

solutions for civilization and humanity. It is well understood by policy makers in the leading and competitive nations that the level of investment in knowledge infrastructures, R&D and innovation are strongly related to the current and future competitiveness of their industries. The creation of a competitive edge involves a long process of knowledge and skills accumulation at the societal level. Given the fact that economic resources are limited, innovation and R&D investment must be targeted towards strategic areas that will potentially function as economic multipliers (Montalvo et al., 2006, p. 4).

In fact, empirical studies suggest a direct relationship between R&D and growth. Recent OECD analysis (OECD, 2009; OECD & World Bank 2009) indicated the existing relationship between R&D and growth based on the relative impact of different components of knowledge investment. Extensive literature review on determinants of innovative ability illustrates two trends in the literature about innovation. According to Adler (1989), the innovation research splits into two broad areas of inquiry: general economic and the organizational tradition. We will focus mostly on the general economic tradition. The general economic tradition examines differences in the patterns of innovation across countries and industrial sectors, the evolution of particular technologies over time, and intra-sectoral differences in the propensity of companies to innovate. The level of analysis is at either the macro- or micro level. Researchers applying this method often use hard, numeric indicators to measure the amount of innovation by a company, such as the amount of R&D expenditure, the percentage of turnover of new products, and the number of patents and licenses. Until the 1980s, however, innovation research was largely limited to case studies or data on the creation of new knowledge, measured by R&D investments, scientific publications, patented inventions, and the number of scientists and engineers employed. The dominant perspective viewed innovation as synonymous with R&D undertaken to develop technical inventions. Theories of innovation were frequently based on linear science push models in which inputs of R&D or the efforts of scientists led to outputs of publications or patents (Arundel & Hollanders, 2006, p. 2). Griliches (1998) provides an excellent review of this approach, including its usefulness for assessing the impacts of R&D and patents on wider economic trends such as total factor productivity. Nonetheless, Guellec and Van Pottelsberghe (2004, 2003, 2002) found that the long-term impacts on economic growth of public and business R&D are strong and significant. The existing literature on a more 'aggregated' economic analysis points to R&D as being the ultimate source of technological change. Many studies in this field of research have confirmed that domestic business R&D and foreign R&D are major drivers of economic growth. Fewer studies have also provided evidence about the economic effect of public research. In some recent papers (such as Guellec & Van Pottelsberghe, 2002) there is macroeconomic evidence on the simultaneous impact of business, foreign and public R&D on economic growth (Guellec & Van Pottelsberghe, 2004, p. 2). Today innovation performance is a crucial determinant of competitiveness and national progress.

A common policy trend across EU Member States concerns the important place of R&D and R&D investment in the overall policy agendas. The volume of financial resources allocated to R&D is an indicator of the level of commitment to the production and exploitation of new knowledge, as well as an indirect measure of a country's capacity for innovation. The EU's strategy for sustainable growth and jobs, called 'Europe 2020', puts innovation and green growth at the heart of its blueprint for competitiveness and comes in the midst of the worst economic crisis in decades. The new strategy replaces the Lisbon Agenda, adopted in 2000, which largely failed to turn the EU into "the world's most dynamic knowledge-based economy by 2010". Although the policy of the European community has consistently stressed the central role of innovation to boost European competitiveness, a close reading of many major policy documents shows that the concept of innovation in use is primarily the performance of the R&D procedures. That is just part of the story. There are several reasons why the policy community has failed to fully adopt modern innovation theory. Perhaps the most important reason is that the main innovation policy instruments in European countries either subsidize R&D or are linked to R&D, such as providing support for intellectual property rights or the commercialization of inventions if these are produced in public research institutions. A second reason is that the main indicators currently used for measuring innovation inputs and outputs are also linked to R&D, including indicators based on patent counts and R&D expenditures (Arundel & Holanders 2006, p. 3).

For small countries like Croatia government policies play a direct role in fostering innovation across the public investment in science and innovation research. In general, Croatia is still in the process of transition, industrial restructuring and integration into the EU economy. Getting closer to the existing European frontiers in terms of technology is a tremendous challenge to R&D and innovation at the national level. In order to track the performance of science, technology and innovation in Croatia a number of indicators are used from domains of R&D, innovation, human resources in science and technology, high tech industries, knowledge-based services, and patenting across countries and sectors. We use the most recent statistics from Eurostat and other internationally recognized sources as available at the time of analysis. International sources have been used wherever possible in order to improve comparability between countries. Statistics about changes in the R&D sector are available for the period of 2003-2010. Each note analyses strengths and weaknesses of the national research and innovation system, its dynamics in the last decade and contribution to the enhancement of economic competitiveness. Some recent trends in Croatia are analysed with respect to R&D intensity, taking the benchmark of the 3% Barcel. Increasing investment in R&D for Croatia means both:

- increasing the amount and
- restructuring research space as an integral part of the European and global research network aiming to create a national research market with characteristics of mobility, competition and research excellence … in order to ensure a better and stronger research basis for the future.

As a country at its final stage of the accession to the EU, Croatia has a goal to achieve the target set by the Barcelona Council in 2002 and the European Strategy 2020 alongside the additional challenge of priorities set at the national level. Moreover, the objective of this paper is to analyse if the public and business R&D in Croatia are significant to its economic growth. In the process of integration within the EU and its research policies, Croatia is still having problems keeping up with the pace at which joint standards in creating national research and educational space are being developed and accepted by other member states.

Science and Innovation

Science and innovation are key drivers of economic growth, primarily through the improvements they generate in productivity as a result of technological progress. In this context technological progress refers to both the invention of new or better products and improvements in physical and human capital. Indeed, in the long run, technological progress has been the most important determinant of growth in economies such as that of Croatia, for which the scope to increase its competitiveness is limited. Consequently, investments in science and innovation underpin technological progress and provide the supply of skills necessary to understand and apply new advances.

In the literature technology is commonly conceptualized as a stock of knowledge which underpins the productive capacity of the economy, with successive investments adding to a country's technological capabilities. In common with other forms of knowledge, technology can be accumulated without limit, with each generation of discoveries standing on the shoulders of the last. Many new technologies arise from the painstaking development of practical and engineering knowledge, or the application of creative effort in areas such as software and design – independent of any research. Nevertheless, the evidence strongly points towards the increasing use of science in technological problem solving, and that highly innovative firms across many industries are closely connected to universities at the forefront of science.

The traditional conceptual model of how science and innovation leads to economic and social benefits was a linear process in which the initial inputs (skilled researchers, capital, etc.) are transformed into ideas, and then applied to create new products or services (Figure 1).

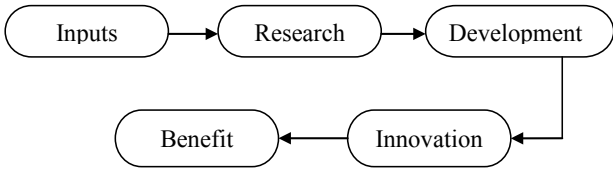

Figure 1. Simple Linear Model of Science and Innovation.

In reality the relationship is more complex, with both publicly funded and private research and innovation repeatedly interacting in various ways at different stages of the process, as well as with experience from later stages being fed back into the next round of innovations.

For example, many firms organize innovation as a chain of processes, with linkages to and from the external knowledge base at various points along it (Figure 2).

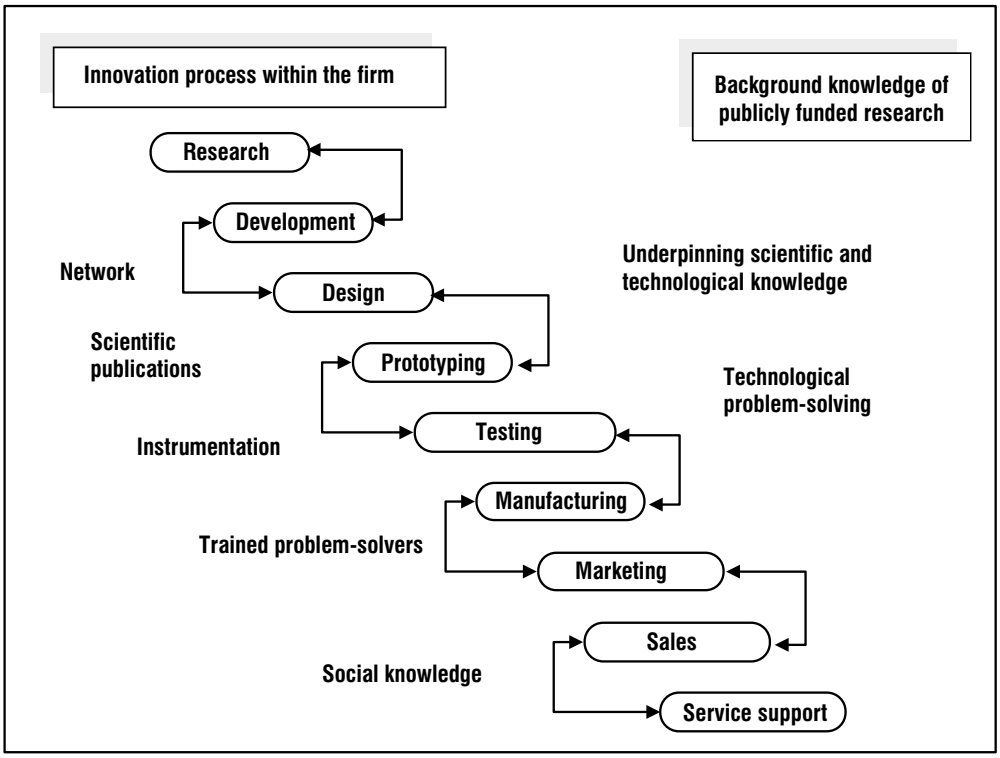

Figure 2. The Innovation Process and Publicly Funded Research.
Source: adapted from Salter et al. (2000).

Identifying these types of relationships is difficult and investments in science and research take long periods of time to build into usable knowledge. For example, the most immediate output of research, Codified Knowledge (research papers, designs etc), typically takes 5–7 years to appear (SPRU, 2004). Other outputs such as the Tacit Knowledge embodied in people as human capital (skills, experience etc), accrue over time, and are far more difficult to quantify.

Although codified knowledge in the form of new designs and production processes is the most visible output of the innovation process, more recent research has emphasized the role of tacit knowledge in underpinning the capacity of countries to carry out research and innovation. In particular, it provides the Absorptive Capacity needed to understand and apply the results of research and innovation carried out elsewhere (See Cohen & Levinthal (1989), and Geroski

(1995). However, the structure and performance of the innovation system (the institutional, regulatory and infrastructural framework) can have a significant influence on the incentives for firms to innovate and their abilities to do so, and hence exert a direct impact on the rate and direction of innovation in the wider economy.

What is the Impact of Science and Innovation on Growth?

Among the important theoretical models (Romer 1990; Grossman & Helpman, 1991; Aghion & Howitt, 1992) R&D is considered the main engine of growth, which is also the reason why the government is so strongly interested in achieving optimal levels of investment in R&D. Economic growth is a result of a more efficient combination of capital and labour, and investment in R&D is a way to find the most effective combination of these two factors.

Numerous empirical studies have attempted to quantify the link between R&D and productivity at different levels of aggregation (e.g. firm, sector, economy). This research confirms it is an important determinant of growth, with the estimated elasticity of output with respect to business R&D varying between 10% and 30% (For a useful survey of the literature see Nadiri (1993)). Bayoumi, Coe, Helpman (1999) also came to the conclusion that the rate of return on investment in R&D is almost five times higher than the rate of investment in physical capital. Additionally, it is important to identify (and perhaps attempt to quantify) the impact of R&D carried out by the various players such as government, public research institutions, or the benefits of R&D flowing from abroad (for examples see Coe & Helpman, 1995; Park, 1995; Mohnen, 2001; Guellec & Van Pottelsberghe, 2004). Although sensitive to the model used, the research generally point to the spillover effects on productivity from R&D carried out abroad or in public research institutions, as being both positive and significant, and in some cases exceeding the returns to business R&D (see Khan & Luintel, 2006). In fact, empirical studies suggest a direct relationship between R&D and growth. Also, Guellec and Van Pottelsberghe (2004) found the long-term impacts on economic growth of public and business R&D to be strong and significant. Business R&D undertaken in other countries apparently also plays an important role. Moreover, increased domestic business R&D accentuates the positive impact of both public and foreign business R&D. In other words, business R&D (either domestic or foreign-funded) has both a direct impact on a country's economic growth as well as an indirect one through improved absorption of the results of public R&D and R&D performed in other countries. However, any leading position in terms of technology is supposed to be a result of accumulating know-how, performing R&D, creativity, and the ability to transform the results into marketable products (Voigt et al., 2008, p. 17).

Although at a theoretical level the links between science and innovation, and the long run growth are well established, empirical evidence of the relationship has proved harder to come by. This is due to difficulties in accurately measuring the level of innovation activity in an economy, as well as identifying where ideas originate and the linkages between the ideas and the eventual innovations. In addition, investments in science and innovation are subject to varying levels of uncertainty in terms of when (if at all) they will lead to a profitable fulfillment. For example, while it is straightforward to derive estimates of the level of R&D expenditure in Croatia, much of what firms would consider to be innovation activity sits outside of the standard definitions of R&D (e.g. process improvements, organizational change, etc.). Similarly measures of innovation performance such as the number of patents may be heavily influenced by industrial structure (some industries rely on patents more than others). A number of studies have attempted to address this shortfall. For example, IUS 2010 have produced an 'Innovation Index' for the EU which draws on a wider range of metrics for innovation. The results suggest that Croatia invests more heavily in innovation than implied by R&D expenditures alone and compares more favourably with some of the other EU member economies than previously thought (although making robust international comparisons of these types of measures is always difficult).

How does Croatia Perform in Terms of Science and Innovation?

Investment in research and innovation is at the heart of the Europe 2020 strategy[3], which has set a goal for Europe's market economy in the 21st century to emerge from the crisis stronger and turn the EU into a smart, sustainable

and inclusive economy, delivering high levels of employment, productivity and social cohesion. Private sector R&D investment plays a particularly important role in this strategy, as well as its flagship initiatives:

- »Innovation Union«[4], which includes a 3% EU headline target for R&D investment intensity[5] and
- "Industrial Policy for the Globalization Era" flagship aims at improving the business environment, notably for SMEs, and supporting the development of a strong and sustainable industrial foundation for global competition (European Commission, 2011, p. 7).

Innovation is important for driving economic progress and competitiveness. Many governments are putting innovation at the centre of their growth strategies. The different legal, institutional, organizational, and governance regimes surrounding innovative activities are of special relevance to their success. These include the political environment, openness to credit, the treatment of investment and trade (is the treatment properly supportive or inadequate?), the presence of competition laws, the protection of intellectual property rights, having acceptable tax laws, and dependable transportation and telecommunications infrastructure. Regarding these variables Table 1 shows 10 strengths of the Croatian Economy (10 variables with the best rankings) — which include applied tariff rate, trademark registrations filed through the Madrid system, pupil-teacher ratio, computer and communications service imports, recreation and culture, time needed to start a business, market access as impacted by trade restrictiveness, utility model applications filed at the national office, creative goods exports, and foreign direct investment net outflows.

Next, the same table shows the weaknesses of the Croatian economy (listed are 10 variables having the worst rankings) - they are rigidity of employment, intensity of local competition, strength of investor protection, ICT and business model creation, computer and communications service exports, state of cluster development, trade and transport-related infrastructure, ICT and organizational model creation.

Table 1 is a partial representation of the framework for achieving better country innovation performance (according to the Global Innovation Index report 2011[6]).

Table 1. Strengths and Weaknesses of Croatian Economy's, compared to Japan and Switzerland, 2010.

Croatia	**Global Innovation Index**	**40**	
Strengths (Economy's 10 best rankings)		**Weaknesses (Economy's 10 worst rankings)**	
Variable	**Rank**	**Variable**	**Rank**
Applied tariff rate	9	Rigidity of employment	110
Trademark registrations filed through the Madrid System	9	Intensity of local competition	106
Pupil-teacher ratio	11	Strength of investor protection	103
Computer and communications service imports	13	ICT and business model creation	93
Recreation and culture	16	Computer and communications service exports	93
Time to start a business	21	State of cluster development	86
Market access trade restrictiveness	21	Trade and transport-related infrastructure	81
Utility model applications filed at the national office	23	ICT and organizational model creation	79
Creative goods exports	24	Ecological footprint and biocapacity	79
Foreign direct investment net outflows	24	Joint ventures / strategic alliances deals	73

Source: GII 2011, Data analysis, INSEAD 2011 Report.
Available at: http://www.globalinnovationindex.org/gii/main/analysis/strengthweakness.cfm

Table 1 (continued). Strengths and Weaknesses of Croatia's Economy, compared to Japan and Switzerland, 2010.

Japan	**Global Innovation Index**	**20**	
Strengths (Economy's 10 best rankings)		**Weaknesses (Economy's 10 worst rankings)**	
Variable	**Rank**	**Variable**	**Rank**
Patent applications filed through the PCT	1	Imports of goods and services	124
Depth of credit information	1	Exports of goods and services	119
Patent applications filed at the national office	1	Foreign direct investment net inflows	115
GERD financed by business enterprise	2	Ecological footprint and bio capacity	109
State of cluster development	3	Tertiary outbound mobility	99
Gross expenditure on R&D (GERD)	4	Total tax rate	93
GERD performed by business enterprise	4	Share of renewables in energy use	91
ICT use	4	Expenditure on education	90
Trade and transport-related infrastructure	5	Creative services exports	87
Intensity of local competition	6	Growth rate of GDP per person engaged	86
Switzerland	**Global Innovation Index**	**1**	
Strengths (Economy's 10 best rankings)		**Weaknesses (Economy's 10 worst rankings)**	
Variable	**Rank**	**Variable**	**Rank**
Trademark registrations filed through the Madrid System	1	Strength of investor protection	119
Total value of stocks trade	1	Ecological footprint and bio capacity	105
Press freedom	1	Creative services exports	97
Patent applications filed through the PCT	1	Gross capital formation	76
Computer software spending	1	Time to start a business	75
Applied tariff rate	1	Growth rate of GDP per person engaged	69
Scientific and technical journal articles	2	Imports of goods and services	58
University/industry collaboration on R&D	2	Online participation	56
Quality of research institutions	2	Tertiary outbound mobility	49
Employment in knowledge-intensive services	3	GERD financed by abroad	48

Source: GII 2011, Data analysis, INSEAD 2011 Report.
Available at: http://www.globalinnovationindex.org/gii/main/analysis/strengthweakness.cfm

Measuring the innovation potential and the results of Croatian Economy (selected variables, INSEAD 2011) in comparison to Switzerland and Japan, as the best performing Economies, it is evident that Croatia shows weaknesses regarding regulatory environment, infrastructure for supporting innovation activities and knowledge absorption, market sophistication, and business sophistication, (as a business sophistication pillar), knowledge creation, and knowledge diffusion (as a scientific outputs pillar).

According to The Global Innovation Index (GII, 2011) in 2010 Croatia achieved an overall remarkable 44th position and moved up significantly from position 62 of the previous year. Croatia achieved a significant advance according to rankings of the Innovation Union Scoreboard (IUS, 2010), in comparison with the previous results from European Innovation Scoreboard (EIS, 2009). By providing a comparative assessment of the innovation performance of Croatia with the EU-27 member states and the relative strengths and weaknesses of their research and innovation systems, Croatia's system is generally weaker, but has some comparative strengths and weaknesses[7].

The main strengths include:

- The human capital and research made the case that the accumulation of human capital through education, and particularly higher education, and the prioritization of R&D activities is an indispensable precondition for innovation to take place. The higher share of population of the age 20 to 24 having completed at least upper secondary education indicates that a rise in the scientific and technical studies' enrolment rate is likely to follow. In the last 10 years the main achievement of the science and research sector was the significant increase in the number of young researchers employed.
- Croatia is one of the moderate innovators with a below average performance according to the IUS 2010. Relative strengths are given in human resources, innovators, and outputs. High growth is observed for non-R&D innovation expenditure, public-private co-publications and community designs (European Commission, 2010, p. 52).
- Increased mobility helps the integration of the Croatian youth, researchers and teachers into EU and contributes to the supply of foreign researchers and diasporas who enrol in the Croatian RTO/universities; however increased mobility does not much influence the general labour supply of researchers in the business sector … neither does it have a positve influence on the present mismatch between enrolment quotas for education programs with higher employability rates and distortions in the university-educated segment of the Croatian labour market towards SSH.
- The orientation towards IPA regional development is an excellent instrument for better integration of RTO/ universities into the local development and for closer science-industry cooperation; the main threats are the lack of good project proposals and low involvement of local economy.
- Croatia's scientific cooperation (measured by co-publications) with other European countries is broader and more intense than its technological cooperation (measured by co-patents), providing potential for growing internationalization of the technology cooperation.
- The participation of Croatian researchers in FP7 is increasing. By application to FP7 research projects among the candidate countries Croatia (HR) ranks 2nd in terms of number of applicants and 2nd in terms of requested EC contribution. Increasing the participation of the Croatian researchers in the ERA remains the key challenge
- SME performance and participation in FP7 research projects: the HR SME applicant success rate was 17.95%
- The most active FP7 research priority areas are: research for the benefit of SMEs, ICT, food, agriculture, fisheries and biotechnology and the environment — including climate change.

Croatia was found to be weak in the following:

- The below average R&D intensity of EU-27 (R&D as a share of GDP) and declining business R&D intensity.
- Poor international linkages, this was given the highest ranking in terms of R&D financed from abroad and the number of international tertiary students with a special reference to post-doctoral students studying in Croatia.
- Low rate of patenting intensity (number of patents in per capita terms).
- Weak links between innovators in the private and public sectors with a small percentage of firms collaborating with public research organizations.
- Weakly developed venture capital due to a deep (conservative) financial system (that shuns risk-taking).
- Relative weaknesses are the lack of open, excellent and attractive research systems and intellectual assets.

Investing in R&D: Macroeconomic and Microeconomic Performance

Countries who are members of the EU have identified research and innovation policy as one of the key priorities in which they will make changes at the national level within in frame of their NRPs. Most of the member states of the EU have determined that:

- business environment,
- entrepreneurship,
- sustainable development and
- competitive objective selection

… are the most important key challenges that should be taken into consideration.

At the same time, one should take into account that priority selection in general depends on the current situation of the country, while competition-related tasks will seek adaptation to upcoming events on the market. Specific areas (Becic & Dabic, 2008, p. 72) that need to function more effectively at the microeconomic level are changes in and generation of human capital, education and skills, generation of common European area of research and innovation, investment in Internet, e-commerce and ICT, development of entrepreneurial spirit, entrepreneurial capital and SMEs and connecting industry with the scientific community. Tables below illustrate Croatia's comparative R&D performance in terms of inputs against a selection of EU-27 advanced and emerging economies. Although Croatia performs relatively well, it still lags behind its major competitors in terms of R&D expenditure. Europe 2020, a strategy for jobs and smart, sustainable and inclusive growth, is based on five EU headline targets which are currently measured by eight headline indicators[8]. One of these puts forward that 3% of GDP that should be invested in R&D.

The analysis of indicators of macroeconomic performance (Table 2) shows that some macroeconomic indicators in Croatia grew faster than in the EU. In 2010, GDP per capita reached 62 % of the EU-27 average. In 2010, the real Croatian GDP growth rate decreased by 1.2%. In 2009 real Croatian GDP growth rate was -6.0% (compared to the EU-27 average of 2.0 %). The growth was predominantly based on private consumption and investments while the trade deficit expanded. The unemployment rate increased by 2.7% to 11.8 %, but remained higher than the EU-27 average (9.7%) in 2010. Labour productivity (GDP over total employment) showed convergence toward the EU-27 productivity levels, reaching 78.5% in 2010 (a decreased from the 79.3% of 2009).

Table 2. Indicators of economic performance[9].

Indicator	National performance				EU 27 average			
	2002	2007	2009	2010	2002	2007	2009	2010
GDP per capita in PPS (EU27=100)	48.4	57.5	64 p	61 p	100	100	100	100
Real GDP growth rate (% change previous year)	5.6	4.5	-6.0	-1.2	1.3	3.2	-4.3	1.9
Labour productivity per person employed (EU27=100)	67.2	75.7	79.3 f	78.5	100	100	100	100
Total employment growth (annual % change)	4.2	0.8	-1.8	-4.0	0.4	1.6	-1.8	-0.5
Inflation rate (average annual)	2.5	2.7	2.2	1.1	2.1	2.3	1	2.1
Unit labour costs (growth rate)	1.3	3.5	3.3 f	-4.2	-0.4	-0.8	2.8	-1.5
Public balance (net borrowing/lending) as a % of GDP	-4.1	-2.5	-4.1**	:	-2.6	-0.9	-6.9	-6.6
General government debt as a % of GDP	40	32.9	35.3*	:	60.4	59	74.7	80.1
Unemployment rate (as % of active population)	14.8	9.0	9.1	11.8	8.9	7.1	9	9.7
Business investment as a percentage of GDP	:	:	:	:	17.3	18.3	16.2	15.9

Source: Authors` calculations, based on Eurostat data
Note: (*) 2006; (**) HR2009; (:) not available

Investment in human resources and research & development are essential for developing knowledge and new technology (Table 3). The EU growth and jobs strategy stresses the importance of information and communication technologies (ICT), and the i2010 strategy for a European information society for growth and employment supports social inclusion, better public services and quality of life.[10]

Table 3. Innovation and Research, Croatia's performance in comparison with EU 27 average.

Indicator	National performance		EU 27 average	
	2002	2009	2002	2009
Persons of the age 20 to 24 having completed at least upper secondary education	90.6	95.3	76.7	79
Science and technology graduates by gender	5.6	12.8	11.3	14.3
Gross domestic expenditure on R&D	0.96	0.73	1.88	2
Patent applications to the European Patent Office (EPO)	8.29	5.39	105.8	115.8
Patents granted by the United States Patent and Trademark Office (USPTO)	5.83	1.64*	56.38	24.74*
High - tech export, % of exports	8.964	6.795*	18.895	16.645*
Level of Internet access - households, %**	:	56	:	70
Broadband penetration rate	:	:	:	25.7
Broadband and connectivity -access at home	:	42	:	58

Source: Authors` calculation based on Eurostat data.
Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/innovation_and_research.
Notes: (*)2006;(**)2010

Investment in knowledge[11] (Table 4), notably in R&D, has been growing in line with the Croatian GDP. This notion contrasts with the late 1990s figures when investment in knowledge outpaced the growth of GDP. Investment in knowledge is crucial for innovation, economic growth, job creation and improved living standards (OECD, 2009). The most of the OECD countries are increasing their investments in the knowledge base. R&D was the main source of increase in many of the analysed OECD countries (i.e. Denmark, Finland, Canada, Spain, Germany, Portugal, Greece, Australia and Austria). The same trend is noted within the OECD and the EU average. Croatia also followed the same trend. Higher education was the main driver of the expansion of investment in knowledge in the United States and Belgium. For Japan, Sweden, France, the Netherlands, and the United Kingdom, increases in software expenditure were the major source of increased investment in knowledge.

Table 4. Investment in knowledge, as a percentage of GDP, 2003[12].

	R&D	Software	Higher Education	Investment in Knowledge	Change in investment in knowledge to GDP ratio (1997-2003)
Portugal (1)	0.78	0.13	0.83	1.74	0.21
Greece (1)	0.64	0.26	0.96	1.85	0.17
Ireland (1)	1.19	0.19	0.89	2.27	-0.28
Italy (1)	1.14	0.57	0.68	2.38	0.38
Spain	1.12	0.64	0.92	2.68	0.45
Belgium (1)	1.92	0.59	0.90	3.41	0.77
Austria (1)	2.21	0.67	0.54	3.43	0.29
United Kingdom (1)	1.80	1.01	0.70	3.50	0.22
EU (3)	2.02	0.80	0.79	3.62	0.38
Netherlands (1)	1.84	1.10	0.80	3.75	0.29
Germany	2.54	0.64	0.73	3.90	0.43
Australia	1.81	0.99	1.14	3.94	0.30
France	2.20	1.16	0.95	4.31	0.49
Canada	2.02	0.83	1.60	4.45	0.54
OECD (2)	2.41	1.08	1.42	4.91	0.69
Denmark (1)	2.58	1.36	1.16	5.10	1.29
Japan	3.31	1.19	0.83	5.33	0.98
Finland (1)	3.49	1.31	1.11	5.92	0.72
Sweden (1)	3.98	1.54	0.93	6.44	0.86
United States	2.74	1.46	2.36	6.56	0.91
HR (4)	1.11	:	0.84	1.95	0.47

Source: OECD, STI Scoreboard 2007; CBS of Croatia

Although consent in achieving objective of the EU to "increase in funding R&D to 3% GDP till 2010" existed, data in Table 5 show that member states of the EU have planned different time frames for achieving the "3% GDP till 2010" objective.

Countries like Ireland have scheduled to fund "3% GNP for R&D", not till 2010 but until 2013, because they have a large number of foreign companies that operate in the country, while the UK estimated that it will achieve their target in 2014. Countries like Germany, Austria, France and Denmark planned to realize their objective of 3 % by 2010. These countries are followed by Slovenia and Belgium. Other countries planned funding for R&D at a level significantly below 3% of GDP. Achieving the objective as shown by the member states' past experience, is primarily related to reforms at the microeconomic level in the implementation of a consistent policy mix to stimulate R&D and innovation. With the re-launch of the Lisbon Strategy in 2005 and the newly launched Europe 2020 Strategy the European Union and its member states committed themselves to a new partnership aimed at securing sustainable growth and jobs. However, not all member states have undertaken reforms with equal determination. Europe is still fragmented when it comes to fostering innovation and research and development; the contribution from the private sector is still insufficient. The EU goes into the new Strategy cycle. The key challenge for Croatia and the Member States during the next cycle would be to implement the outstanding reforms, particularly in those areas which are detailed in the country-specific recommendations.

Table 5. Expenditure for R&D, as a part of the objective in NRPs (% in GDP).

	2004	Objective for 2010		2004	Objective for 2010
EU-25	1.86	3.00	Luxembourg	1.65	3.00
Belgium	1.90	3.00	Hungary	0.89	1.80
Czech Republic	1.27	2.06	Malta	0.64	0.75
Denmark	2.48	3.00	Netherlands	1.78	3.00
Germany	2.49	3.00	Austria	2.24	3.00
Estonia	0.91	1.90	Poland	0.56	1.56
Greece	0.57	1.50	Portugal	0.74	1.80
Spain	1.07	2.00	Slovenia	1.45	3.00
France	2.16	3.00	Slovak Republic	0.53	1.80
Ireland	1.20	2.50% GNP	Finland	3.51	4.00
Italy	1.14	2.50	Sweden	3.70	4.00
Cyprus	0.37	1.00	United Kingdom	1.79	2.50
Latvia	0.42	1.50	Croatia	1.20	toward 3.00

Source: Eurostat; NRPs (National Reform Programmes) by countries, [online]
Available at: http://ec.europa.eu/growthandjobs/annual-report_en.htm
http://ec.europa.eu/archives/growthandjobs_2009/documentation/index_en.htm#implementation

Levels of R&D are a very imprecise indicator of an economy's growth potential or capacity for innovation. The EU is also far too heterogeneous economically and in terms of industrial structure for a single R&D target to be appropriate. There is some relationship between levels of R&D and GDP per capita, of course, but it is not an especially close one (CER, 2008, p. 24) (see the Table 6).

Table 6. GERD/BDP ratio and BDP per capita (PPS), 2006 -2010[13].

Country	GDP per capita (PPS)		R&D expenditure as % of GDP	
	2006	2010	2006	2010
EU 27	100	100	1.85	2.0
France	108	107	2.11	2.26
Ireland	146	127	1.24	1.79
Austria	126	126	2.44	2.76
Luxembourg	270	274	1.66	1.63
Belgium	118	119	1.86	1.99
Finland	114	116	3.48	3.87
Sweden	123	123	3.68	3.42
UK	120	114	1.75	1.77
Iceland	123	110	2.99	3.11*
Norway	183	179	1.49	1.71
Netherlands	131	133	1.88	1.83
Switzerland	134	148	2.9*	2.99**
United States	154	149	2.60	2.79**
Japan	110	107	3.32	3.45**
Slovenia	88	86	1.56	2.11
Spain	208	108	1.20	1.39 p
Croatia	58	62	0.75	0.73

Source: Authors` calculations based on Eurostat data

The focus on overall R&D spending and patent activity is therefore misguided, and gives a misleading picture of the innovative capacity of the various EU member-states. The openness of firms to new technologies is as important as the R&D intensity of economies. However imperfect R&D is as a measure of innovative capacity, the reasons for the relative lack of R&D are a real concern. European firms are big investors in R&D in sectors in which they are dominant such as car manufacturing and mechanical and electrical engineering (CER, 2008, p. 25). A similar trend is also observed among Croatia's firms.

R&D at the National Level

Government Budget Appropriations or Outlays on Research and Development (GBAORD)

Government budget appropriations or outlays on research and development (GBAORD) are funds allocated to R&D in central government or federal budgets and therefore these are merely budget provisions, not actual expenditure. In 2009, GBAORD expressed as a percentage of GDP stood at 0.69 % in Croatia which is below the average levels recorded in the EU-27 which stood at 0.74 %. In 2009, there were wide disparities in GBAORD as a share of GDP between the member states, ranging from 1.13 % in Finland to 0.20 % in Latvia. A further eight member states: Denmark, Portugal, Sweden, Germany, Austria, the Netherlands, France and Slovenia recorded GBAORD levels above the EU-27 average (0.74 %). Government budget appropriations or outlays on R&D are distributed by socio-economic objectives, depending on the purpose of the R&D programmes or projects, on the basis of the nomenclature for the analysis and comparison of scientific programmes and budgets (NABS, 2007). In 2009 the main socio-economic objective within

the EU-27 was "general advancement of knowledge: R&D financed from general university funds (GUF)", which accounted for 31.8 % of total GBAORD (in Croatia this accounted for 53.9%) followed by "general advancement of knowledge: R&D financed from other sources than GUF" 17.5 % (in Croatia this was 33.3%), "industrial production and technology" (EU27: 9.7 %; HR: 1.2%) "health" (EU27: 8.2 %; HR: 2.2%) and "transport, telecommunication and other infrastructure" (EU27: 3.9%; HR: 2.2%). (EC, 2011, p. 21).

R&D Expenditure

The current situation of national R&D expenditure shows that Europe is still working to achieve the target set by the Europe 2020 Strategy (in the past this was the Lisbon Strategy target) of devoting 3% of GDP to research and development activities. With a R&D intensity of around 2% of GDP since 2000 the EU-27 is still below the Lisbon target. The highest R&D intensities, above the 3% target, were achieved by Sweden, Finland and Denmark. All of the other member states were below this threshold. The current situation of national R&D expenditure in Croatia shows negative trends in the last 3 years. Croatia had the GERD R&D intensity of 0.84% in 2009, a value which is considerably lower than the EU average of 2.01%. R&D intensity in Croatia has fluctuated over the last decade. More precisely, it decreased from 1.05% in 2004 to 0.75% in 2006, slightly increased to 0.9% in 2008, before decreasing in 2009 to 0.84%. These fluctuations are mirrored by fluctuations in the R&D intensity of both private and public sector (Government plus Higher Education) over the same period. The financial and economic crisis reduced the total R&D expenditures in 2010 to 0.73% of GDP from 0.9% of GDP in 2008. The public resources for R&D decreased to 0.41% of GDP which is far from the Lisbon target of 1% of GDP of public resources for R&D. At the same time EU27 and most developed world and EU economies, records growth of investment in R&D despite the negative efffect of the financial crisis during the last several years.

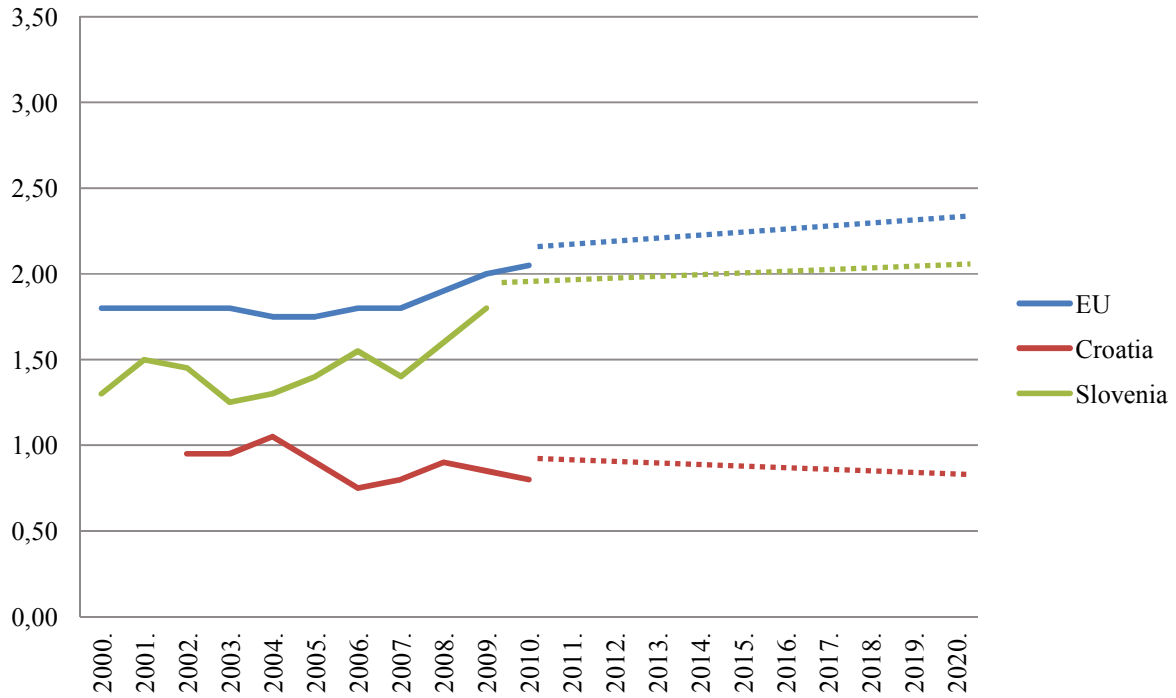

Figure 3. Croatia R&D Intensity projections, 2000-2020[14].
Source: Authors` calculation based on DG Research and Innovation, Innovation Union Competitiveness Report 2011

Figure 3 exhibits R&D intensity projections for Croatia from 2010 - 2020, and in the case of Slovenia from 2009 up to 2020 on the basis of ten year data from 2000-2010. Both EU and Slovenia have higher rates of investment and intensity projections than Croatia.

Table 7. R&D intensity in Croatia, in the EU-27, and selected countries, 2006-2010[15].

	BERD as a percentage GDP					GERD as a % of GDP (R&D intensity)				
	2006	**2007**	**2008**	**2009**	**2010**	**2006**	**2007**	**2008**	**2009**	**2010**
EU 27 countries	1.17 s	1.18 s	1.21 s	1.24 s	1.23 s	1.85 s	1.85 s	1.92 s	2.01 s	2.00s
Belgium	1.29	1.32	1.34	1.34	1.32 p	1.86	1.89	1.97	2.03	1.99p
Bulgaria	0.12	0.14	0.15	0.16	0.30p	0.46	0.45	0.47	0.53	0.60p
Czech Rep.	0.97	0.92	0.87	0.89	0.97	1.49	1.48	1.41	1.48	1.56
Denmark	1.66	1.8 b	1.99	2.08	2.08 e	2.48	2.58 b	2.85	3.06	3.06 e
Germany	1.78	1.77	1.86	1.91	1.90 p	2.54	2.53	2.69	2.82	2.82 e
Estonia	0.50	0.51	0.55	0.64	0.81 p	1.13	1.08	1.28	1.43	1.62 p
Ireland	0.82	0.84	0.94	1.16	1.22 e	1.24	1.28	1.45	1.74 e	1.79 p
Greece	0.18 e	0.17	:	:	:	0.59 e	0.60 e	:	:	:
Spain	0.67	0.71	0.74 b	0.72	0.71 p	1.20	1.27	1.35	1.39	1.39 p
France	1.33 b	1.31	1.33	1.39	1.38 p	2.11	2.08	2.12	2.26	2.26 p
Italy	0.55	0.61	0.65	0.67	0.67 p	1.13	1.17	1.21	1.26	1.26 p
Cyprus	0.10	0.10	0.10	0.10	0.09 p	0.43	0.44	0.43	0.49	0.50 p
Latvia	0.35	0.19	0.15	0.17	0.22	0.70	0.60	0.62	0.46	0.60
Lithuania	0.22	0.23	0.19	0.20	0.23	0.79	0.81	0.79	0.83	0.79
Luxembourg	1.43	1.32	1.22	1.26	1.16 p	1.66	1.58 e	1.57	1.66	1.63 p
Hungary	0.49 i	0.49 i	0.53 i	0.67 i	0.69 i	1.01	0.98	1.00	1.17	1.16
Malta	0.41	0.38	0.37	0.35	0.37 p	0.62	0.58	0.56	0.54	0.63 p
Netherlands	1.01	0.96	0.89	0.86	0.87 p	1.88	1.81	1.77	1.82	1.83 p
Austria	1.72	1.77	1.85 e	1.85	1.88 p	2.44	2.51	2.67 e	2.72	2.76 p
Poland	0.18	0.17	0.19	0.19 i	0.20	0.56	0.57	0.60	0.68	0.74
Portugal	0.46 e	0.60	0.75	0.78	0.72 p	0.99 e	1.17	1.50	1.64	1.59 p
Romania	0.22	0.22	0.17	0.19	0.18	0.45	0.52	0.58	0.47	0.47
Slovenia	0.94	0.87	1.07 b	1.20	1.43 p	1.56	1.45	1.65 b	1.86	2.11 p
Slovakia	0.21	0.18	0.20	0.20	0.27	0.49	0.46	0.47	0.48	0.63
Finland	2.48	2.51	2.75	2.80	2.69	3.48	3.47	3.70	3.92	3.87
Sweden	2.75 ei	2.47	2.74 e	2.54	2.35 e	3.68 ei	3.40	3.70 e	3.61	3.42 ei
United Kingdom	1.08	1.11	1.11	1.12	1.08	1.75	1.78	1.79 e	1.86 e	1.77 p
Iceland	1.59	1.46	1.44	1.64	:	2.99	2.68	2.64	3.11	:
Norway	0.82	0.88	0.88	0.95 p		1.49	1.62	1.61	1.80	1.71 p
Switzerland	:	:	2.20	:		:	2.99	:	:	
Croatia	0.27	0.33	0.39	0.34	0.32	0.75	0.80	0.89	0.83	0.73
Turkey	0.21	0.29	0.32	0.34	:	0.57	0.71	0.73	0.85	:
Russia	0.72	0.72	0.65	0.78		1.07	1.12	1.03	1.24	
United States	1.85 i	1.92 i	2.02 ip	:		2.6 i	2.66 i	2.79 ip	:	:
China (except Hong Kong)	0.99	1.01	1.08	:		1.42	1.44	1.54	:	
Japan	2.63	2.68	2.70	:		3.40	3.44	3.45 b	:	
South Korea	2.32 i	2.45b	2.53	:		3.01 G	3.21 A	3.36	:	

Source: Authors` calculation based on Eurostat R&D database

It can be seen that in the Croatian business sector (BERD) investing in research and development measured as a proportion of the GDP stagned and declined in the period 2008-2010. Meanwhile EU27 and most of the other countries recorded an increased share of business sector investment in R&D as a proportion of GDP. The expenditure of business enterprises on research and development (BERD) is considered important for innovation and economic growth (OECD, 2011, p. 80). In 2009 the business enterprise expenditure on R&D as a % of GDP was 0.34% and the public sector expenditure (Government plus Higher Education) was 0.50%, these values being above the average of the Reference Group of countries. In EU 27 investment in R&D by the business sector reached 1.23% of GDP in 2010, up slightly from 1.17 in 2006. In Croatia same indicator decreased from 0.39% in 2008 to 0.32% of GDP in 2010.

Data about business sector investment in R&D (companies that are registered for complying with R&D activities) shows that BERD intensity of around 0.33% of GDP implies how Croatian companies reached certain level of funding above which there has been no significant increase. Given that in Croatia there is no detailed analysis or empirical study of factors and changes at the micro level that affect the movement of investment in the business sector, it is assumed (based on data retrieved from the Questionnaire that CBS employed to find out more about R&D, from those companies that have reported expenditure on R&D) that one of the main reasons that affected this recorded downward trend was the decline in the amount of funding available to companies that constantly invest in research and development. The trend scenario provided by the EC DG Research till 2020 illustrates that Croatia will still be below the EU average in 2020 having the R&D intensity level of 0.68% (EU, 2011, p. 27).

R&D Expenditures by Sources of Financing

The indicator of expenditure on R&D by source of funding (by sectors and overall on the level of country-GERD) illustrates the financial flows related to R&D within the country and inflows from abroad. Table 8 shows the trend of stagnation and fall in allocation of investment in R&D at the national level:

- Decline in GDP growth rate with negative rates of growth in 2009 and 2010
- Three year of consecutive decline in overall R&D investment (GERD) in the period of 2008-2010
- Decreased business sector funding of R&D (BERD) in the period of 2008-2010
- Stagnation in public sector funding of R&D (sector of higher education and state)
- Stagnation of state's R&D expenditures from the Budget for science and research (GBOARD as % of GDP)

The stagnation and lower R&D investment in recent years could be attributed to negative GDP growth and a decline in the share of the total R&D investment (as % of GDP), and also a change in the sectoral structure of R&D funding (Table 8).

Table 8. Total intra-mural expenditure (GERD) by source of funds, Croatia 2002-2010.

	Business	Government	Higher education	Non-profit sector	All sectors
	(BERD)	(GOVERD)	(HERD)	NPS	(GERD)
2002 total, HRK 000	855.902	446.643	703.762	:	2.006.307
Own resources	87.49%	15.68%	18.14%	:	47.18%
Central and local government	1.83%	77.30%	71.00%	:	42.89%
Private and public enterprises	7.51%	1.46%	9.66%	:	6.92%
Other domestic resources	0.62%	3.96%	0.87%	:	1.49%
Foreign investors	2.55%	1.60%	0.33%	:	1.56%
2003 total, HRK 000	864.196	485.336	859.742	:	2.209.274
Own resources	87.68%	17.19%	21.53%	:	46.45%

Central and local government	1.58%	78.79%	66.16%	:	43.67%
Private and public enterprises	7.62%	1.49%	8.19%	:	6.49%
Other domestic resources	0.40%	0.70%	2.25%	:	1.18%
Foreign investors	2.72%	1.83%	1.87%	:	2.20%
2004 total, HRK 000	1.077.390	541.141	968.155	:	2.586.686
Own resources	48.84%	15.42%	20.98%	:	31.42%
Central and local government	1.73%	77.75%	70.49%	:	43.37%
Private and public enterprises	44.29%	3.72%	7.03%	:	21.87%
Other domestic resources	0.58%	1.38%	0.72%	:	0.80%
Foreign investors	4.57%	1.74%	0.78%	:	2.56%
2005 total, HRK 000	953.523	555.341	799.880	2.968	2.311.712
Own resources	49.00%	15.00%	14.30%	0	28.70%
Central and local government	21.00%	79.00%	77.10%	47.94	54.50%
Private and public enterprises	27.00%	3.00%	6.30%	0	14.20%
Other domestic resources	0.00%	0.00%	0.00%	0	0.00%
Foreign investors	3.00%	3.00%	2.30%	52.06	2.60%
2006 total, HRK 000	799.891	577.682	798.480	3.107	2.179.160
Own resources	61.05%	14.69%	6.95%	16.83%	28.87%
Central and local government	2.11%	80.01%	81.48%	43.60%	51.90%
Private and public enterprises	24.17%	1.65%	7.79%	0.00%	12.16%
Non-profit institutions	0.00%	0.54%	0.21%	0.00%	0.22%
Foreign investors	12.67%	3.11%	3.57%	39.60%	6.84%
2007 total, HRK 000	1.037.832	650.960	861.489	3.249	2.553.530
Own resources	79.39%	12.20%	9.00%	0.00%	29.80%
Central and local government	2.27%	79.31%	77.30%	37.30%	47.30%
Private and public enterprises	17.04%	5.10%	10.80%	0.00%	11.90%
Non-profit institutions	0.00%	0.40%	0.10%	0.00%	0.10%
Foreign investors	22.50%	3.00%	2.80%	62.70%	10.90%
2008 total, HRK 000	1.361.423	776.109	932.702	3.731	3.073.965
Own resources	72.20%	10.10%	6.10%	0.60%	36.40%
Central and local government	1.80%	84.30%	81.20%	47.90%	46.70%
Private and public enterprises	11.30%	2.80%	10.30%	0.00%	8.80%
Non-profit institutions	0.00%	0.20%	0.30%	0.00%	0.20%
Foreign investors	14.70%	2.60%	2.10%	51.50%	7.90%
2009 total, HRK 000	1.129.337	758.811	902.711	3.311	2.794.170
Own resources	74.20%	7.10%	6.00%	1.70%	33.90%
Central and local government	2.10%	82.50%	80.40%	41.10%	49.30%
Private and public enterprises	12.30%	6.10%	9.80%	0.00%	9.80%
Non-profit institutions	0.00%	0.20%	0.20%	0.00%	0.10%
Foreign investors	11.40%	4.10%	3.60%	57.20%	6.90%
2010 total, HRK 000	1.077.264	672.444	689.543	3.650	2.442.901
Own resources	68.70%	5.80%	6.90%	3.40%	33.80%
Central and local government	3.90%	84.20%	80.10%	44.70%	47.60%
Private and public enterprises	10.00%	4.70%	10.00%	0.00%	8.50%
Non-profit institutions	0.10%	0.40%	0.20%	0.00%	0.20%
Foreign investors	17.30%	4.90%	2.80%	51.90%	9.90%

Source: Authors` calculation based on CBS data

The data in Table 8 clearly shows the dynamic changes in the structure of funding of research and development by different sectors in the period 2002-2010. Unlike industrialized countries where the industry is financing and carrying out most of the R&D activities (60-70%), and employs the majority of researchers, Croatia exhibits the opposite trend. The domestic industry (private sector) is funding only about 40% of total R&D expenditure. Main share of investment in R&D comes from only two or three large industrial companies, and these firms employ about 10% of the total number of researchers, which number is insufficient for meeting the numerous challenges imposed by today's knowledge economy. Beside investment by the private sector in R&D (which amounts to 40%), other sectors also invest in R&D: government (around 30%), sector of Higher Education (around 30%), and finally there is minor participation by the non-profit sector.

However, since in almost all developed countries the private sector (business sector) is the largest participant in investment in R&D it is important to note the structure of the source of funding for R&D by the private sector in Croatia. Data in table 9, shows the structure for the period 2000 - 2010.

Table 9. Sources of funds for research and development in the business sector BERD 2000 – 2010.

Source	**Structure by resources in %**										
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Own resources	**72.64**	**88.2**	**87.49**	**87.86**	**48.84**	**49**	**61.05**	**79.39**	**72.2**	**74.2**	**68.8**
Central and local government	2.02	2.47	1.83	1.58	1.73	21	2.11	2.27	1.8	2.1	3.9
Private and public enterprises	10.66	8.21	7.51	7.62	44.29	27	24.17	17.04	11.3	12.3	10
Non-profit institutions	3.87	0.27	0.62	0.4	0.58	0	0	0	0	0	0.1
Foreign investors	10.8	0.84	2.55	2.72	4.57	3	12.67	22.5	14.7	11.4	17.3

Source: Authors` calculation based on CBS data

Although the amount of R&D funding in Croatia does not follow a positive trend, or perhaps it is even better to say it does not follow the European trend, sources of funds for research and development in the business sector in Croatia largely follow trends set by companies in the EU: the largest part of funding for R&D is made up from the companies' own sources[16]. However, business sector sourced funding over the last ten years fluctuated significantly. Percentage of R&D funding from companies' own resources was similar in 2010 to what it was in 2000 and it amounted to around 70%. However, a significant increase was recorded in 2003 (when it reached almost 90%), after which it dramatically fell (to around 50%) in 2004. Percentage of R&D funding by foreign investors displayed significant fluctuation as well. From 10.8% in 2000 it fell to only 3% in 2005 after which it rose all the way to 17.3% in 2010. Share of R&D funding by non-profit institutions in the business sector, fell from approximately 4% in 2000 to almost 0% in 2010. While the share of funding by central and local government and private and public enterprises recorded important fluctuation during a 10-year period, by 2010 they were again at the same level as they were in 2000.

The next table shows the analysis of R&D funding structure by contractors. From this table it is possible to see a stagnation trend which occurred in the period 2005-2010.

Table 10. R&D source of funding by type of contractors, in %.

Source by contractor	All sectors					
	2005	2006	2007	2008	2009	2010
Source of financing - total	**100**	**100**	**100**	**100**	**100**	**100**
Government budget funds	**45.8**	**49.7**	**45.9**	**44.5**	**47.4**	**46.0**
Government agencies and foundations` funds for R&D activities	0.4	0.8	0.6	1.4	1.0	1.1
Local communities` funds for R&D activities	8.3	0.7	0.7	0.8	0.9	0.5
Business sector`s funds for R&D activities	14.1	12.2	11.9	8.8	9.8	8.5
PNP` funds for R&D activities	0.1	0.2	0.2	0.2	0.1	0.2
Patent, licence, and other funds (from sales within a country)	**0.3**	**0.5**	**0.0**	**0.0**	**0.1**	**0.1**
Other private funds for R&D	28.4	28.4	29.7	36.4	33.8	33.7
Technology licence funds for R&D activities	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**
Foreign investors` technology licence funds for R&D activities	1.1	1.7	1.4	1.2	2.0	1.7
Joint venture funds for R&D activities	0.0	0.1	7.5	5.4	2.8	6.3
Foreign government funds for R&D activities	**0.4**	**0.2**	**0.3**	**0.2**	**0.4**	**0.3**
University and other higher education institutions` funds for R&D activities	0.1	0.1	0.1	0.1	0.2	0.0
PNP funds for R&D activities	0.0	3.5	0.1	0.0	0.1	0.1
European commission funds for R&D activities	0.1	0.4	0.5	0.2	0.4	0.5
International organizations` funds for R&D activities	0.4	0.5	0.4	0.6	1.0	0.8
Other	0.4	0.5	0.6	0.1	0.0	0.1

Source: Authors` calculation based on CBS R&D database

R&D activities are seen to be funded by different sources if analyzed by type of contractors. Table 10 shows the structure of sources of funding for the period 2005-2010. The majority of the sources for R&D activities came from the largest contractor, the Government. Government budget funds represent approximately 45% of total source of financing, and this level remained constant during the entire period from 2005-2010. The source of approximately 32%, a significant part of financing, was private funds, this level remained constant during the period 2005-2010. Probably largest changes were recorded from the following supplying contractors: Local communities` and Joint ventures. Local communities as a source of funds for R&D fell from 8.3% in 2005 to 0.5% in 2010, while Joint venture funds for R&D increased significantly from 0% in 2005 to 6,3% in 2010.

In 2010, investment in research and development of more than 10 million HRK was reported by 18 companies according to the CBS data on expenditures by the Business sector. These companies employed 16536 employees, of that number 2021 worked in research and development while only 990 were employed as actual researchers. Of the 18 companies, only 6 companies were operating in the sector C-Manufacturing. In total, they employed 9217 people, including employees in R&D (481), and researchers (228). The number of employees employed in R&D activity in Croatian firms is generally very low compared to the total number of employees in the company.

Table 11. Number of employed on R&D in Business sector, 2003-2010.

Indicator	2003	2004	2005	2006	2007	2008	2009	2010
Total number of employees	**35.332**	**63.092**	**35.264**	**37.571**	**37.111**	**29.737**	**44.292**	**45.613**
Employees in R&D								
* Total number(HC)	2.134	3.135	2.441	2.517	2.623	2.898	3.260	2.913
* FTE	2.092	2.807	2.100	2.228	2.325	2.535	2.797	2.572
Researchers								
* Total number(HC)	864	1.164	906	916	1.059	1.299	1.521	1.387
* FTE	852	999	707	735	881	1.098	1.289	1.281
Participation of researchers in R&D (FTE) in total number of employees, in %	2	2	2	2	2	4	3	3
Participation of researchers in R&D (HC) in total number of employees, in %	2	2	3	2	3	4	3	3
Participation of employees in R&D (FTE) in total number of employees, in %	6	4	6	6	6	9	6	6
Number of firms that register expenditure for R&D	32	102	76	74	72	68	123	106

Source: Authors` calculation based on CBS R&D database for Business sector

Table 11 shows significant fluctuation in the number of person employed in R&D in business sector in the period 2003-2010. In 2010 this number amounted approximately 46 thousand. In the period 2003-2010 the number of employees employed in R&D activities (FTE) in companies that have declared that they perform R&D activities and invest in R&D activities, accounted for an average of about 6% of total employment and the share of researchers was approximately 3% of total employment in the business sector (Table 11).

Between 2003 and 2008, R&D personnel measured in FTE in the EU-27grew by 3.3 % a year on average. There were substantial variations between the Member States. The highest increase of more than 10 % was recorded by Malta (17.0 %), Portugal (14.0 %), Czech Republic (12.7 %) and Slovenia (11.2 %), Croatia had a 3.0% increase while the three countries that reported a decline were Finland (-0.2 %), Poland (-0.6 %) and Romania (-1.7 %) (European Union, 2011. p. 45). The number of firms that registered expenditure for R&D during the observed period varied (from 32 in 2003 up to 106 in 2010). This number is very small compared to the total number of registered companies and a decrease was also recorded in the amount of expenditure on R&D that companies set aside on an annual basis.

Innovation Performance

Over the five year period (2006-2010) the average annual growth rate in innovation performance of the EU-27 countries was 0.85%. Growth was particularly strong in open, excellent and attractive research systems and intellectual assets (European Commission, 2010, p. 11). Croatian growth in innovation performance was 3.5%, well above the EU-27 average in the same period. The recent Eurostat data (data provided by the Community Innovation Survey CIS 2008 and CIS 2006) shows that Croatian enterprises innovation activities follow some of the key trends described below.

44.15% of enterprises in industry and services in Croatia reported innovation activity between 2006 and 2008 (compared to 30.56% of enterprises who did so between 2004 and 2006), while in the EU-27 countries 51.6 % of enterprises reported innovation activity in the same period (up from 38.87% of enterprises between 2004-2006). In 2008, 34,5% of enterprises in Croatia were considered innovative in terms of technological innovation, four percentage points more than in 2006. 39.8 % of enterprises in 2008 in the EU-27 were considered innovative in terms of technological innovation, one percentage point more than in 2006. The proportion of innovative enterprises was generally higher in manufacturing at 47.3% (EU-27: 54,5%) than in service activities, which stood at 41.67% in Croatia (EU-27: 48.49%); this performance difference was observed in most EU countries. Additionally, 14.47% of innovative enterprises in Croatia cooperated with universities or other higher education institutions over the period 2006–2008, 11.01% cooperated with the government or public research institutes and 17.18% cooperated with other enterprises of the same sector. On the other hand, one third of innovative enterprises in the EU-27 countries cooperated with other enterprises, universities or public research institutes, while the remaining two thirds relied only on their own internal resources (EC, 2011, p. 81). Finally, 13.5% of innovative enterprises in Croatia teamed up with a partner from the EU-27, EFTA or the candidate countries (in the EU-27, 11.2 % of innovative enterprises did so), 0.7 % joined forces with a partner from the United States and 1.1 % cooperated with a partner from India or China. Innovation cooperation with European partners was the highest in Slovenia (35.0 %), followed by Estonia (33.3 %), Belgium (29.5 %), Luxembourg (27.9 %) and Finland (26.4 %), and it was the lowest in Spain and Italy (both 4.4 %) (Table 12).

Table 12. Type of cooperation on innovation activities by location, as % of innovative enterprises[17], 2008.

Enterprises engaged in any type of innovation co-operation					
	National	**within other Europe**	**within other partner countries**	**within the US**	**with China or India**
EU27	**24.2**	**11.2**	**3.2**	**2.6**	**1.8**
BE	41.8	29.5	9.4	7.9	5.8
BG	14.4	5.6	1.1	1.7	0.5
CZ	29.1	19.8	2.8	2.8	2.0
DK	:	:	:	:	:
DE	19.9	7.2	2.4	1.5	1.3
EE	34	33.3	2.7	3.2	1.4
IE	19.3	5.6	2.5	15.9	2.8
EL	:	:	:	:	:
ES	17.7	4.4	1	0.9	0.4
FR	39.1	15.9	5.2	4.0	2.4
IT	14.8	4.4	1.3	0.7	0.8
CY	46.7	24.9	3.6	6.6	3.2
LV	9.3	12.0	1.2	3.6	0.1
LT	35.3	19.9	4.5	5.8	2.6
LU	24.7	27.9	8.7	6.3	0.1
HU	38.9	16.7	3.1	2.5	2.7
MT	11.7	15.7	3.1	3.6	2.0
NL	36.3	21.1	7.4	5.1	3.1
AT	33.6	23.9	3.1	2.6	1.8
PL	35.8	18.8	4.2	3.8	2.0
PT	27.0	11.8	1.8	2.4	1.1
RO	12.9	7.6	1.4	0.6	0.8
SI	45.0	35.0	6.6	8.9	4.1
SK	27.0	25.8	4	4.8	3.5
FI	36.4	26.4	11.1	7.6	7.6
SE	37.7	24.8	11.2	8.6	7.3
UK	:	:	:	:	:
HR	**35.6**	**13.5**	**2.3**	**0.7**	**1.1**

Source: Authors` calculation based on Eurostat, CIS 2008, data

According to Table 12, innovative enterprises in Croatia were more often engaged in in-house R&D activities (35.6%)than in external R&D activities (similar trend was exhibited in the EU-27 countries). Similar behaviour was found within the EU-27 average countries' share (in-house R&D 24.2%). However, EU-27 countries did cooperate with other countries within the EU (11.2% on average). Of the EU-27 countries Belgium had the highest level of co-operation with other countries within the EU at (29.5%) and it was followed by Luxemburg (27.9%). Croatia attributes 13.5% of its R&D cooperation with other EU countries, which is higher than the EU average but which share could grow after the accession period.

Based on its average innovation performance, Croatia is one of the moderate innovators with a below average performance[18]. Croatia scores higher than the Reference Group countries[19] average in the share of new doctoral graduates per thousand inhabitants between 25-34 years old, PCT patent applications per billion GDP, licence and patent revenues from abroad as percentage of GDP and employment in knowledge intensive activities. Compared to the EU, the main weaknesses of Croatia are the low levels of business enterprise expenditure on R&D and licence and patent revenues. In dynamic terms, relative strengths and increases in the Croatian science and innovation system, when compared to Reference Group countries' average, are given in the employment in knowledge intensive activities, new doctoral graduates and high-impact scientific publications. Relative weaknesses are shown in patenting intensity and licence and patents revenues from abroad (European Union, 2011, p. 30). Over the past 5 years human resources and throughputs have been the main drivers of Croatian innovation performance improvement, in particular as a result of S&E and SSH doctorate graduates (10.7%) and community designs (11.8%). Performance in firm investments has worsened, in particular due to a decrease in business R&D expenditures (-3.5%) (EIS, 2009).

The following table 13 compares Croatia's rank by overall performance in innovation and competitiveness with the global level indexes and countries.

Table 13. Overall innovation performance by selected composite indexes, 2009- 2010.

Composite indexes	Source of data	Publication dynamics/ number of countries ranked in the index	Croatia's position and trend
WEF GCI	WEF Global Competitiveness Report: Global Competitiveness Index	Published since 1979. In 2008-2009 it ranked 134 countries; in 2009-2010 133 countries; and in 2010-2011 and 2011-2012 142 countries in the world.	The reports record low global competitiveness in the period of 2008-2011. Croatia fell from 61st place in 2008-2009 to 72nd in 2009-2010 and 76th in 2010-2011. Lower competitiveness sub-indexes include: • *Knowledge application,* • *Knowledge creation,* • *Science industry collaboration*, • *Intensity of local competition*, • *Growth rate of labour productivity*; while the industry's Gross Value Added (GVA) was placed 69th out of 118 countries (GVA of industry in GDP was 28.22% in 2010-2011 report).
WEF Lisbon Review	WEF – The Lisbon Review: Measuring Europe's Progress in Reforms	It is published every two years since 2004. It included 27 EU countries and 16 non-EU and Central Asian countries until 2008.	Croatia shares 23rd place with Greece on a list of 38 countries (EU-27 11 current candidates and potential candidates for the EU). Index analysis in composite index of reform improvement shows that Croatia lags behind in the following indexes: • *business environment*, • *liberalisation* and • *social inclusion*

Source: authors' analysis

Table 13 (continued). Overall innovation performance by selected composite indexes, 2009-2010.

Composite indexes	Source of data	Publication dynamics/number of countries ranked in the index	Croatia's position and trend
WEF ETI	WEF – The Global Enabling Trade Report: The Enabling Trade Index	Published since 2008 and ranking 118 countries. In 2009 121 countries and in 2010 125 countries were included.	In 2010 Croatia is put in 45th place out of 125 countries (in 2009 it was ranked 39th). The total index score was 4.30 (Singapore as the first economy had a score of 6.06) with the worst positions recorded in indexes • *business environment* and • *movement of goods and services (administrative barriers).*
WB-DBR	WB Doing Business Report	Economies are ranked on the ease of doing business, from 1 – 183 as 183 economies are ranked. A high ranking on the ease of doing business index means the regulatory environment is more conducive to the starting and operation of a local firm. This index averages the country's percentile rankings on 10 topics, made up of a variety of indicators, giving equal weight to each topic. The rankings for all economies are benchmarked to June 2011.	According to the WB Doing Business Index in Croatia and reforms made herein, Croatia is put on the 80th place in 2011 with respect to 2010. Out of 11 sub-indexes Croatia records lower positions in the following sub-indexes: • *Dealing with construction permits* (rank 143); • *Registering property* (rank 102); • *Protecting investors* (rank 133) • *Resolving insolvency* (rank 94) and • *Trading across borders* (rank 100).
IMD-WCR	IMD World Competitiveness Yearbook	Between 1989 and 2008 it included 55 countries; in 2010 58 countries and in 2011 it ranked 59 countries.	In 2010 out of 58 countries Croatia takes 56th place. In 2011 Croatia records further worsening according to business efficiency when it is placed 59th out of 59 countries, while Government efficiency is ranked 54th .

Source: authors' analysis

Table 13 (continued). Overall innovation performance by selected composite indexes, 2009- 2010.

Composite indexes	Source of data	Publication dynamics/number of countries ranked in the index	Croatia's position and trend
INSEAD-GII	INSEAD - Global Innovation Index Report 2009-2010; Global Innovation Index	It was published for the period 2009 -2010 and measured the innovation of 133 countries.	Measures the innovation through 2 aspects: innovation stimulation in the economy and (2) results of innovation activities. Although Croatia takes 45th rank out of 133 countries, the analysis of sub -index measuring innovation stimulation and variables within the sub-index shows lags in • Human capacity (investment in education: 82nd rank); and • Business sophistication (innovation environment for firms: 85th out of 133 countries).
UNDP-TAI	Technology Achievement Index (TAI)	UNDP HDR 2001 ranks 72 countries according to the TAI index in 3 groups: leaders TAI<0,5; Potential Leaders TAI< 0,34-0,48; Dynamic Adopters TAI < 0,34. It measures the improvement and capability of a country in creating and spreading technology and innovations and its level of technology achievements.	Tai index ranks Croatia as the 31st country with the index of 0.391 thereby grouping her in the "potential leaders" category. Index is based on a quantitative data similar to WB KI index. According to this index Croatia lags in these sub-indexes: • Spreading existing and new innovation, • Technology creation and • Human skills.

Source: authors' analysis

Table 13 (continued). Overall innovation performance by selected composite indexes, 2009- 2010.

Composite indexes	Source of data	Publication dynamics/number of countries ranked in the index	Croatia's position and trend
WB KEI	The KAM Knowledge Index (KI)	KAM measures a country's ability to generate, adopt and diffuse knowledge. This is an indication of overall potential of knowledge development in a given country. KAM also derives a country's overall Knowledge Economy Index (KEI) and Knowledge Index (KI). It demonstrates countries' progress on Knowledge Economy pillars and compiles indexes from 1995, 2000 to the most recent years. The KAM also derives a country's overall Knowledge Economy Index (KEI) and Knowledge Index (KI) for 145 countries.	KAM index put Croatia at the 40th out of 145 places in 2009. KEI and KA total score was 7.28 while for the Western European countries it amounted to 8.76 and KA was 8.78.
EIS-SII	European Innovation Scoreboard-Summary Innovation Index	The total innovation performance of a country at the European region level; a pilot EIS was started in 2000 and it has been published as a yearly report since 2001. In 2009 the composite index of innovation performance consisted of 29 indicators.	Croatia, as a "catching up" country, recorded lower activity in 2009 (EIS, 2009) according to the Successful innovation index (SII) in a dimension *Firm activities* (creation of innovation and conditions for innovation) in indicators: *Firm investments* and *Throughputs*. The total SII index in 2009 was 0.288, while for the EU-27 countries SII was 6.28

Source: authors' analysis

The composite indexes given in Table 13 are consistent with the overall competitiveness of Croatia and its country rank in 2011. The overall competitiveness of Croatia strongly depends on its government and business efficiency. Countries' rank in government and business efficiency shows the gap in their relative competitiveness in 2011 (IMD, 2011). Croatia is ranked 59th by business efficiency and 54th by government efficiency in 2011 from among 59 economies in the world. Imbalance in Croatian government and business efficiencies exists and correlates with the lag between government reforms and economic imperatives in recent years.

Analysis of Croatian comparative research and innovation performance in terms of inputs against a selection of advanced and emerging economies shows the following regularities:

Although Croatia performs relatively well, it still lags behind major competitors in terms of R&D expenditure as a share of GDP and numbers of researchers.

- The differences, of course, between Croatia's pursuit of S&T and that of the U.S. and Europe lies in the political structure of their respective economies. Nearly 60% of the performance (and funding) of Croatia's R&D comes from the government, with about 30% coming from the industry. Similar performance trends are noted China. Almost 70% of the performance (and funding) of China's R&D comes from the government, with about 21% coming from industry. In the U.S.A. that relationship is mostly reversed. 70% of all R&D is performed by industry and just 11% is performed by the government. The remaining 19% is performed by academia and non-profit research organizations. About 65% of all R&D funds come from industrial sources and 28% comes from the government.

One explanation for this situation can be found in Croatian industrial structure. Recent research and analysis (Racic & Aralica, 2006; Aralica et al., 2007, 2009; Aralica, 2007; Radas, 2004; Radas & Bozic, 2009; Svarc, 2011; Svarc et al., 2011) suggests that the difference in the R&D intensity between Croatia and selected economies is due to the smaller share of Croatian added value in the R&D-intensive sectors with particular reference to a high technology sector. This is consistent with results of the OECD review on the strengthening of entrepreneurial innovation and economic development in Croatia (OECD, 2007), which showed that differences between Croatia and other countries are to a large extent the result of such 'industry-mix' effects.

Croatia has a quite static economic structure. In the past decades the contribution of the high and medium-high tech manufacturing sectors to its added value has not changed. The composition of the manufacturing sector in terms of added value has not changed over the years. In 2007, Croatia's manufacturing sector's composition was practically similar to that of 2003, i.e.:

- 5.9% (2003: 6.5%) in the low,
- 4.4% (2003: 4.3%) in the medium-low,
- 2.8% (2003: 3.3%) in the medium-high and
- 1.4% (2003: 1.2%) in the high R&D intensive sectors.

Moreover, GVA of the entire economy records a yearly trend of decline in all of the activities. If we exhibit the production side of the GDP, the real gross added value (GVA) of the total economy records the trend of a yearly decline in the period of 2008-2010. In 2010 it declined by 1.7% as compared to 2009. In 2009 it was 4% lower than in 2008. In 2010 the fall was recorded in all activities apart from the activities of the financial advisory sector (Croatian national bank, 2010, p. 12). In 2009 almost all industrial sectors recorded a fall in their activities. The greatest negative contribution and contraction took place in the sectors of industry and trade (Croatian national bank, 2009, p. 17). Consequently, the explanation can be found in the fact that Croatia may be relatively specialised in activities for which R&D is not the primary form of innovation (Radas et al., 2002; Dabic & Drenjancevic-Peric, 2008; Becic & Dabic, 2008; Becic & Svarc, 2010).

Conclusion

The Republic of Croatia is a case of small country where the majority of investment in R&D comes from the state, while in the EU the bulk of investment in R&D comes from the business sector. When looking at the statistical data, it can be seen that Croatia is not a statistical outlier. However, it lags behind the EU average. One reason for a low level of GDP per capita in Croatia lies in the low R&D share in GDP (e.g. R&D expenditures in Croatia in 2010 were 0.73% compared to the 2.01% average of the EU). One possibility for triggering R&D spending growth could be the introduction of incentives for companies to employ more research and development staff.

Previous discussion of the nature of technology has shown that research and development and formal institutions which generate knowledge are not the only contributors to technological change. There exists the awareness that scientific papers and patents represent the mostly formal component of scientific and technological knowledge. Formation of national technological capacities also demands capacities for spreading, assimilating and imitating the knowledge generated in other countries. Other contributors of available skills, such as the level of education, show that the gap between developed and developing countries is smaller than previously thought. However, there are huge differences within developing countries. It is important to state that countries with better capabilities and indicators of education also have significant and growing share of R&D and patents. In economic theory (especially in industrial economics) there is a history of discussion of correlation between company size and innovation (on the level of R&D investment and output – typically in the form of patents). This has formed a foundation for numerous questions (such as Schumpeterian hypothesis of the significance of company size and concentration of market power for innovation incitement, underestimation of innovation output of big companies measured by number of patents and other ways of safeguarding intellectual property). Based on intercorporative differences in R&D (as in Dosi, 1988) it is possible to observe 3 key facts and from them make deductions which are highlighted by the available empirical studies:

(1) there is a rough log-linear intra-industry relationship between company size and R&D expenditure (i.e. as mesured by number of patents) which shows that statistical levelling of innovative capacity cannot size all of the aspects of technical change, mostly those based on "informal" learning (thereby independent of R&D investment) and these give rise to incremental innovations (thereby not recorded in innovation calculations as patents or other discrete innovations);
(2) the size distribution of innovative companies within a sector depends on technological characteristics of the sectors themselves which presume that some (generally unfounded) part of intrasectoral differences in innovation performance has to be attributed to differences in contemporary companies (and thereby their opportunities and alignments) which are however statistically classified within the same industry; and
(3) despite previous conclusions, there are still significant and unexplainable intercorporative, intersectoral differences regarding R&D investments and even more so regarding innovative output, i.e. although some companies cannot patent and innovate, they still undertake significant R&D activities directed towards "staying on track" and adapting to issues where they rely on their competitive strength.

Nevertheless, Croatia's future position could be improved by making it an attractive destination for R&D-based foreign investment. This could be done by implementing steps that could lead towards making Croatia attractive for researchers given its share of doctorate holders in the fields of biomedicine and health followed by life sciences and engineering (CBS, 2009). Unfortunately, current evidence shows their weak interactions. Further improvement should be made in ensuring the supply of a workforce with the STEM skills required for those industries which will contribute to economic growth. There has been strong growth in Science, Technology, Engineering and Mathematics (STEM) graduates in recent years, and likewise in STEM postgraduate training. Hence, this achievement or asset should be built upon and developed. Tackling these challenges will inevitably require improvements in the efficiency of the research base, which is already the most productive in the EU 27 and increasing the incentives for business to take advantage of the Croatia's research capacity. The ultimate goal of these proposals is to improve the Croatia's exploitation of technologically relevant knowledge, including the wider knowledge base on which innovation depends, such as design and branding – which are increasingly recognised as co-investment in innovation alongside R&D. Finally, if the named measures should be followed upon simultaneously with the targeting of new growth areas to compete in the global economy within the framework of sectoral and technology specialisation and in accordance with the firm size and dynamics, we believe that the convergence with the global and the EU trends might arise.

Endnotes

[1] Ministry of Science, Education and Sport, Zagreb, Croatia

[2] Faculty of Economics and Business, University of Zagreb, Croatia,

[3] See: European Commission: Europe 2020: A strategy for smart, sustainable and inclusive growth. Adapted from: http://ec.europa.eu/eu2020/index_en.htm.

[4] The Innovation Union flagship aims at strengthening knowledge and innovation as drivers of future growth by re-focusing R&D and innovation policies for the main challenges society faces, such as climate change, energy and resource efficiency, health and demographic change.

[5] This target refers to the EU's overall (public and private) R&D investment approaching 3% of GDP (see: http://ec.europa.eu/research/era/areas/investing/investing_r esearch_en.htm).

[6] GII 2011 - The survey is prepared by INSEAD, the leading international business school, with Knowledge Partners Booz & Company, Alcatel-Lucent, Confederation of Indian Industry, and World Intellectual Property Organization.

[7] For HR and EU27 countries relative strengths and weaknesses in innovation performance and its main drivers of innovation growth, detailed data tables are also available from the INNO Metrics website (http://www.proinno-europe.eu/metrics). More of the composite indices which referred on Innovation are nowadays published: IUS 2010, IMD WCI, WEF GCI; INSEAD GII 2011etc.

[8] See: http://epp.eurostat.ec.europa.eu/portal/page/portal/europe_2020_indicators/headline_indicators; and: http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/short_list

[9] This policy area monitors a country's prosperity – the general economic conditions which provide the basis for structural reform measures by set of follow indicators: GDP per capita (in purchasing power standards) - Strong macroeconomic conditions are essential for growth and job creation. Gross domestic product (GDP) measures overall economic activity in all sectors of the economy. To compensate for price differences between countries, GDP is measured in purchasing power standards (PPS); Labour productivity - Productivity is the basis for long-term economic welfare and general economic growth. It is important for jobs and competitiveness – both are among the main targets in the EU growth and jobs strategy; Inflation rate. This is a performance indicator, reflecting the background economic conditions against which progress towards the goals of the EU growth and job strategy can be evaluated; Public balance - Public balance and general government debt indicate the country's financial position in the context of the "excessive deficit procedure".

[10] Structural indicators: Innovation and Research, some indicators: Persons of the age 20 to 24 having completed at least upper secondary education - An upper secondary school education is generally considered the minimum for taking part in a knowledge-based society, either for entering the labour market or further/higher education; Science and technology graduates by gender - A secondary objective is to increase the enrolment rate in scientific and technical studies. Europe needs mathematicians and scientists to maintain its competitiveness; Gross domestic expenditure on R&D - Investment in the creation of new knowledge is essential for developing new and improved products and processes; Patent applications to the European Patent Office (EPO); Patents granted by the United States Patent and Trademark Office (USPTO) - Innovation and ideas must be adequately rewarded, particularly through patent protection; Venture capital investments by type of investment stage - This measures how obstacles to investment in entrepreneurship are being removed – to encourage a genuine European risk capital market; Broadband penetration rate – High-speed internet access is an important factor in productivity growth and stimulating innovation – ensuring Europe stays a leading player in the internet age.

[11] Investment in knowledge is defined as the sum of R&D expenditure, expenditure for higher education (public and private) and investment in software (OECD, 2008. Chapter A-1).

[12] Note: For all countries, investment on education refers to 2003. For Belgium, Australia and Austria the period of reference is 1998-2003. 1. 2003; 2. OECD excludes Greece, Australia and Austria from the group of reporting countries; 3. EU: excludes Greece from the group of reporting countries; 4. For Croatia investment for software is not available. Investment for education and R&D refers to 2003; For Croatia the period of reference is 1998-2003. Author's calculations.

[13] Note:Iceland: 2009; Japan, Switzerland: 2004*; 2008**

[14] Notes: (1) The R&D Intensity projections based on trends are derived from the average annual growth in R&D Intensity 2000-2009; (2) EU: This projection is based on the R&D Intensity target of 3.0% for 2020; (3) SI: This projection is based on a tentative R&D Intensity target of 3.0% for 2020.

[15] Explanation notes: s: eurostat estimate p: provisional; b: break in series; e: estimated value ip: provisional value

[16] See: The EU Survey on R&D Investments Business Trends; http://iri.jrc.ec.europa.eu/research/survey.html

[17] Innovative enterprises mean enterprises with technological innovation (product, process, ongoing or abandoned), regardless organizational or marketing innovation.

[18] Innovation Union Scoreboard 2010, The Innovation Union's performance scoreboard for Research and Innovation (RIUS), See: http://www.proinno-europe.eu/inno-metrics/page/innovation-union-scoreboard-2010.

[19] Reference Group BG+PL+RO+HR+TR

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CHAPTER 6

Aleksandra Gawel[1]

The Significance of Research and Development Activity in Respect of the Dynamics of Entrepreneurship in Polish Regions

Abstract
The aim of this chapter is to assess the influence of research and development activity in the economy of a region on the dynamics of entrepreneurship, understood as undertaking and conducting entrepreneurial activity. Research and development activity is concerned with creating innovation and it can affect entrepreneurship directly and indirectly. The direct influence is connected with introducing new innovative products, resulting from R&D activity, onto the market by newly created companies, and the indirect influence is related to the impact of research and development activity on the overall market situation. In order to assess the influence of R&D activity on entrepreneurship, econometric studies using the panel method were conducted, which involved data from 16 regions in Poland for each year between 2003 and 2009. The panel was a stacked time series. The findings indicate a favourable influence of research and development expenditure on the emergence of new businesses and on the saturation of the economy with business enterprises.

Keywords: *Development, Entrepreneurship, Innovations, Regions of Poland, Research.*

Introduction

Entrepreneurship is a multidimensional phenomenon, the study of which is undertaken by various branches of science such as economics, management, psychology or sociology. As far as the theory of economics is concerned, entrepreneurship remains outside the scientific mainstream. Because of this, particularly in view of the many different ways in which entrepreneurship can be understood, there is no specific theory or even a clear definition of this notion.

In the theory of economics, entrepreneurship stems from three principal research areas which determine its meaning. It is thus understood as:

- innovation, i.e. introducing new solutions to the economy;
- activities involving risk-taking and uncertainty, as the future results of current actions are unknown;
- finding and exploiting market opportunities.

Such discrepancies in the perception of the essence of entrepreneurship are reflected in how this notion is defined in the literature. In scientific articles entrepreneurship is usually equated with starting a new business enterprise, innovation, looking for opportunities, risk-taking, profit-seeking, new resource configurations, obtaining and managing resources, value creating activities, company existence, taking initiatives, generating change, ownership, as well as strategic development (Morris et al., 1994).

In this chapter, entrepreneurship is understood as starting and running a business enterprise.

When the dynamics of entrepreneurship understood in this way have been analysed in a spatial and temporal perspective, significant differences have been observed. This led to the suggestion of some possible reasons for those differences. Out of the various factors which can influence the rate of entrepreneurship, this study adopted the expenditure on research and development as the determinant.

The Temporal and Spatial Diversification of the Dynamics of Entrepreneurship in Poland

Entrepreneurship is a multidimensional phenomenon which can be understood in a variety of ways. In this chapter, it is equated with conducting business activity. Therefore the author has adopted two measures of entrepreneurship: the rate of business start-up and the rate of saturation of the economy with business enterprises. The rate of business start-ups is defined as the proportion of new companies in the total number of business enterprises, and the saturation rate indicates the number of business enterprises per 1,000 inhabitants.

Entrepreneurship is not only multifaceted, but it is also characterised by considerable temporal and spatial diversification. The rates of entrepreneurship vary considerably between particular countries and regions, as well as being subject to temporal variations.

A similar temporal and spatial diversification of entrepreneurship can be observed in Poland.

Table 1. Entrepreneurship measures in Polish regions in 2003-2009.

Regions	Average start-up rate	Standard deviation of start-up rate	% deviation	Average saturation	Standard deviation of saturation	% deviation
Dolnoslaskie	8.04	0.9396	0.1156	106.86	2.3392	0.0219
Kujawsko-pomorskie	8.02	1.2514	0.1560	90.72	1.6801	0.0185
Lubelskie	8.18	0.9370	0.1146	70.09	1.5343	0.0219
Lubuskie	8.56	0.9531	0.1114	101.04	3.2495	0.0322
Lodzkie	7.59	1.3008	0.1715	93.49	3.1600	0.0338
Malopolskie	8.03	1.2368	0.1540	90.11	2.5370	0.0282
Mazowieckie	7.31	0.5832	0.0798	118.56	4.8435	0.0408
Opolskie	6.60	0.8421	0.1275	88.54	4.1659	0.0470
Podkarpackie	7.77	1.0928	0.1406	67.62	1.0495	0.0155
Podlaskie	8.09	1.2216	0.1510	75.70	2.1908	0.0289
Pomorskie	8.83	1.3361	0.1513	105.34	3.5455	0.0337
Slaskie	7.37	0.9328	0.1266	91.47	0.9442	0.0103
Swietkorzyskie	7.01	0.8722	0.1244	82.40	1.9258	0.0234
Warminsko-mazurskie	9.31	1.0476	0.1125	78.49	1.8494	0.0236
Wielkopolskie	7.92	1.0701	0.1351	102.64	2.6818	0.0261
Zachodniopomorskie	8.12	0.9279	0.1143	122.96	3.2993	0.0268

Source: Author's own calculations

Analysing the data from Table 1 one can observe the diversified dynamics of entrepreneurship in the 16 Polish regions between the years 2003 and 2009. The average start-up rate ranged from 9.31% in the region with the highest rate of enterprise start up (Warmińsko-mazurskie) to 6.6% in the region with the lowest rate of new enterprise creation (Opolskie). This means that the difference between the highest and the lowest rates of business start-up amounts to approximately 30%.

Simultaneously one could observe changes in the start-up rate in particular years between 2003 and 2009. As the data from Table 1 shows, the standard deviation of the start-up rate ranged between 0.58 and 1.33, which means that the start-up rates in particular regions in particular years showed a deviation from the average of between 8% and 17%.

Temporal and spatial diversification can be observed when analysing the rate of saturation of the particular regional economies with business enterprises over the years 2003 to 2009. In the region which had the highest saturation rate there were approximately 123 companies per 1,000 inhabitants (Zachodniopomorskie), whereas in the region with the lowest saturation rate there were only 67 (Podkarpackie). In the case of this measure of entrepreneurship, the difference between the regions which had the extreme rates amounts to approximately 45%.

An analysis of the fluctuations in this measure of entrepreneurship over time reveals that the standard deviation of the saturation rate ranged between 4.8 and 0.9, which means that in these particular years the saturation of the regional economies with businesses showed a deviation from the average of between 1% and 4%.

Comparing the findings obtained for the two measures of entrepreneurship in the regions of Poland in the years 2003 to 2009, one can observe that the spatial diversification of the enterprise saturation rate is greater than that of the start-up rate, whereas the temporal diversification is greater in the case of the start-up rate than in the case of the saturation rate.

As such considerable differences have been observed in the rates of entrepreneurship between particular Polish regions, the author set out to identify the factors which could contribute to those differences. The literature on the subject indicates the existence of a range of determinants of new enterprise creation.

Determinants of New Enterprise Creation: A Review of Research to Date

Creating a new business enterprise is a process which begins when the future entrepreneur decides to start their own business and ends when the business becomes a legal entity, when financial investments are made, or when the first profits are obtained. The fact that setting up a business is a process means that it is a long-term undertaking, and as such it can be affected by a number of factors.

A review of research into entrepreneurship to date indicates that different studies take different determinants into account. One study (Naudé et al., 2008) researched the influence of the profit margin, the level of education, and the access to financing from banking institutions. Another study (Capelleras & Greene, 2008) studied previous entrepreneurial experience, using external support, the characteristics of the region, and business planning as the factors affecting the dynamics of entrepreneurship. Yet another study (Wagner & Sternbeg, 2004) concentrated on the influence of factors such as unemployment, previous entrepreneurial experience, aversion to risk, the population of a region, and enterprise start-up rate.

The above brief review shows that there are a broad and varied range of factors which can affect the rate of entrepreneurship. In an attempt to synthesise them, they can be categorised according to several criteria:

1. Level of analysis:
    - determinants at macroeconomic level (economic structure as determinant; for one country or a comparison among different countries),
    - determinants at regional level (features of a region as determinant; for one region or comparison among regions)
    - determinants at personal level (individual characteristics of a given person starting a new business),
2. Kind of capital used in new business creation:
    - human capital of entrepreneur,
    - financial capital of entrepreneur,
    - social capital,
3. Source of determinants:
    - internal (connected with the entrepreneur's human and financial capital),
    - external (connected with the entrepreneur's environmental, macroeconomic and regional level).

To begin with, when analysing the discussion of the factors affecting the rate of new enterprise creation on the basis of the analysis level one must indicate the determinants which exist in the national, regional and individual environment. On the macroeconomic level such factors as the level of economic development and the level of unemployment must be taken into account.

On the regional level, examples of factors which affect new enterprise creation include the industrial structure of a region, understood as either an entrepreneurial regime characterised by a high rate of new enterprise creation in which innovations are introduced onto the market through newly created companies; or a routinised regime with a low rate of new enterprise creation which favours the innovative activity of already existing rather than new companies (Audretsch & Fritsch, 2002; Lin & Huang, 2008; Peneder, 2008).

Other features of a region which affect the business start-up rate are those connected with its population, including population density (Wagner & Sternberg, 2004), and the level of education in the region (Armington & Acs, 2002). Such factors as the conditions for imitating existing businesses (Luttmer, 2007), or the previous experience of entrepreneurs in setting up companies as well as the rate of business failure (Sutaria & Hicks, 2004) are also indicated.

The factors which occur on the individual level are connected with the characteristics of the person who starts or runs a business. This level of analysis can be linked with the second criterion, i.e. the kind of capital available to the entrepreneur and used in the creation of a new business enterprise. In particular, one can distinguish between the different kinds of capital at the disposal of an entrepreneur: human, financial and social.

Among the factors connected with the human capital of an entrepreneur which are considered as the most essential for starting and running a business are such features of character as the need for achievement, internal focus of control, willingness to take risks, initiative, proactivity and the need for self-fulfillment (Korunka et al., 2003). Education (Naudé et al., 2008) and previous entrepreneurial experience (Capelleras & Greene, 2008) also play an important part.

On the individual level entrepreneurial motivation is essential for starting a business. Positive motivation, referred to as entrepreneurial pull, is a result of such features of an entrepreneur as independence, the need for achievement, or the desire to exploit business opportunities. On the other hand, negative motivation, referred to as a recessional push towards entrepreneurship, results form difficulty in finding jobs due to high unemployment, or a lack of satisfying jobs which would guarantee promotion and personal development (Thurik et al., 2008; Block & Koellinger, 2009).

Another important factor influencing the decision to start a company is access to financial capital. The imperfections of the financial market mean that not all new business ventures can secure a source of finance. Consequently, the availability of local financial capital is a significant factor determining the rate of enterprise creation in a region (Sutaria & Hicks, 2004).

Innovation in New Enterprise Creation: Research Assumption

In this research an attempt has been made to combine two features of entrepreneurship, namely innovation and new enterprise creation. This is based on the assumption that research and development activity as a measure of entrepreneurship affects the founding and running of companies. With reference to the classification of the determinants of the business start-up rate presented above this study concentrates on the regional level, and assesses the research and development activity in the particular region, treating R&D as an external factor.

Innovation as a field of research started to be explored with the works of Joseph Schumpeter (1934), who was the first to highlight the importance of innovation for economic development. In Schumpeter's works, innovation is treated as new combinations in the economy, including new combinations of goods, methods (production technology), markets, suppliers and organization, and the source of companies' profits.

Research into innovation is conducted on various levels. Innovation is treated as a process, reflecting the actions of companies in respect of planning and modifying their activities (Nauwelaers & Wintjes, 2002). Innovation can be understood as introducing solutions which are entirely new on the market or new for a given company (Koellinger, 2008), therefore it involves not only creating new market solutions but also creative imitation and the dissemination of innovative solutions. Introducing innovation signifies a departure from the existing methods of operation and going beyond the current mode of activity (Dess & Lumpkin, 2005). Studies also analyse the types and determinants of innovation (Gudmundson et al., 2003) and entrepreneurs as creators of innovation, as well as presenting research on economic geography as the clusters of innovation (Kalantaridis & Pheby, 1999).

Innovation can be introduced onto the market in two principal ways: by introducing new market solutions through newly created companies or by companies already present on the market diversifying into new areas (Auerswald, 2008). This produces certain consequences. The innovative activity of existing companies may be a barrier for new companies wanting to enter the market because it makes it more difficult for new companies to imitate the existing ones. At the same time, the companies already on the market undertake research and development work in order to improve the quality of existing products, and innovative entries of new companies onto the market result from the diffusion of knowledge (Acs et al., 2009). In this sense, the innovative activity of existing companies encourages the creation of new enterprises.

In this study it has been assumed that research and development activity is a measure of innovation. However, according to the literature the relationship between innovation and R&D expenditure is ambiguous. Some publications indicate that expenditure on research and development favourably influences companies' innovativeness (Acs & Audretsch, 1988; Bhattacharya & Bloch, 2004). Other studies, however, indicate that there is no such relationship and show that there is no connection between R&D and product innovation, and the influence of R&D expenditure on process innovation is in fact negative (Simonen & McCann, 2008). In spite of such different conclusions in the literature, this research assumes that research and development activity is a measure of innovation.

As far as expenditure on research and development is concerned, a company has two options: it can either conduct the research on its own or it can buy the results of research from R&D institutions (Esteve-Pérez & Mañez-Castillejo, 2008).

Analysing the implications of the findings presented above, it can be stated that R&D activity can directly and indirectly influence the starting and running of companies. The direct influence manifests itself in new companies being created to introduce onto the market the innovations which are a result of R&D activity. It can therefore be assumed that the greater the scale of R&D activity, the greater the number of newly created companies.

Research and development activity can also indirectly influence entrepreneurship, as it contributes to creating the supply and demand effects on the product and labour markets. R&D activity generates demand for products which are its production factors, and in this way creates a demand for intermediate and investment goods on the production factors market. This in turn generates a demand for workers and sub-contractors in the R&D sector, which brings about changes in employment and people's incomes. As a result, society's purchasing power increases and the demand for consumer goods grows. The above changes trigger a number of multiplicatory actions, which can be indirectly utilised by new companies.

The above relationships are presented in Figure 1.

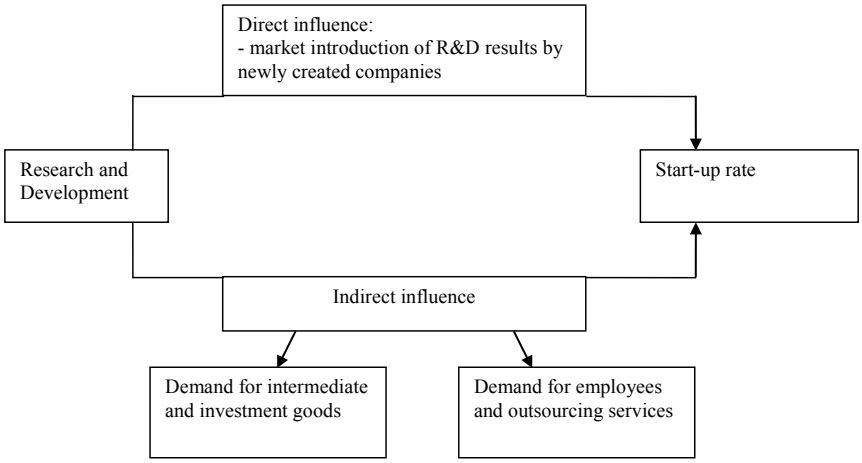

Figure 1. Influence of R&D activities on new enterprise creation.

The assumption of the above relationships is the basis for formulating two research hypotheses. The first hypothesis assumes that expenditure on research and development has a favourable influence on entrepreneurship. The second hypothesis assumes that there is a favourable relationship between employment in research and development activity and entrepreneurship.

Temporal and Spatial Diversification of Research and Development Activity in Poland and the Relationship Between R&D and Entrepreneurship

In order to empirically verify the two research hypotheses the author analysed the dynamics of research and development activity in Polish regions. As the regions differ in respect of area, population and GDP per capita, the research adopted for analysis the relative measures of R&D in relation to the number of inhabitants and the number of professionally active people. It has also been assumed that in order to reveal the relationships between the studied variables both expenditure on R&D activity and employment in this branch are significant. To recapitulate, the following three measures of research and development activity have been adopted:

- expenditure on R&D per capita in PLN (PLN – Polish zloty, Polish national currency),
- expenditure on R&D per 1 employee in R&D,
- the proportion of R&D employees per 1,000 professionally active people.

The characteristics of the adopted measures of research and development activity in the regions of Poland between the years 2003 and 2009 are presented in Table 2.

Table 2. R&D measures in Polish regions in 2003-2009.

Regions	Average expenditures on R&D per capita (in PLN)	Standard deviation of R&D per capita	% deviation	Average expenditure on R&D per employee (in thousands PLN)	Standard deviation of R&D per employee	% deviation	Average employment in R&D per 1000 professionally active people	Standard deviation of average proportion of R&D employment in professional activity	% deviation
Dolnoslaskie	130.04	39.7231	0.3055	42.30	14.4131	0.3407	4.40	0.4163	0.0946
Kujawsko-pomorskie	75.73	42.1739	0.5569	34.93	20.8919	0.5981	3.23	0.4192	0.1298
Lubelskie	95.59	25.7756	0.2697	29.89	7.9671	0.2666	3.09	0.1574	0.0510
Lubuskie	28.14	4.5460	0.1615	24.59	3.8360	0.1560	1.80	0.1155	0.0642
Lodzkie	141.54	30.6090	0.2163	47.29	10.7843	0.2281	3.24	0.1902	0.0587
Malopolskie	228.59	41.7721	0.1827	51.53	13.6589	0.2651	6.19	1.0621	0.1717
Mazowieckie	513.21	105.2391	0.2051	78.61	17.1790	0.2185	10.03	0.7499	0.0748
Opolskie	36.76	13.8558	0.3770	25.34	9.8899	0.3902	2.36	0.1397	0.0593
Podkarpackie	68.86	16.1104	0.2340	44.66	8.8572	0.1983	1.61	0.0378	0.0234
Podlaskie	48.84	9.7610	0.1998	24.27	4.0668	0.1676	2.63	0.3094	0.1177
Pomorskie	140.89	32.9168	0.2336	46.70	11.0431	0.2365	5.00	0.3055	0.0611
Slaskie	118.34	43.2678	0.3656	47.91	19.2513	0.4018	3.53	0.1254	0.0355
Swietkorzyskie	38.80	40.0533	1.0323	34.87	33.5599	0.9624	1.30	0.2000	0.1538
Warminsko-mazurskie	52.24	16.8829	0.3232	33.89	11.7163	0.3458	2.03	0.0488	0.0241
Wielkopolskie	153.76	49.6065	0.3226	41.74	12.4781	0.2989	3.97	0.5024	0.1265
Zachodniopomorskie	52.93	16.4908	0.3116	26.30	9.1568	0.3482	3.01	0.2673	0.0887

Source: Author's own calculations

The diversification between particular regions in respect of R&D activity is considerable, and is significantly greater than the diversification in respect of the business start-up rate or the rate of enterprise saturation. The average annual expenditure on research and development between the years 2003 and 2009 range from approximately 513 PLN per capita in the region with the highest expenditure level (Mazowieckie) to approximately 28 PLN in the region with the lowest expenditure level (Lubuskie). This means that the spatial diversification in R&D expenditure per capita is almost nineteen-fold.

When calculating research and development expenditure per one R&D employee, the spatial diversification turns out to be a little lower, though still greater than in the case of entrepreneurship. In the region which has the highest R&D expenditure per one R&D employee it amounts to approximately 78,610 PLN per annum (Mazowieckie), whereas in the region with the lowest expenditure it amounts to approximately 24,270 PLN per annum (Podlaskie). This means that the territorial diversification in R&D expenditure per one R&D employee is more than three-fold.

It is therefore quite apparent that the spatial diversification of research and development expenditure is significantly greater than that of entrepreneurship measures as the differences between the regions in respect of the expenditure are nineteen-fold (R&D expenditure per capita) and four-fold (R&D expenditure per one R&D employee), whereas the regional diversification of the business start-up rate amounts to 30%, and of the enterprise saturation rate to approximately 45%.

In order to determine the temporal diversification of R&D expenditure over the period of 2003-2009, standard deviations were calculated. However, because of the considerable disproportion in the average values, the percentage share of standard deviation in the average value was also calculated, which made it possible to compare the temporal diversification for particular regions. It transpires that expenditure on research and development not only varies from region to region, but it also fluctuates over time. In most regions a steady increase in this expenditure can be observed, though this does not apply to all of them and the increase is not the same in every region.

Temporal diversification in expenditure on research and development, both per capita and per employee, was the greatest in the Świętokrzyskie region and the smallest in the Lubuskie region. In the region with the greatest temporal diversification, standard deviation amounts to over 100% of the average value in the case of R&D expenditure per capita and approximately 96% in the case of R&D expenditure per R&D employee. In the region with the smallest temporal diversification, standard deviation amounted to approximately 16% of the average expenditure on research and development both per capita and per R&D employee.

When comparing the temporal diversification presented above and the temporal diversification of entrepreneurship measures it can be observed that in the case of the time criterion R&D expenditure also shows greater fluctuations than the analysed measures of entrepreneurship. While the percentage of standard deviation in the average value of R&D expenditure ranged between 16% and 100%, the standard deviation of business start-up rate in the average value ranged between 8% and 17%, and of business saturation rate between 1% and 4%.

Regional and temporal diversity in the proportion of research and development employees in the total number of professionally active inhabitants are also significant. The average annual differences are ten-fold. In the region with the highest proportion of people employed in R&D, there are about 10 R&D employees per 1,000 professionally active people (Mazowieckie). In the region with the lowest number of people employed in R&D for every 1,000 professionally active people, the yearly average of R&D employees is only 1.3 (Świętokrzyskie). This diversity is again greater than the regional differences in the business start-up rate (approximately 30%) or the business saturation rate (approximately 45%).

Because of the considerable differences in the values of average R&D employment, the percentage of standard deviation from the average value was calculated in order to obtain comparable results which would make it possible to assess the temporal diversity of this measure. As the findings in Table 2 show, the temporal diversity of average employment in R&D per 1,000 professionally active people ranges between 2.3% (Podkarpackie) to 17% (Małopolskie). Thus it is greater than in the case of the business saturation rate and comparable with the business start-up rate.

The Influence of Research and Development Activity on Starting and Running Companies in Polish Regions: Research Results

In order to study the relationship between the creation of new businesses and the activities of existing ones on the one hand, and innovation measured by research and development activity on the other, an econometric study was was conducted which made it possible to verify the research hypotheses. A theoretical analysis of the issue has led to formulating two research hypotheses. The first hypothesis assumes that expenditure on research and development has a favourable influence on entrepreneurship. The second hypothesis assumes that there is a favourable relationship between employment in research and development activity and entrepreneurship.

In order to verify the research hypotheses an econometric study was conducted, which was based on panel data for 16 Polish regions over the period of 7 years from 2003 to 2009. The data panel was a stacked time series with 7 time periods (the years 2003-2009) and 16 cross-sectional units. Regression function parameters were estimated by means

of three simultaneous research methods: ordinary least squares OLS, panel regression with fixed effects, and panel regression with random effects.

The following measures of entrepreneurship were assumed to be dependent variables:

- business start-up rate
- business saturation rate in the region.

In order to verify the first hypothesis, which assumed the favourable influence of research and development expenditure on entrepreneurship, the following factors were adopted as independent variables:

- expenditure on R&D per capita (R&D pc),
- expenditure on R&D per 1 employee in R&D (R&D pe).

In order to verify the second hypothesis, relating to the favourable relationship between employment in research and development and entrepreneurship, the independent variable was the proportion of R&D employees per 1,000 professionally active inhabitants (em R&D).

Before calculating the function parameters, all the original data were converted into natural logarithms to create linear relationships between them.

The results of the estimation of regression function parameters by means of the three research procedures, with business start-up rate as a dependent variable, are presented in Table 3.

Table 3. Regression function with start-up rate as dependent variable

No.	Regression type	Coefficients				
		Name of coef.	**Value of coef.**	**Std. Error**	**t-ratio**	**p-value**
1.	Ordinary Least Squares OLS	const	1.8852	0.0734	25.6800	0.0000
		R&D pc	0.0392	0.0163	2.4070	0.0178
2.	Panel regression with fixed effects	const	0.9096	0.1223	7.4370	0.0000
		R&D pc	0.2595	0.0275	9.4210	0.0000
3.	Panel regression with random effects	const	1.4663	0.1062	13.8100	0.0000
		R&D pc	0.1338	0.0233	5.7530	0.0000
4.	Ordinary Least Squares OLS	const	1.5923	0.0994	16.0200	0.0000
		R&D pe	0.1306	0.0276	4.7330	0.0000
5.	Panel regression with fixed effects	const	1.0739	0.0938	11.4500	0.0000
		R&D pe	0.2757	0.0261	10.5500	0.0000
6.	Panel regression with random effects	const	1.2105	0.0955	12.6700	0.0000
		R&D pe	0.2374	0.0259	9.1570	0.0000
7.	Ordinary Least Squares OLS	const	2.0522	0.0343	59.8500	0.0000
		Em R&D	0.0058	0.0275	0.2112	0.8332
8.	Panel regression with fixed effects	const	1.9891	0.1649	12.0600	0.0000
		Em R&D	0.0612	0.1443	0.4239	0.6726
9.	Panel regression with random effects	const	2.0486	0.0522	39.2200	0.0000
		Em R&D	0.0089	0.0416	0.2148	0.8303

Source: Author's own calculations

Judged on the basis of the p-value parameter, expenditure on R&D per capita and expenditure on R&D per one R&D employee are statistically significant factors affecting business start-up rate. The above conclusions can be drawn on the basis of all the three methods of parameter estimation; i.e. OLS as well as panel regression with fixed and random effects. Regardless of the method used for estimating the function parameters, both independent variables show a directly proportional influence on the business start-up rate, indicated by the positive value of regression function parameters.
The findings presented above can be interpreted in two ways. On the one hand, an increase in expenditure on research and development activity contributes to an increase in business start-up rate because the supply and demand effects which are thus created can be exploited by new companies, and the effects of R&D activity, such as new products and technologies, can be introduced onto the market by newly created companies. On the other hand, the findings indicate that the regions with higher levels of R&D expenditure are also characterised by a higher business start-up rate.

It is also worth noting that the influence on the start-up rate is stronger in the case of expenditure on research and development per one R&D employee than in the case of expenditure on R&D per capita. This may result from the fact that the relationship between R&D expenditure and employment in this sector may reflect the capability of a given region to exploit the opportunities created by research and development activity.

To recapitulate, the above findings partly support the validity of the first research hypothesis, which assumed the favourable influence of expenditure on research and development on entrepreneurship.
On the other hand, the p-value parameter indicates that the influence of the number of research and development employees per 1,000 professionally active inhabitants on the business start-up rate has no statistical significance. In each of the three methods used, the p-value is considerably higher than the 5% significance threshold, which indicates no statistically significant links. The above findings mean that in this area of analysis the second research hypothesis, which assumed a favourable influence of R&D employment on entrepreneurship, could not be confirmed.

The second measure of entrepreneurship adopted in this study is the business saturation rate. Table 4 presents the results of the estimation of regression function parameters by means of three research procedures, where the business saturation rate is the dependent variable and the measures of research and development activity are independent variables.

When analysing the findings presented in Table 4, it must be noted that the results obtained are markedly convergent. The p-value indicates that expenditure on research and development per capita and expenditure on research and development per one R&D employee are statistically significant in respect of their influence on the saturation of the economy of a region with business enterprises. The above conclusions can be drawn on the basis of all the three methods of parameter estimation; i.e. OLS as well as panel regression with fixed and random effects. The positive values of regression function parameters indicate that both independent variables have a directly proportional influence on the business saturation rate.

The above results mean that, on the one hand, an increase in expenditure on R&D per capita or per one R&D employee contributes to an increase in the saturation of the economy of a region with business enterprises. On the other hand, the results imply that regions with higher levels of R&D expenditure are characterised by a higher rate of business saturation.

As was the case with the first analysed measure of entrepreneurship, and also in respect of the second measure, business saturation rate, expenditure on R&D per one R&D employee have a greater influence on the saturation rate than expenditure on R&D per capita. This confirms the earlier observation that the relationship between expenditure on research and development and employment indicates the potential of a region's economy for absorbing the benefits of R&D activity.

Table 4. Regression functions with business saturation rate as dependent variable.

No.	Regression type	Coefficients				
		Name of coef.	Value of coef.	Std. Error	t-ratio	p-value
10.	Ordinary Least Squares OLS	const	4.1884	0.0816	51.3100	0.0000
		R&D pc	0.0741	0.0181	4.0940	0.0000
11.	Panel regression with fixed effects	const	4.3715	0.0336	129.9000	0.0000
		R&D pc	0.0328	0.0076	4.3300	0.0000
12.	Panel regression with random effects	const	4.3674	0.0534	81.8000	0.0000
		R&D pc	0.0337	0.0075	4.5010	0.0000
13.	Ordinary Least Squares OLS	const	4.1847	0.1228	34.0900	0.0000
		R&D pe	0.0930	0.0341	2.7280	0.0074
14.	Panel regression with fixed effects	const	4.3900	0.0269	163.2000	0.0000
		R&D pe	0.0355	0.0075	4.7330	0.0000
15.	Panel regression with random effects	const	4.3887	0.0507	86.5300	0.0000
		R&D pe	0.0359	0.0075	4.7960	0.0000
16.	Ordinary Least Squares OLS	const	4.3046	0.0332	129.7000	0.0000
		Em R&D	0.1861	0.0266	7.0050	0.0000
17.	Panel regression with fixed effects	const	4.5362	0.0357	127.2000	0.0000
		Em R&D	-0.0170	0.0312	-0.5459	0.5864
18.	Panel regression with random effects	const	4.4999	0.0507	88.7500	0.0000
		Em R&D	0.0148	0.0295	0.5016	0.6170

Source: Author's own calculations

The above findings provide confirmation for the first research hypothesis which assumed that expenditure on research and development activity has a favourable influence on entrepreneurship.

Regarding the relationship between the proportion of R&D employees in the total number of professionally active people and the business saturation rate, it can be observed that in all the models used the p-value of this regression function parameter is not statistically significant as it considerably exceeds the 5% significance threshold, which means that no statistically significant relationships exist in this area.

Consequently, the second research hypothesis, which assumed a favourable influence of employment in R&D on entrepreneurship, again could not be confirmed.

Conclusions

The aim of this chapter was to assess the influence of research and development activity in the economy of a region on the dynamics of entrepreneurship, understood as starting and running business enterprises. In order to achieve this aim two research hypotheses were formulated, which were subsequently subjected to empirical verification. The first research hypothesis assumed that expenditure on research and development favourably influences the starting and running of companies. The second hypothesis indicated the existence of a favourable relationship between the proportion of employment in R&D and entrepreneurship.

Research and development activity is regarded as a source of innovation. It can affect entrepreneurship directly or indirectly. The direct influence is connected with the possibility of introducing innovation, the product of R&D activity, onto the market through newly created companies, whereas the indirect influence is a result of the impact of R&D activity on the overall economic situation and the generation of supply and demand effects.
The empirical verification of the proposed research hypotheses was based on an econometric study using the panel method on 16 regions in Poland for each year between 2003 and 2009. The panel was a stacked time series with 16 cross-sectional units (16 regions) in 7 time periods. The panel data were used to estimate regression function parameters with the measures of entrepreneurship being dependent variables and the measures of research and development activity being independent variables. The two measures of entrepreneurship used were the business start-up rate and the business saturation rate. The measures of research and development activity comprised expenditure on research and development per capita, expenditure on research and development per one R&D employee and the proportion of R&D employees per 1,000 professionally active inhabitants.

The estimation of regression function parameters was conducted simultaneously by means of three methods: OLS, panel regressions with fixed effects and panel regression with random effects.
The findings of the research reveal the favourable influence of expenditure on research and development per capita and the expenditure on research and development per one R&D employee on the dynamics of new enterprise creation as well as on the saturation of the economy by business enterprises. Thus, the first research hypothesis was empirically confirmed. The second research hypothesis, however, was not confirmed as the level of employment in R&D institutions turned out to be of no statistical significance in relation to the dynamics of entrepreneurship.

The research results answer some questions, but at the same time they pose other questions for further research. One such question is whether the results obtained for Poland are also true for other countries. Thus, further research could focus on comparing the impact of research and development activity on entrepreneurship in different countries, as well as describing the characteristics of the economic structures of the countries in which the studied relationships do or do not occur. Another issue which could be addressed by further research is defining the mechanisms of the direct and indirect influences affecting the relationship between entrepreneurship and research and development activity.

Endnotes

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CHAPTER 7

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Researching Innovation in Service and Manufacturing SMEs – Two Roads to the Same End or Not?

Abstract

The aim of this chapter is to discuss and analyze different approaches applied in studying and measuring innovation in manufacturing and services and view them from SMEs' perspective. The chapter seeks to explore the differences and arguments behind these approaches and draws conclusions and recommendations based upon the insights they provide. It also discusses the necessary preconditions for innovation in the manufacturing and service SMEs and the elements in which they differ. After the theoretical discussion, the results from two separate SME innovation surveys conducted in Croatia are presented – one in the service (hotel industry) sector and the other in the manufacturing sector. The results are interpreted and compared in the light of the innovation research approaches discussed in the theoretical part of the chapter. As such, they contribute to understanding the patterns of innovation in services and manufacturing and to closing (or maybe widening?) the bridge between the research in these two areas.

Keywords: *Innovation, Manufacturing, Preconditions for innovation, Service, Small and medium enterprise.*

Introduction

The importance of innovation in the global economy and all economic branches is beyond discussion. It is "one of the five drivers of productivity growth, alongside skills, investments, enterprise and competition" (DTI, 2007, p.iii). It is known that the industrial sectors vary in terms of the sources, paces and rates of technological change (Pavitt, 1984). However, there appear to be significant differences between how manufacturing and services approach the innovation process, primarily because of the way organizations formalize development of new offerings/business developments in these two sectors. Innovation in manufacturing (Hjalager, 2002, p.466) has often been described as a linear process, arising from a specific R&D department within an individual firm, motivated by a market pool and a technology push. On the other hand, innovative behavior in the service sector enterprises is motivated by: (a) the market and the customers (Hjalager, 2002, p. 466), (b) the firm's strategy (Sundbo et al., 2003, p.13) and (c) entrepreneurialism (Sundbo et al., 2003, p.3).

There are also differences in theories that are used to describe innovation. While in the manufacturing sector we find (Amara & Landry, 2005) the engineering theories of innovation, clients–suppliers (or interfirms) network theories of innovation, technological network theories of innovation, and social network theories of innovation, in the service sector we find the technologist approach, assimilation approach, distinction/service-oriented approach and synthesis/ integrative approach (Sundbo & Gallouj, 2000; Tether & Howells, 2007; Droedge & Hilderbrand, 2009).

Also, the empirical evidence gathered so far has revealed differences in innovation in these two sectors. It was found that the non-technological innovation (Tether, 2004; OECD, 2000 according to OECD, 2005; Trigo, 2009; Trigo & Vence, 2009) and the incremental innovation (Tether, 2004; OECD, 2000 according to OECD, 2005; Trigo, 2009) are more significant in the service sector. Furthermore, researchers focusing on the service innovation highlight other service innovation specifics: high frequency of the so-called *ad hoc* innovation, a specific type of service innovation i.e. a specific solution the service companies created in response to a particular client's problem, usually in cooperation with their customers (OECD, 2001); greater importance of coordination and networking of different subjects during the innovation process (Sundbo et al., 2003; DTI, 2007) and higher importance of demand conditions and end-users (Bessant & Davies, 2007; Zomerdijk & Voss, 2007). Also, they find that services do not use the usual innovation terminology – the phrases like customer satisfaction/reviews, quality improvement are used when they are actually improving their products (Sundbo & Gallouj, 2000; Preissl, 2000; Gallouj, 2002; Bessant & Davies, 2007).

SMEs play a vital role in the global economy today. On the other hand, there is a general consensus that innovation is a prerequisite for the survival of SMEs (Markman et al., 2001; McAdam et al., 2004; O'Regan et al., 2006; De Jong & Marsili, 2006; Kessler et al., 2007; Radas & Bozic, 2009; Varis & Littunen, 2010). This idea can be followed back to Drucker (1985) who states that "innovation is a specific tool of entrepreneurs" (p. 32). However, regardless of innovation, many SMEs are short-lived according to De Jong and Marsili (2006). Radas and Bozic (2009) argue that understanding SMEs is an important issue because they are vital for any economy. Contrary to SMEs, large firms have the resources to invest into technology and human resources. So, the question is what fosters innovation in SMEs? Bearing this in mind, a surprising fact is that little research, especially empirical research, has been devoted to the differences in innovation in the manufacturing and service SMEs. We seek to explore this by basing the empirical part of the chapter on two autonomous studies conducted on the Croatian SMEs in the service (tourism) and manufacturing sectors.

Importance of SMEs in Contemporary Economy and Factors Influencing their Innovativness

Small and medium-sized enterprises (SMEs) are often referred to as the backbone of the European economy, providing a potential source for jobs and economic growth (European Commission, 2010). The best description of the key characteristics of a small firm remains the one used by the Bolton Committee in its 1971 Report on Small Firms, describing a SME as a small firm that is an independent business managed by its owner or part-owners and having a small market share (Lukács, 2005). But maybe the best explanation of the importance of SMEs was given by Zoltán Cséfalvay (Cséfalvay, 2011) the Hungarian Minister of State on the Informal Meeting of Ministers for Industry *"Innovation is the driving force behind a successful, progressive, growing economy, an economy which rises up from the financial crises of recent years stronger and more competitive, able to respond to the opportunities and challenges of the 21st century. Small and medium sized enterprises (SMEs) have a vital role to play in this. SMEs are nimble, flexible and responsive economic actors. They are innovative, adapting quickly to new market opportunities and emerging market trends"* (p.1). The importance of SMEs (Fan, 2003) can be recognized also in terms of SMEs being *the engine of growth, being essential for a competitive and efficient market, being critical for poverty reduction, as well as being a major source of technological innovation and new products*; also the SME sector is the largest provider of employment in most countries, especially of new jobs and it plays a particularly important role in the developing countries. In addition, SMEs are a major source of entrepreneurial skills, innovation and economic and social cohesion (Commission of the European Union, 2007; Stein et al., 2010).

Two main approaches in defining SMEs are the following (McQuaid, 2003):

- *Quantitative* – based on the criteria such as employment, turnover, and asset size that vary by industry and country; and
- *Qualitative* – ownership or the control of business. According to Glancey and McQuaid (2000) other forms of qualitative approach to defining small firms include an attempt to capture the meanings, beliefs and behavioral aspects, including the issues that face managers and distinguish a small business from a large one.

According to the European Commission (2011) there are approximately 23 million SMEs in the European Union. Therefore, the market position of SMEs is significant - in numbers: 99, 8 % of all enterprises. Out of the estimated 20.2 million enterprises within the EU-27 in the non-financial economy, only 43000 were large-scale enterprises, others were SMEs. The average European SME provides employment for 4 people, including the owner/manager, and has the average turnover of 500.000 euro (EUROSTAT, 2010). Another significant indicator is gains and losses in employment that are showing that the prospective industries are mostly based on services. The definitions of small and medium enterprises vary from one country to another, but many recent articles adopted the OECD definition where a SME is defined as an enterprise with less than 250 employees and the annual turnover of less than 50M€ (Clark, 2010, p.602).

A specific feature of SMEs is that they provide products and services that the big competitors do not, for one reason or another (Lukács, 2005). SMEs deliver what no one else seems to want to deliver, and in many cases, they do it very well. Many large companies treat SMEs as indentured servants that can be pushed around with (sometimes) unreasonable demands. Firstly, because of a sense of power, and/or secondly, they forget that without SMEs out there, many big companies would not be able to deliver what they promise to customers (Lukács, 2005). SMEs contribute to economic development in various ways: by *creating employment, providing desirable sustainability* and *innovation in the economy as a whole.*

Innovation is also one of the key ways by which companies can adapt to and manage their environments (Kumar, 2010, p. 51 according to Cohen & Cyert, 1973). Kumar's study (2010) showed that the strategic orientation of SMEs and large firms in terms of the Miles and Snow typology is different: a large firm operates as a "prospector" – an organization with a strong concern for product and market innovation, while the majority of SMEs have a "defender" orientation – a narrow product-market domain or a "reactor" orientation – do not have a stable strategy and they make adaptations when forced by the environment orientation. The same study also showed that SMEs have taken a defensive position, introducing products that involve low novelty of innovation, and that a small number of SMEs were able to innovate successfully in all product categories. So, it is the firm that has to foster the intangible resources that firms employ in order to boost innovativeness and assure competitiveness.

The challenge for companies nowadays is to deliver quickly and flexibly new quality products and services, in order to be able to respond to greater and changing demands from clients (Vasková, 2007). To thrive, a company must develop products and services that have a discernible edge (Urip, 2010, p.28). This can only be achieved if there is an ongoing commitment to recognize the changing needs of the customers, to identify gaps in the market, and to develop socially innovative products that consistently meet those changing needs (Urip, 2010, p.28). The new Barroso Commission (Soet, 2010) established *research and innovation as the central priorities for Europe over the next decade.* The post-2010 decade calls for a more explicit emphasis on the new challenges posed by the post-crisis world:
"The aim is for Europe to lead, compete and prosper as a greener, knowledge–based economy, growing fast and sustainable, creating high level of employment and social progress. To achieve this, Europe needs a strengthened industrial base, a modern service sector and a thriving rural economy. As a "first mover" in building this society for the future, Europe can derive important benefits by developing competitive, innovative products, rolling out the infrastructures of the future, entering new markets and creating new, high quality jobs". (Soete, 2010, p.2)

At the same time, innovations in today's"globalized" world are hardly feasible in isolation. Firms must both innovate and successfully implement innovation to grow and stay competitive (Cadwallader et al. 2010). Corporations must be aware of their customers' wants and needs and accordingly assure corporations' ability to create an environment that germinates and grows new ideas as a critical factor of an organization's sustainability (Ricardo, 2010). *Corporations that intend to be around for the long run must embrace innovation as a part of doing business* (Ricardo 2010, p. 17). Why? As Totterdill (2007) says, only higher rates of innovation in products and services lead to economic growth and the creation of new jobs.

Innovation is common across the entire small business sector, regardless of size, industry or geographic location; innovations are driven by passion for business, concerns for customers, non-stop market pressures, and many small business owners innovate on a continuous basis in order to survive and thrive (King & Ockels, 2009). Innovative SMEs are defined as small and medium enterprises that create value through "innovation" or continuously seek for innovative activities (APEC SME Innovation Centre, 2006). *Innovative SMEs are the companies that play a leading role in creating jobs and value added by improving the existing products and services, or producing and distributing new ones* and they have the potential to drive economic growth and create quality jobs through continuous innovation activities (APEC SME Innovation Center, 2006).

The economic impacts on innovative SMEs implicate that the policy incentive and R&D support promote innovative SMEs. But we have to bear in mind that there are already theoreticians, such as Qingrui et al. (2007), who believe that innovation is no longer the function of the R&D personnel alone, but the expected behavior and practice of all employees.

Innovation, generally, refers to new ways of achieving something. The emphasis lies on applicability: any significant improvement in business practice (either in the product range or in support structures) is classified as innovation (Gallup Organization, 2009). However, the range of possible innovations is extremely broad: from introducing new rules in a company department that facilitate a business process, to creating a working fusion power plant (Gallup Organization, 2009). For Greenhalgh and Rogers (2010) innovation can be important for: a firm, a market (industry) and globally (the world). In today's world, innovation seeks to drive economic growth and to assure organizational success, it is often not radical, and it is based on incremental and constant improvements.

The new focus of the innovation policy is the Total Innovation Management (TIM) policy introduced by Qingrui et al. (2007) defined *as innovation by anyone at any time in all processes, among different functions and around the world.* Shapiro (2001) indicated that enterprises should try to realize innovation 24/7 in order to respond in a timely fashion to the needs of their customers (Qingrui et al., 2007). The all-elements innovation can be described as creating synergy between technological (mainly product, process, and portfolio) and non-technological (mainly market, organization and institution) areas in an organization, through effective tools and facilitating mechanisms that encourage and regulate innovation by every employee (Qingrui et al., 2007). The workplace has an important role in the success of the introduced theory. Studies have already demonstrated that if employees are encouraged to take part in and learn the entire process of their job, they will show greater innovative performance (Hammer & Champy, 1993; Qingrui et al., 2007). Therefore, firms must focus on the workplace innovation. Apart from detached workplace innovation, companies should understand that innovation depends on different internal and external factors. Important internal factors (Radas & Bozic, 2009, p.439) are planning and setting innovation as a priority, hiring qualified scientists and engineers, investing into R&D as well as firm's age. For O'Regan et al. (2006) the internal factors are quality programs, investment in R&D, skilled personnel that cannot be easily imitated and can pose a competitive priority. Varis and Littunen (2010) state that all the above mentioned internal factors are the key ingredients for the innovativeness of SMEs, but add that the intensity of the industry and the owner's or manager's personality will also play an important role in the initiation and development of innovativeness. According to them innovativeness will not necessarily lead to profitability, but

to a better chance of survival and growth. Finally, Copus et al. (2008) dissociate proximity to other enterprises as an innovativeness factor explaining that accessible areas constantly produce higher rates of innovative activity (Copus et al.,2008, p.51). For Radas and Bozic (2009, p.439) the main external factor is collaboration with other firms[5] (suppliers, research institutions, customers, consultants), Kessler et al. (2007) find that external partnerships prolong time for new product completion and that the size of the company does not influence the speed of new product introduction.

However, internal and external factors do not have to be mutually exclusive. To clarify, Barlett and Bukvic (2006) show that SMEs with highly qualified people will, naturally, have stronger ties with academia; Subrahmanya (2005) finds that SMEs oriented toward radical innovation will depend more on their internal factors, while incremental innovations will depend more on external connections the firm has with other institutions; and De Jong and Marsili (2006) find that investment into R&D and cooperation enhances innovativeness. It is suggested that the focus should be placed on innovation drivers. Laforet and Tamn (2006, p.365) highlight that the drivers of SMEs' success are: strategic formulation, investment in people, cooperation and networking, extensive use of external links and market and competitors analysis. For Bolinao (2009) there are three determinants of SMEs' success: owner's or manager's leadership strategy, internal and external factors. In general, the environment constantly changes and should be closely monitored and influenced in order to enhance and keep innovativeness, especially because innovativeness today is a strength, tomorrow a weakness and companies cannot be complacent or assured that innovativeness is their salvation. Another fact that should be considered is that the main focus in business today is on – service, even production is dependent on the post trade services, customer service, etc. (Gonan Bozac & Paulisic, 2011). In 2009 in the world context, the GDP composition by sector was the following: agriculture 6%, industry 30.6% and services 63.4% (Schwab & Porter, 2009, p.67). Therefore, the strengths that would maximize the rate of innovation in production and services should be based on human resources.

Researching Innovation in Services and Manufacturing

The literature on innovation has to a large extent been influenced by the manufacturing sector in line with the general view that the manufacturing industries are the main engine of economic changes and technology the main source of innovation (Cainelli et al., 2006). As a result, innovation in the service sectors has for a long time been a neglected area of the innovation research (Drejer, 2004), despite the fact that services generate high proportion of employment and value added in the global economy. Symbolically, Miles (2000) described the position of services in innovation research as having a "Cinderella status ...being neglected and marginal" (p.371) as cited in Tether (2004). So, the innovation researches in manufacturing and services have different origins, paths, history and age. Still, in recent years, the research interest in service innovation has been growing (Sirili & Evangelista 1998; Hipp et al., 2000; Hollenstein, 2000; Gallouj, 2002; Kandampully, 2002; Drejer, 2004; Howells, 2004; Tether 2004, 2005; Avlointis et al., 2001; Cainelli et al., 2006; Nijssen et al., 2006; DTI, 2007).

It is a known fact that services differ from products in many important aspects. The question that inevitably arises is: to what extent do these service specifics reflect on innovation in service companies? In other words, to what extent are the models and methods for the measurement and study of innovation that have developed in manufacturing, applicable in the service sector? Many authors have investigated specific features of innovation in services (Sirili & Evangelista, 1998; Van der Aa & Elfring, 2002; Tether, 2004). They can be summed up in the following:

- Co-terminality of service production and provision;
- Information intensity of service products and processes;
- High importance of human factor;
- Critical role of organizational factors for service firms' success and
- Inappropriateness of intellectual rights for service innovation protection.

The simultaneity of the production and service provision stems from the fact that services involve close interaction between the service "producer" i.e. provider and service consumers. As a result, the customer becomes a "co-creator" and "co-producer" of the service experience. The boundaries between the activities of manufacturers and customers are flexible and this flexibility creates opportunities for innovation (Vandermerwe 1993 according to Hall & Williams, 2008). In literature, this characteristic of services is often mentioned under different names such as the interface interaction, co-production, servuction, socially regulated service encounter, service encounter (Gallouj & Weinstein, 1997).

The simultaneity of service production and consumption has two important implications for a potential innovation activity. On the one hand, customers can be regarded as "partial" employees (Schneider & Bowen, 1995 as cited in Hall & Williams, 2008) and their motivation nearly as essential for effective service delivery as the employees' motivation. Also, customers' involvement may be the source of innovative ideas for new products, new technology, market information and development opportunities that companies do not have "in the house". On the other hand, this results in the difficulty of differentiating service products and service processes and, consequently, the difficulty in distinguishing between production and process innovation. This was confirmed by several empirical studies (e.g. Sirili & Evangelista, 1998; Hipp et al, 2000; Jacob et al., 2003) that showed that in many service industries, particularly in the areas such as cleaning, travel, transportation, food preparation and serving and hospitality, the distinction between these two types of innovation is problematic. As a result of the above characteristics, the literature finds that the major focus of innovation in services is customization i.e. the adaptation of services to customer requirements (Sirili & Evangelista, 1998; Torres & Jacob, 2001 as cited in Jacob & Groizard, 2007).

The information intensity and the related role of information technology reflect the intangible and information-intensive nature of services that are based on a large number of personalized interactions with customers. The application of information technology presents a significant potential for collecting, sorting and analyzing such data. Particularly active are retail stores that have their own debit or credit cards. These cards serve as a means for creating large electronic databases of customers' information and their analysis enables the identification of market trends and often are the basis for innovation. Although, for a long time considered to be lagging behind in terms of technology application, the service sector enterprises, in fact, play a significant role in innovation, particularly in the creative use and diffusion of technology (Tether et al., 2002). Based on the above, Sirili and Evangelista (1998) conclude that the generation and diffusion of information technology should clearly be included in the definition of innovation and cost of innovation.

The importance of the human factor and the related importance of quality are a consequence of the importance of customers' involvement in service production. In this respect, there is a significant difference between the "front line" employees, i.e. those who are in direct contact with customers/clients and employees in the "back-stage" departments who provide them with necessary logistic, operational and administrative support. Sirilli and Evangelista (1998) conclude that the training of employees should be viewed as an innovative input, because it is often one of the major channels to enhance the technological capabilities of enterprises in the service industries.

The great importance of organizational factors is indisputable in services and Van der Aa and Elfring (2002) provide excellent examples through multi-organizational forms and new combinations of services. The first form is found in the service companies trying to expand their market/market share through opening new business units to serve localized markets in different places. Common examples are retail, tourism and travel agencies. By applying the "reproductive formula" (Norman, 1984, as cited in Hall & Williams, 2008), service companies standardize the process of providing services and, in this way, lower their costs, but also use the existing experiences to improve their quality (Sundbo, 1994). The second form denotes new combinations of the existing products, and relates to Norman's concept of linking services (Hall & Williams, 2008).Namely, if there is a demand for complementary services, companies can increase sales and reduce costs per unit by providing these services in a package. Good examples are financial companies that offer a range of services, from basic financial services to pension and other services, or tourism operators that provide a range

of services from transportation services to accommodation or insurance. Recognizing the importance of organizational factors in service companies has led to demands for expanding the innovation concept and involving organizational changes, which may be related to or independent from the introduction of technological innovations in the business. For example, CIS III (DTI, 2001), 2001), for the first time, introduces forms of organizational and marketing innovation under the term "wider innovation", while in CIS IV (OECD, 2004) they are dealt with in more detail.

In the engineering theories of innovation, the opportunities to improve products or manufacturing processes are found in the uptake of research results. In this theory, basic research and industrial R&D are the sources of new or improved products and processes. In the client supplier theories of innovation, customers are the sources of information for developing or improving products and processes. The basic assumption of the technological network theories is that innovative firms are linked to a highly diversified set of agents through technical networks of collaboration and exchange of information. They predict that the more sustained and intense the interactions between firms and external sources of technical information, the more likely the technical information will be used to develop innovations that are world's first introductions on the market, rather than innovations that are first introductions at the national or company level. The social network theories of innovation are based on two old ideas and a new insight. The old ideas are that innovation is determined by research (borrowed from the engineering theory), and by disorderly interaction processes between firms and other actors (borrowed from the technical network theories of innovation). It was found that knowledge plays an ever more important role in fostering innovation.

On the one hand, the research approaches used to investigate innovation in services are not unique and, depending on their view on the elaborated service innovation specific, can be divided into four categories. The first is the technologist approach, where innovation is only treated as technology based and services viewed as mere adopters of the technologies developed by the manufacturing sector. Very similar, but still slightly different, is the assimilation approach that follows the tradition from manufacturing and applies the same methodologies in services. On the other hand, the distinction/ service-oriented approach is based upon the assumption that services are significantly distinctive from products and as such call for specific approaches to be used in researching innovation. Especially prominent in developing this line of research is the so-called "Lille school" (Tether, 2004) i.e. researchers associated with the University of Lille, France (Gadrey & Gallouj, 1995; Gallouj & Weinstein, 1997; Sundbo & Gallouj, 2000). Finally, there is the synthesis/ integrative approach that aims at developing methodologies and concepts for innovation measurement that can be used in both services and manufacturing. The first study based upon this approach was the one of Barcet et al. (1987, as cited in Sundbo & Gallouj, 1998) while the foundations were laid by Gallouj & Weinstein (1997). Important contributions were also given by Preissl (2000) and de Vries (2006), while Drejer (2004) concludes that this approach is still in its infancy. In their historical review of innovation research, Tether and Howells (2007) name these three approaches as the phases of the service innovation research development, naming the technologist phase the phase of neglect and thus showing how this research issue has been developing through time.

Furthermore, innovation in manufacturing (Hjalager, 2002, p.466) has often been described as a linear process, arising from a specific R&D department within an individual firm, motivated by a market pool and a technology push. On the other hand, innovative behavior in service enterprises is found to be motivated by: (a) market and customers (Hjalager, 2002, p.466), (b) firm's strategy (Sundbo et al. 2003, p.13) and (c) entrepreneurialism (Sundbo et al. 2003, p. 3). Also, it has been noted that manufacturing is more likely to report the need for new strategies and structures when products are new to the industry or new to the firm (Ettlie & Rosenthal, 2011). In addition, it is clear that there are several important aspects for service innovations that are not even considered in the study of innovation in manufacturing. These include, for example, the interactive role of consumers and the challenge of defining and measuring the intangible results of the service process.

The literature on innovation has so far shown that innovation (and the process of innovation creation) in services differs from that in manufacturing in the following features:

- Service companies usually do not designate specific resources or functions for research and development. Therefore, innovation in services is rarely the result of some *a priori* planning. On the contrary, rather than as a planned and targeted activity, innovation in services often arises as a by-product in the process of providing services to meet customer requirements, and only *a posteriori* is it recognized as innovation (Hjalager, 2002; Toivonen & Tuominen, 2006);
- It is difficult to apply the common classification, existing in production, process and organizational innovation, to services, because services are simultaneously a product and a process (Sirili & Evangelista, 1998; Van der Aa & Elfring 2002; Tether, 2004);
- A vague nature of the service process result makes the perception and recognition of changes and improvements difficult. When asked directly, service companies are often unable to determine whether they have produced innovations or not. They often even underestimate them, or, due to its unique nature, see any service act as an innovation. Also, service companies often do not use the usual innovation terminology. They rather talk about customer satisfaction/reviews, quality improvement, when they actually work on improving their products (Gallouj, 2002; Sundbo & Gallouj, 2000; Preissl, 2000; Bessant & Davies, 2007);
- High importance of non-technological innovation (OECD, 2000 according to OECD, 2005; Trigo, 2009; Tether, 2004; Tether & Howells, 2007; Trigo & Vence, 2009);
- A high proportion of incremental innovation (Tether, 2004; OECD, 2000 according to OECD, 2005; Trigo, 2009);
- Existence and high frequency of so-called *ad hoc* innovation, a specific type of service innovation. The *ad hoc* innovation actually denotes a specific solution the service company created in response to a particular client's problem and as such usually occurs in cooperation with customers (OECD, 2001);
- Importance of coordination and networking of different subjects during the innovation process (DTI, 2007);
- High importance of demand conditions and end-users (Bessant & Davies, 2007; Zomerdijk & Voss, 2007).

It is clear from the review of the above literature that there are differences between innovation in services and innovation in manufacturing. Bearing in mind that there are differences in (manufacturing) innovation between small and medium sized enterprises (SMEs) and large companies, the next question is to what extent the innovation in SMEs in the manufacturing sector differs from the innovation in SMEs in the services sector. Encouraging innovation is a challenge for all enterprises because long term survival means embracing innovation as a part of doing business (Ricardo 2010, p.17). However, due to their number and market importance, in our view, it is especially crucial for SMEs. As seen in the previous section, the research so far, although using different methodologies and approaches, has revealed differences in the innovation activity of service and manufacturing. Still, the extent of these differences, or perhaps even similarities, found among SMEs in these subsectors, is rather unknown. Our goal is to reveal at least some parts of this question through the answer of the empirical studies presented in the following section.

Results of Two Empirical Studies on SME Innovation Activity in Services and Manufacturing

In this part of the chapter we bring two empirical analyses, one conducted in the service and the other in the manufacturing sector.

The empirical research regarding service companies was carried out in the specific service sector – the hotel industry in Croatia, in the period between the beginning of April and the end of August 2010. The population was all 559 hotels operating at the time[6]. They were presented with an adapted CIS questionnaire designed specifically for the research. After the extensive phone and e-mail communication, the resulting sample size was 68 hotels, resulting in a 12.76% response rate. The sample was tested for representativeness and (in terms of category and location) was found to be representative of the whole population. For this research, only small and medium hotels[7] were taken into consideration, leaving us with 57 valid and usable cases.

The research on the manufacturing sector is a part of EMIS (European Manufacturing Innovation Survey) led by Fraunhofer ISI Institute from Karlsruhe, Germany[8]. This research was conducted in May 2009 in Croatia. The target group was the whole manufacturing sector consisting of companies with over 20 employees. 1207 companies met the criterion and 89 answers were obtained leading to a 7% response rate. This lower rate occurred due to the fact that this round of research was conducted in the time of severe crisis and the other reason is the length of the questionnaire[9]. The sample was tested for representativeness in terms of size and industry and was found to be representative of the population of both criteria. For this research, only SMEs were analyzed, i.e. the firms with the number of employees ranging from 10 - 250. Micro organizations (fewer than 10 employees) were not taken into consideration according to the OSLO manual guidelines (OECD, 1996). This resulted in 69 valid cases. However, since the category with less than 20 employees was underrepresented, it was discarded from further analysis, leaving us with 66 valid cases.

Innovation Activity of Service SMEs

The research questions and relationships investigated in the hotel sector data are visually presented in Figure1.

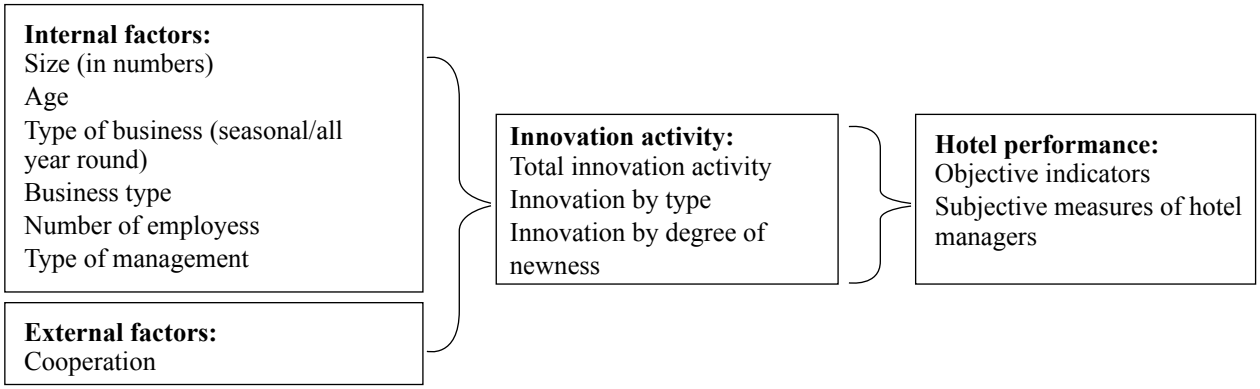

Figure 1. Factors and outcomes researched for service SMEs (hotels).

With regard to the service sector, adapted CIS methodology was applied and the innovation activity was measured by the Likert scale. The respondent (hotel manager) was asked to give an estimation of the grade of introduction for each type of innovation in the hotel in the period of the last three years. The offered range was from 1 (none) to 5 (to a very large extent). Since the measurement scale was ordinal, the research generated the grade of innovation introduction for each hotel[10] as shown in Table 1.

Table 1. Total innovation activity by types of innovation for small and medium and large hotels.

	Total Innovation by degree of newness			**Innovation by type**			
	Innovations	Radical innovations	Incremental innovations	Service innovations	Process innovations	Organizational innovations	Marketing innovations
Small and medium hotel	3.10	2.35	2.92	3.75	3.14	2.85	3.60
Large hotels	3.47	2.41	2.76	3.64	3.41	3.21	3.64
p value (ANOVA)	.563	.408	.543	.714	.481	.30	.905

As can be seen from the table, large hotels exhibit a higher grade of total innovation activity and this is in line with the general view dating back to Schumpeter (1947) that innovation increases with the size of the company. However, applying a one way ANOVA, we find that the difference in innovation activity is not statistically significant ($p = 0.563$). On the contrary, a calculation of Pearson correlation between the hotel size (measured by number of rooms) and innovation activity, shows that there is no correlation between these two variables ($r = 0.115$, $p = 0.193$). Therefore, the conclusion is that the innovation activity of Croatian hotels does not depend on the hotel size and points to the fact that small hotels are not far behind their big counterparts in the area of innovation.

Taking into account the newness of innovation, we find that large hotels are prompter to innovate radically, while small and medium hotels exhibit higher rate of incremental innovation. This is in contradiction with the finding of Martinez-Ros and Orfila-Sintes (2009) who found that in Balearic hotels size had a positive impact on both types of innovation, although statistically significant only on incremental ones, while it supported the results of qualitative research of Pikkemaat (2008), who found that Austrian small and medium hotels rarely innovated radically. On the other hand, looking at the innovation activity by types of innovation, we see that small and medium hotels exhibit higher innovation activity in only one type of innovation – service innovation. This means that small and medium hotels are prompter to introduce new or significantly improved services into their business than their large counterparts. In all other innovation types, small and medium hotels perform worse and only in marketing innovation come close to large hotels. Still, the ANOVA shows that for all types of innovations, the difference in the degree of innovation in small and medium hotels, on the one hand, and large hotels, on the other, is not statistically significant, showing that these differences have to be taken with caution. Interestingly enough, although the service innovation literature highlights the importance of organizational innovations (Gadrey & Gallouj, 2002 as cited in den Hertog et al., 2003; Tether, 2005), they are found to be the least developed innovation type, in small, medium and large hotels respectively.

In order to provide a more detailed analysis, a cluster analysis of small and medium hotels' innovation activity was performed. The cluster analysis is a multivariate technique used to group observations or variables into smaller groups or clusters. The aim is to classify observations with regard to their similarities and differences according to the measurement characteristics. As such, it reveals the optimal number of clusters (groups) through minimizing variations within groups and maximizing the differences between them (Rozga, 2009). The cluster analysis performed indicated that the optimal grouping of observations from the research would be into two clusters: the cluster of highly innovative hotels (39) and the cluster of low innovative (18) hotels (Table 2).

Table 2. Clusters of small and medium hotels according to innovation activity (N=57).

		Average grade of total innovations	**Number of units in cluster**
Clusters according to innovation activity (Ward method)	Highly-innovative	3.72	39
	Low-innovative	1.77	18

The cluster analysis is exploratory, meaning it »...always provides a classification, a good one or a bad one« (Rozga, 2009, pp. 48), and this is often quoted as its main drawback. In order to discard this doubt, the statistical significance of differences between the obtained clusters was tested using the parametric t-test that showed that the resulting hotel classification is acceptable % ($p = 0.00$).

Clustering was the basis for investigating the relationship between the characteristics of small and medium hotels and their innovation activity. It was performed through logistic regression. The results given in Table 3 show that only one estimated coefficient is statistically significant for the variable number of rooms ($p = 0.032$). Since it has a negative sign it means that in the group of small and medium sized hotels the increase of room numbers increases the probability of the hotel belonging to the low innovative cluster.

Table 3. Logistic regression for small and medium hotels' features and innovation activity (N=57).

		B	S.E.	Wald	Df	Sig.	Exp(B)
Step 1(1)	Number of rooms	-.046	.021	4.623	1	.032	.955
	Age	-.001	.029	.002	1	.963	.000
	Seasonal/all-year round business	2.507	1.690	2.200	1	.138	12.268
	Occupancy (in days)	.035	.040	.789	1	.374	1.036
	Ownership type*	18.424	6,033.608	.000	1	.998	1E + 008
	Business type**	-5.611	4,634.975	.000	1	.999	.004
	Number of employees	1.630	.894	3.324	1	.068	5.104
	Type of management***	-.162	.890	.033	1	.855	.850
	Location****	-.922	.909	1.028	1	.311	.398
	Constant	5.821	19,496.981	.000	1	1.000	337.241

Variable(s) entered in step 1: @ No. of rooms @ Age @ Seasonal/all-year round. @ Occupancy. @ Ownership type. @ Business type. @ No. of employees. @ Type of management. @ Location
* Ownership type: a) private domestic. b) public-private domestic. c) foreign. d) mixed e) other
** Business type: a) management contract. b) franchise. c) consortium. d) autonomously. e) other
*** Type of management: managed by a) manager. b) owner. c) family
**** Location: a) island. b) seaside. c) continent

In addition, using the Pearson correlation, we investigated the relationship between the hotel age and two other variables - hotel size and innovation activity. We found that hotel age is statistically significantly correlated to hotel size (r=0.410; p=0.01), while no relationship was found between hotel age and innovation activity. This proved that small and medium hotels are growth oriented but longer time in the hotel business does not influence their innovation activity (r=0.193; p= 0.775).

In order to investigate the factors that affect innovation activity, we investigated the initial stimulus for innovation activity, the information sources as well as the innovation barriers. In all these elements, we found slight differences among small and medium and large hotels but none of them was statistically significant. Also, we investigated, for the whole data set, the relationship between the involvement in different kinds of networks and innovation activity, applying different statistical methods (descriptive statistics indicators of total innovation activity for networked and non-networked hotels and the t-test for independent samples; classification table for two groups of variables – highly and low innovative hotels and networked and non-networked hotels as well as the H square test and binary logistic regression). These methods have all confirmed that these two variables are statistically significantly positively connected i.e. that hotels involved in different kinds of partnerships exhibit higher innovation rates.

In order to see how the innovation activity influences hotels' business performance, we calculated the correlation between the total innovation activity of small and medium sized hotels and, through research, gathered selected hotels' specific performance indicators.

Table 4. Correlation between total innovation activity and hotel performance indicators for small and medium sized hotels (N=57).

		Total innovations	Occupancy (%) in 2009	Change of occupancy % compared to 2008	Change of overnights compared to 2008	Change of income compared to 2008
Total innovations	Pearson Correlation	1	.55	.321*	.268	.252
	Sig. (2-tailed)		.734	.038	.095	.164
	N	57	40	42	40	32
Occupancy (%) in 2009	Pearson Correlation	.055	1	-.066	.068	.173
	Sig. (2-tailed)	.734		.713	.707	.409
	N	40	40	34	33	25
Change of occupancy % compared to 2008	Pearson Correlation	.321*	-.066	1	.835**	.573**
	Sig. (2-tailed)	.038	.713		.000	.001
	N	42	34	42	39	31
Change of overnights compared to 2008	Pearson Correlation	.268	.068	.835**	1	.807**
	Sig. (2-tailed)	.095	.707	.000		.000
	N	40	33	39	40	31
Change of income compared to 2008	Pearson Correlation	.252	.173	.573**	.807**	1
	Sig. (2-tailed)	.164	.409	.001	.000	
	N	32	25	31	31	32

The data in Table 4 show that the total innovation activity of small and medium hotels is statistically significantly correlated only with the percentage change of occupancy rate (in %) compared to the previous year (2008), in line with the findings of Orfila-Sintes and Mattson (2007). Although the correlation was also found between the relationship of total innovation activity and hotel occupancy (in %), % change of overnights and income compared to the previous year (2008), it was not statistically significant ($p > 0.05$). On the other hand, the relationship between the total innovation activity and the percentage change of occupancy compared to 2008 is positive and of moderate intensity ($r=0.321$; $p=0.038$). Since for all hotels the same correlation was weaker ($r=0.281$; $p= 0.044$) it shows that small and medium hotels' innovation activity reflects more intensively on their occupancy rates. Having in mind that the year in which the research was conducted (2009) was a tough year for the hotel business and that the whole sector suffered a decline due to the global recession, this finding shows that more innovative hotels and especially small and medium ones are more resistant to negative market trends i.e. they experience them to a smaller extent. As such, this finding has important managerial implications.

Also, to confirm the positive impact of innovation activity on business performance, we calculated the correlation between the innovation activity and the assessment of 13 business performance indicators given by hotel managers[11] (total income, total profit, total overnights, yearly occupancy rate, market share, total costs, guests' satisfaction with service quality, number of guest complaints, customer loyalty, employees' satisfaction, fluctuation of managerial staff, fluctuation of other staff, hotel's positive image). Namely, the previous research (Tajeddini, 2010) showed that entrepreneurs/managers are often reluctant to provide financial data on their business. For this reason, the researchers

using subjective grading based upon the performance perceptions given by managers and several researchers have so far demonstrated the validity and reliability of such data (Pearce et al., 1987). In our case, the results showed that innovation activity is statistically positively related to 10 indicators (from which 9 with p=0.01 and 1 with p=0.05), and not statistically related to two of them (business costs and the fluctuation rate of other staff). Also, it is negatively related to one of the indicators - the fluctuation rate of managerial staff. Since it is, in fact, a negative indicator, its negative correlation presents a positive impact on the hotel business. These data also confirm the positive impact of innovation activity on the performance of small and medium hotels.

Innovation Activity of Manufacturing SMEs

Similarly to the analysis of the service sector, an empirical analysis was conducted on the manufacturing sector. We investigated the way internal and external factors affect innovation in the manufacturing sector, taking into account the size of companies. The research questions are represented in Figure 2.

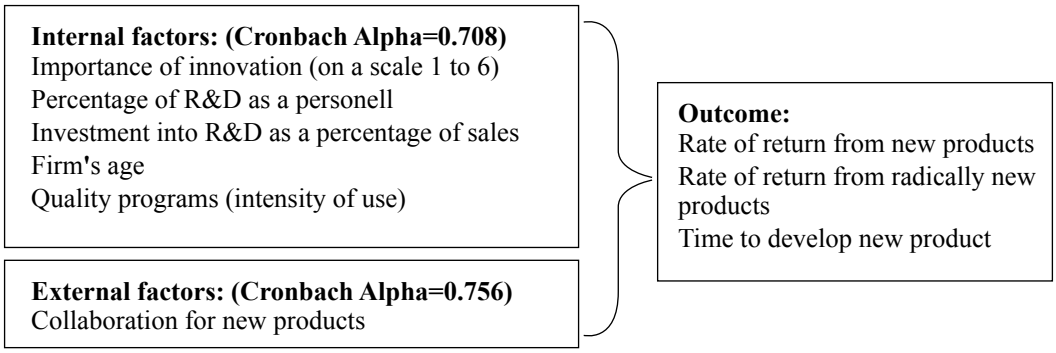

Figure 2. Factors influencing innovation in SMEs.

In terms of size, the sample consists of 27.53% of very small companies (up to 49 employees), 34.78% of small companies (50-99 employees) and 33.33% of medium companies (100 – 250 employees). On the other hand, in terms of industry, the manufacturing of rubber and plastic products (13.04%) is the most represented sector; followed by the manufacturing of fabricated metal products (11.59%); manufacturing of other transport equipment (8.66%); manufacturing of machinery and equipment (8.66%); publishing, printing, reproduction of recorded media (8.66%) and manufacturing of wood and wood products (8.66%).

The first question was to rate the importance of six strategic priorities (cost, quality, innovativeness, customization, speed, additional service) in the range from 1 (the most important) to 6 (the least important). Small companies (up to 100 employees) name price and quality as their first priorities. Only medium firms (100 to 250 employees) stated that innovative products are among their competitive priorities. This is in line with the statement of Cagliano et al. (2001) that small firms are too operationally oriented.

The next question was the percentage of returns given back to research and development and the share of R&D personnel. Interestingly, small firms invest most into R&D, as can be seen in Figure 3, and this is in contradiction to their above stated priorities (cost and quality).

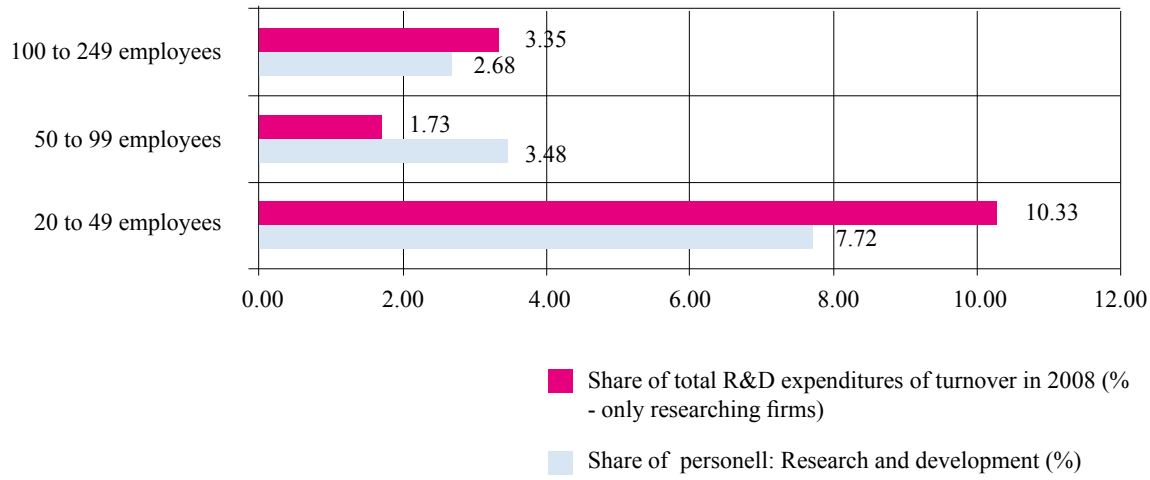

Figure 3. Percentage of R&D investments and percentage of R&D personnel (EMIS Croatia 2009, N=66).

When the number of employees is analyzed in comparison to the company age, the analysis shows that very small firms are on average 24.84, small firms 26.54 and medium firms 32.91 years old. This indicates that manufacturing SMEs are growth oriented.

Since cost and quality emerged as the most important competitive priorities, the issue of quality was researched in more detail. Interestingly enough, it was noted that very small and medium enterprises are more into quality programs than the group in between, since 31.82% of very small companies (20-49 employees), 18.18% of small companies (50-99 employees) and almost half (45.45%) of medium companies (100 – 249 employees) use TQM. It can be concluded that medium firms are more into quality programs, followed by very small companies.

Finally, as for the cooperation, it was found that it rises with the size of the company. For example 25.53% of very small firms cooperate with external partners, 31.91% of companies in the range from 50-99 employees cooperate with external partners, while 40.43% of companies in the range from 100-249 employees cooperate with external partners.

After descriptively presenting our sample and internal and external factors, we test if these internal and external factors influence returns from new products (new products and radically new products). As expected, the returns from radically new products are much higher than from only modified products. Interestingly, small firms have the highest returns. But if we look at Figure 4, it is evident that they are also the ones that invested most into R&D. This is in contradiction to Cagliano et al. (2001) who state that small firms are too operationally oriented. However, the regression analyses show different results. We have conducted two regression analyses: the one where the dependent variable is the returns from a new product (significantly improved products but not radically new) and the other where the dependent variable is the returns from radically new products.

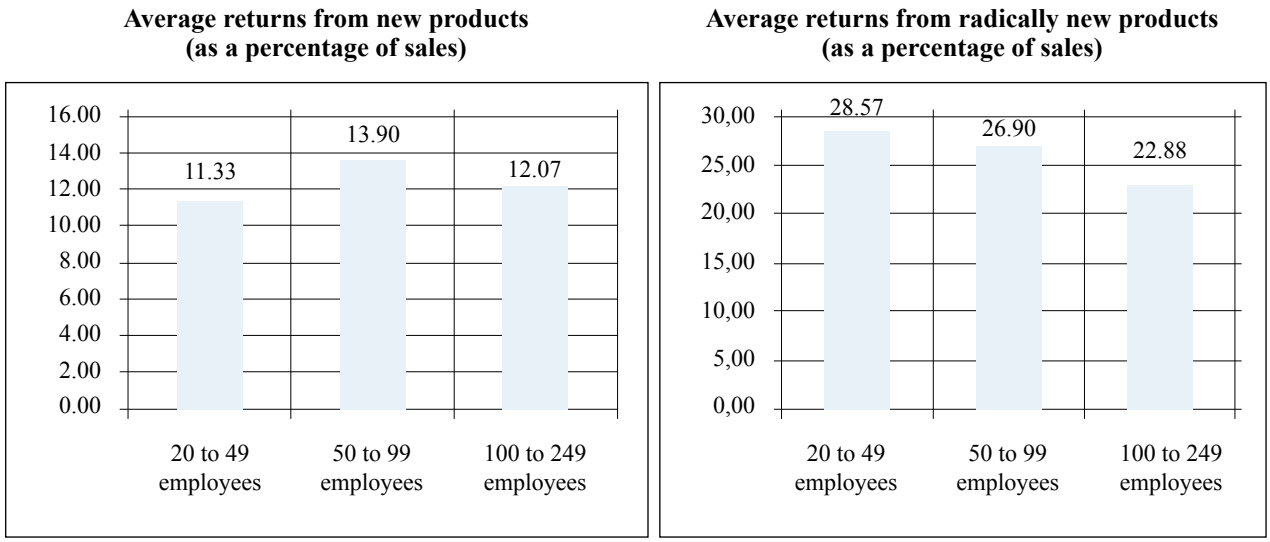

Figure 4. Average returns from new products and radically new products (EMIS Croatia 2009, N=66).

It can be seen that the revenues from modified products are the largest in companies with 50 – 99 employees, while the revenues from radically new products are the largest in the smallest companies and steadily falling as the size of the company rises (in terms of the number of employees). It is also important to see how long it takes to develop a new product. The fastest introduction of a new product is found in very small firms (20-49 employees) and it takes them on average 11.33 months to launch a new product. Right behind them are medium sized companies (100-249 employees) with 12.7 months, while for the companies with 50 to 99 employees, it takes on average 13.9 months to launch a new product.

When the shares generated by new products are regressed against our internal and external variables, we have a fairly predictable model (Table 5).

Table 5. Model summary (new products are regressed against our internal and external variables).

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.863(a)	.745	.363	16.471	2.484

However, the standardized beta coefficients are more interesting. If we take a look at Table 6, we see that cooperation negatively influences new products' returns (we are talking only about incremental innovations). This is in complete contradiction to Subrahmanya (2005) who says that SMEs oriented on radical innovation will depend more on their internal factors, while incremental innovation will depend more on external connections the firm has with other institutions. The share of R&D personnel, interestingly enough, also shows a negative sign. This means that the smaller the number of R&D personnel, the higher the returns. This is in line with our descriptive statistics that small firms invest more into R&D, which is a curiosity. The same thing holds true for the age of the company. The younger the company, the greater the returns it generates on new products. Again, this is in line with our descriptive statistics but not in line with the findings of Cagliano et al. (2001). As we can see from Table 5, the model is fairly predictable. The changes in our independent variables account for 74.5% of change in returns from new products. However, a word of caution is in order here. If we look at Table 6, the significances of the coefficients are not good. The best significance refers to the R&D expenditures. This means that the most significant impact on returns from new products, in fact, comes from the internal R&D investments.

Table 6. Coefficients of the model.

	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Std. error	Beta		
(Constant)	46.309	33.238		1.393	.236
Competitive factor: innovative product	1.028	4.469	.087	.230	.829
Quality circle: use	-1.009	16.023	-.025	-.063	.953
Inno. coop. on new products: frequency	-13.679	11.289	-.456	-1.212	.292
Share of personnel: Research and development [%]	-1.080	.931	-.421	-1.160	.311
Share of total R&D expenditures of turnover in 2008 [% - only researching firms]	5.375	1.993	1.205	2.697	.054
Age of the firm	-.247	400	-.272	-.617	.571

Dependent Variable: Share of turnover generated by new products [% - only innovators]

Table 7. Correlation coefficients of the model.

	Share of turnover generated by new products [% - only innovators]	Competitive factor: innovative product	Quality circle: use	Inno. coop. on new products: frequency	Share of personnel: Research and development [%]	Share of total R&D expenditures of turnover in 2008 [% - only researching firms]	Age of the firm
Share of turnover generated by new products	1.00						
Competitive factor: innovative product	-0.42	1.00					
Quality circle: use	-0.10	0.22	1.00				
Inno. coop. on new products: frequency	-0.02	0.03	-0.05	1.00			
Share of personnel: Research and development [%]	0.21	-0.24	0.41	0.12	1.00		
Share of total R&D expenditures of turnover	0.75	-0.45	-0.06	0.32	0.55	1.00	
Age of the firm	0.18	0.14	-0.49	-0.37	-0.21	0.14	1.00

As can be seen from Table 7, the greatest influence on the share of turnover from new products is produced by the amount of R&D investment, which is logical, but strange for small companies known for the lack of resources. Another surprising result is the strategic importance of innovation. Naming innovative products as the most important priority has a statistically negative influence on the turnover from new products. In a way, this is in line with Varis and Littunen (2010) who state that new products do not necessarily create profitability, but increase the likelihood of a company's survival and growth. The same analysis was performed for radically new products.

Table 8. Returns from radically new products regressed against our internal and external variables.

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
2	.726(a)	.527	-.183	.508	2.740

This model is a little weaker than the model for new products, judged by the coefficient of determinacy (R square), indicating that only 52.7% of change in returns from radically new products can be explained by variables put in the model.

Table 9. Coefficients of the model 2.

	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Std. error	Beta		
(Constant)	1.449	1.025		1.414	.230
Competitive factor: innovative product	.065	.138	.242	.472	.662
Quality circle: use	.035	.494	.038	.070	.947
Inno. coop. on new products: frequency	-.398	.348	-.586	-1.143	.317
Share of personnel: Research and development [%]	.028	.029	.477	.965	.389
Share of total R&D expenditures of turnover	-.010	.061	-.101	-.165	.877
Age of the firm	-.003	.012	-.128	-.213	.842

Dependent Variable: Products new to the market

Again, we get the same results for cooperation, R&D personnel and age of the firm, although less pronounced than for new products. Again, the significances are not good, meaning that generalizations from these coefficients cannot be made.

Table 10. Correlation coefficients of the model.

	Share of turnover generated by new products [% - only innovators]	Competitive factor: innovative product	Quality circle: use	Inno. coop. on new products: frequency	Share of personnel: Research and development [%]	Share of total R&D expenditures of turnover in 2008 [% - only researching firms]	Age of the firm
Share of turnover from products new to the market	1.00						
Competitive factor: innovative product	0.09	1.00					
Quality circle: use	0.68	0.12	1.00				
Inno. coop. on new products: frequency	0.25	0.13	0.22	1.00			
Share of personnel: Research and development [%]	0.50	-0.35	0.31	0.36	1.00		
Share of total R&D expenditures of turnover	0.57	-0.34	0.34	0.38	0.97	1.00	
Age of the firm	-0.34	0.31	-0.63	-0.48	-0.22	-0.19	1.00

However, the correlation analysis shows that the share of expenditures on R&D, share of R&D personnel and quality circle significantly positively affect the turnover from radically new products. These are all internal factors, so we can agree with Subrahmanya (2005) that SMEs oriented on radical innovation will depend more on their internal factors.

Comparison of Two Empirical Researches – Similarities and Differences

In services, larger firms (hotels) exhibit higher innovative activity, which is in line with the previous researches that argument this effect by large companies' higher availability of resources. However, in the group of small and medium sized hotels, the increase in room numbers (i.e. hotel size) reflects negatively on innovation activity since it reduces the probability of hotels belonging to the highly innovative cluster. On the other hand, when innovation activity by type is analyzed, small and medium service firms exhibit a higher rate of service innovation, showing that they introduce more new and significantly improved services into business then their big counterparts. Adding to the contradictory findings of the previous research, large service firms are found to be more engaged in radical innovation, while small and medium sized ones are more engaged in the area of incremental innovation. There is no significant correlation between the age of the service of firms and their innovative activity. This means that the size of the company is an important determinant of innovation, while age is not. Cooperation, as an external factor, is an important determinant of innovation rates in services. Also, it was shown that innovation positively affects business performance in services (hotels).

In the manufacturing sector, contrary to the findings in services, radical innovations are more present in small companies, while incremental innovations are more present in medium sized companies. On the other hand, in line with the findings in services, in the sample of manufacturing companies, size is also found to be positively correlated with the age of the company. However, in manufacturing, size is negatively correlated with the returns from new products. If we treat these returns as an innovation activity indicator, it can be concluded that innovation activity decreases with the firm size and this is contrary to the findings in services. As far as cooperation, as an external innovation factor, is concerned, it is more present in larger manufacturing companies. Furthermore, contrary to the previous researches, small manufacturing companies invest more into R&D and have a higher percentage of R&D personnel. This is in contradiction to the conclusions that state that larger companies have more resources to invest into R&D and therefore have higher innovative activity. The small and medium manufacturing companies in this research invest more into R&D and this might explain why they have higher returns from new products as the percentage of sales.

Finally, it can be concluded that the service and manufacturing SMEs differ in some aspects of innovation activity; however, similar elements can be found as well.

Issues, Controversies, Problems

This research opened several new issues and controversies. Firstly, the research found that in both services and manufacturing, in the group of small and medium sized firms, size does not reflect positively on innovation activity. In manufacturing, contrary to SMEs, large firms have the resources to invest into technology and human resources. This is in line with Laforet and Tamn (2006) who state that innovativeness, in terms of company size, is not sufficiently explored. They find that companies from 20 to 49 employees are in the most vulnerable position, because they lack flexibility and resources. However, contrary to this research it was found that the R&D investment and higher innovation activity are not in positive correlation with the company size (smaller companies invest more into R&D and have accordingly higher returns from sales from these new products), while in services, the increase in room numbers was found to decrease the probability of hotel being more innovative. These findings show that, specifically, small firms in both sectors seem to be the most innovative element of this group, and as such call for more research and attention. Secondly, the issue of the degree of innovation newness calls for more investigation. Namely, in service firms (hotels), the findings in this area are contradictory to date (Pikemaat, 2008; Martinez-Ros & Orfila-Sintes, 2009), and our findings do not seem to contribute to reaching a mutual point. Large service firms are found to be more engaged in radical innovation, while small and medium

sized ones in the area of incremental innovation. On the contrary, in manufacturing, small firms are more innovative in terms of radical innovation; while small to medium firms (50-99 employees) are more innovative in incremental innovation. Furthermore, we found that cooperation, as a form of organizational innovation, is more important for innovation activity in services then in manufacturing, which is in line with the reviewed literature (DTI, 2007).
As for the issues opened in each sector, the issue of importance of organizational innovations in services found in the previous research is (re)opened (Gadrey & Gallouj, 2002 as cited in den Hertog et al., 2003; Tether, 2005). This finding can be seen as supporting the view that the service sector is very heterogeneous in its nature (Miles, 2000; OECD, 2005). Obviously, there is a need to investigate this more deeply and thoroughly. In manufacturing, contrary to the previous research, it was found that small firms invest more in R&D and also have higher innovation output measured through higher returns from new products as the percentage of total sales.

Having in mind the limitations of the study, primarily in terms of one service sector being researched as well as being limited by the geographic/national area in both researches, these results are to be taken as indicative not representative.

Solutions and Recommendations

Due to the complex nature of innovation, its empirical measurement has always been a thorny task for researchers (Nieto & Santamaria, 2007). The UK National Endowment for Science, Technology and Arts notes that the measurement of innovation has lagged someway behind theoretical ideas, whilst theoretical ideas often lag someway behind changes in the 'real world'. Thus, the measurement of innovation lags considerably behind changes in the real world (NESTA, 2006). We can only agree with the above said.

When it comes to the issue of measuring and comparing innovations in services and manufacturing, these problems multiply. Namely, due to the inherent specifics of these two sectors, the measuring instruments applied are, fully justified, somewhat specific and prevent from making direct comparisons. For instance, this is the case with the R&D function and its importance. Although often regarded as the most important innovation input in manufacturing, in services it is generally not very important, but there are several exceptions, such as telecommunications, KIBS, financial intermediaries, software consulting, architecture or engineering[12]. Also, in manufacturing, the percentage of income generated by new product(s) is an important innovation indicator, whilst in services it is not always the applicable indicator (for instance, free internet in rooms is a new service for hotels but since it's free, it generates no income - on the contrary, it generates costs). These issues pose severe limitations when trying to investigate the trends and developments in innovation activity of SMEs in these two sectors. Still, the need to investigate and compare innovation activity in these two sectors is obvious and crucial in order to be able to design the appropriate and effective policy measures for their enhancement, as well as to diminish the obstacles they encounter when pursuing innovation. As such, further development of measurement tools that capture to the best ability the specifics of both sectors is necessary. The question is whether such measurement tools are a future reality or an impossible dream. We can only hope that the insights given here will be of at least modest help in answering this query.

Future Research Directions

As far as future directions are concerned, it would be interesting to explore how services obtain ideas for innovative activity, since it is not usual for services to have an R&D department, which is present in manufacturing. This question is also interesting, because it can be found in literature that innovations in the service sector are more *ad hoc*, unlike in manufacturing. It would also be interesting to explore innovative activity in the whole service sector and not just one industry (hotels). For manufacturing and services, it would be interesting to explore more in depth the question of cooperation and its role in the innovation process as well as why it is used or how it relates to novel ideas.

Also, another very important issue is the human resources issue and their role in innovation activity of both service and manufacturing SMEs. As we argued in the theoretical part of the paper, the issue of workplace innovation is crucial for today's and future competitiveness and must be regarded as a function of all employees, not only R&D (in manufacturing) or front office employees (in services). As such, it should be explored in future research.

Conclusion

Clients, users, employees, managers, shareholders, and owners, generally all the stakeholders seek in an organization the ways of creating new products/services that will assure organizational survival. Even though innovation is seen as a "unique" process, it behaves differently in the manufacturing than in the service sector. The main explanation can be found in the fundamental differences between products and services, but we should not forget that production is also dependent on post-trade services and the production companies should follow the steps of the service companies in terms of innovation activity.

In theory, specific features of service innovation are the following: a high frequency of so-called *ad hoc* innovation, specific type of service innovation, greater importance given to coordination and networking of different subjects during the innovation process, higher importance of demand conditions and end-users and the usage of specific innovation terminology. On the other hand, innovation in manufacturing is mostly seen as a linear process, arising from a specific R&D department within an individual firm, motivated by a market pool and a technology push. Manufacturing is also more likely to report the need for new strategies and structures when products are new to the industry or new to the firm.

With regard to SMEs, in terms of innovation activity, their most valuable features are that they are *nimble, flexible and responsive economic actors*. Accordingly, the main question is: What motivates SMEs to be innovative? In theory, Laforet and Tamn (2006, p.365) highlight that the drivers of SMEs' success are: *strategic formulation, investment in people, cooperation and networking, extensive use of external links and market and competitors analysis*. According to research results, the necessary preconditions for innovation in the manufacturing and service SMEs differ. The factors that affect innovation activity in manufacturing are the share of expenditures in R&D, the share of R&D personnel, quality circle (as internal factors) and cooperation (as an external factor). They all significantly positively affect turnover from radically new products. For cooperation it is also significant that it rises with the size of the company (25,53% of very small firms cooperate with external partners, 31,91% of companies in the range from 50-99 employees cooperate with external partners, while 40,43% of companies in the range from 100-249 employees cooperate with external partners). For SMEs in the service sector, the factors that influence innovation activity are the size of the company, internally (measured by room numbers), and cooperation, externally. An interesting finding in the service sector is that there is no significant correlation between the age of the service firm and innovative activity. Among external factors, cooperation is the most significant one as well as an important determinant in innovation rates, especially in services, where there is a statistically significant and positive connection between different kinds of partnerships and higher innovation rates.

It should be pointed out that in the **service sector** innovation activity influences service performance (hotels' business performance) and it is shown that innovation activity is statistically positively related to 11 indicators: *occupancy rate change compared to the previous year*, *total income, total profit, total overnights, yearly occupancy rate, market share, guests' satisfaction with service quality, number of guest complaints, customer loyalty, employees' satisfaction, hotel's positive image*; not statistically related with *business costs and the fluctuation rate of other staff*, while it is negatively related to the *fluctuation rate of managerial staff*. Considering innovation activity by types of innovation, we can see that small and medium hotels exhibit higher innovation activity in only one type of innovation – service innovation, which means that they are ahead of large hotels in introducing new or significantly improved services into their business. With respect to all other innovation types, small and medium hotels perform worse and only in marketing innovation come close to large hotels. Interestingly enough, although the service innovation literature highlights the importance of organizational innovations (Gadrey & Gallouj, 2002 as cited in den Hertog et al., 2005) they are found to be the least developed innovation type, in small, medium and large hotels respectively.

For the manufacturing sector it is notable that small companies put the price and quality as their priorities; in medium firms, innovative products are seen as competitive priorities, while small firms are mainly operationally oriented. Furthermore, radical innovations are more present in small companies, while incremental innovations predominate in medium sized companies. In manufacturing, it is also evident that the returns from radically new products are much higher than those from modified products and small firms have the highest returns. Also, the fastest introduction of new products can be found in small firms (20-49 employees) and it takes them on average 11, 33 months to launch a new product. To conclude, in manufacturing, few results are not in line with the theoretical assumptions: (a) small firms invest most into R&D; (b) the smaller the number of R&D personnel the higher the returns; (c) the younger the company, the more returns it generates on new products and (d) the most significant impact on returns from new products would actually come from the internal R&D investments.

But although research results show that innovation, specifically in manufacturing, is the result of the R&D activity, there are already theoreticians, such as Qingrui et al. (2007), who believe that innovation is no longer the function of R&D personnel alone, but the expected behavior and practice of all employees. From this model - Total Innovation Management (TIM) is defined as the innovation activity by anyone at any time in all processes, among different functions and around the world. From this point of view, workplace innovation is the main internal factor that should be enhanced. It is also important to understand that innovation is not only the production of new services/products, but new ways of achieving something, any significant improvement in business practice, from introducing new rules in a company department that facilitate a business process, to creating a working fusion power plant.

In the future, SMEs should pay more attention to innovation activity by using other internal factors such as: planning and setting innovation as a priority, hiring qualified scientists and engineers, skilled personnel, introducing quality programs, etc., and, especially, putting their effort into factors that are not too easily imitated and that can pose a competitive priority. In terms of external factors, more attention should be paid to external partnerships that shorten the time for new product completion and reinforce out boundaries connections. But according to Varis and Littunen (2010), the innovativeness of SMEs is especially dependent on the intensity of the industry and the owner's or manger's personality and this is something enterprises should bear in mind. If we know that the majority of SMEs possess a "defender" or a "reactor" orientation, the conclusion is that innovation activity of the Croatian service and manufacturing firms should initialize innovative behavior forced by market and customers, leader inspiration, interesting and challenging workplace etc. to ensure continuous improvement. Finally, we could conclude there are two roads with the same end. SMEs want to be sustainable and survive in the manufacturing as well as the service sector.

Endnotes

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[5] More up to date researches on cooperation can be found in Freel and de Jong (2009) and Tödtling et al. (2009).

[6] The list was taken from the web pages of Croatian Ministry of Tourism (2010).

[7] In the hotel industry, the number of rooms is usually used as measure of hotel size as it is an independent (resistant to inflation), clear and comparable measure considered the most appropriate for classifying hotels by size (Galicic et al. 2005). It was also used in this research and the threshold for small and medium sized hotels was 200 rooms as suggested by Galicic et al. (2005)

[8] The research is originally conducted since 1993 on a two years basis. Since 2003, thirteen other countries have joined the project, including Croatia

[9] Preliminary reports of some other countries joining the research also show low response rates: France 3,4%, Spain 4%, Austria 8%, Slovenia 8,72%, Germany 9,58%, Denmark 10% and Switzerland 13%. They all mentioned crisis and the length of the questionnaire as reasons for such response rates (EMIS, 2010). Response rate in 2006 (previous round) was 8% (Prester, 2009).

[10] When using ordinal measurement scales, the use of median values is appropriate. However, using the median value does not allow the calculation of aggregate indicators. Therefore, the only appropriate option is average rate, i.e. arithmetic mean, since it enables the necessary aggregation of data relating to innovation activities. Furthermore, for service and process innovations two categories are offered - a brand new (discontinued) innovation and significant improvement (incremental) innovations. To calculate the overall assessment of innovation in these two categories, the average value was used as well.

[11] Hotel managers were asked to grade the development of listed indicators in the last three years using the Likert scale ranking from 1 (significantly decreased) to 5 (significantly increased).

[12] As Trigo (2009) finds, these activities account for 85% of internal R&D investments in the overall service sector in Spain. He also finds that more then 35& of all business sector R&D expenditures are generated by service companies.

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CHAPTER 8

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Innovation Driven Growth Aspirations of Slovenian Early-Stage Entrepreneurs

Abstract

The purpose of the chapter is to explore the growth aspirations of Slovenian early-stage entrepreneurs. It is based on an analysis of data obtained from the 2009 Global Entrepreneurship Monitor Adult Population Survey, in which entrepreneurs in the start-up phase were identified. Our aim is to provide a clearer insight into the characteristics of early-stage entrepreneurs in Slovenia, particularly in regard to the newness of products/services they are offering, technology orientation, and openness towards innovations as well as growth aspirations regarding future employment. Previous research reveals that SMEs can overcome the disadvantage of their small size by using technology to reach new customers and operate more efficiently. We expect gender to affect the use of technology in Slovenian companies and, consequently, their growth aspirations and suggest that 'high-growth entrepreneurship policy' and 'gender-specific policy' present an imperative as firms that want to grow have many specific needs that must be addressed with flexibility and agility.

Keywords: *Early-Stage Entrepreneurs, Growth inspiration, Innovation, Slovenia.*

Introduction

Firm growth is critical to economic development and the creation of wealth and employment. According to Global Entrepreneurship Monitor (Rebernik et al., 2010) and Slovenian Entrepreneurship Observatory (Rebernik & Sirec, 2009), entrepreneurial potential in Slovenia is not fully utilized. Indeed, small firm growth—the focal point of this paper—is neither a self-evident phenomenon nor a matter of chance. Rather, it is the result of an owner's/entrepreneur's clear, positively motivated business intentions and actions, driven by the belief that (s)he can produce the desired outcomes (Gray, 2000; Maki & Pukkinen, 2000). Consequently, exploring issues and challenges facing particular entrepreneurs, such as female entrepreneurs, may offer valuable insights into promoting firm growth.

Female entrepreneurs are a diverse and complex group, with varied backgrounds, circumstances, and worldviews. The proposed study derives from the social feminist theory (Fisher et al., 1993), which posits that men and women indeed differ due to differences in the socialization processes they experience. Males and females are viewed as two separate groups, each with equally effective and valid—but distinct—ways of thinking and rationalizing (Johnsen & McMahon,

2005). Social feminist theory expects findings on men and women to differ in terms of motivation to start and run a business, business skills, level of education, measurements of success, level of self-confidence, personal attributes and prioritization of business tasks (Moore & Buttner, 1997). According to such presumptions, the majority of research has found that female entrepreneurs generally underperform male entrepreneurs on a variety of measures, including revenues, profit, growth, and discontinuance rates (Du Rietz & Henrekson, 2000). Moreover, an extensive literature review of studies on gender issues from the past 25 years demonstrated that many questions still remain unanswered (Greene et al., 2003), particularly in three primary areas: human capital, strategic choice, and structural barriers. In discussing inhibiting factors, Brush (1997) applied a broader perspective to studying barriers and challenges that inhibit growth, finding that opportunities for female entrepreneurs improved with the use of technology, which could also be a positive contributor to growth.

Previous research has revealed that SMEs can overcome the disadvantage of their small size by using technology to reach new customers and operate more efficiently (Cavusgil & Knight, 1997; Dutta & Evrard, 1999). One of the causes of business stagnation is risk avoidance (Ward, 1997), which—among entrepreneurs—may frustrate the adoption of new technology and the allocation of resources to foster growth. Prior research has shown that female entrepreneurs (on average) may be more risk averse than male entrepreneurs (Anna et al., 1999; Cooper, 1993; Sirec, 2007). Thus, gender may affect the technology orientation in Slovenian companies and, consequently, their growth aspirations.

The current paper stemmed from the desire to explore the perceived difference in growth aspirations among female and male Slovenian early-stage entrepreneurs as well as the perception that not all elements of technological change in a company positively affect them. The research concentrates on the relationship among various dimensions of entrepreneurship (e.g., gender and company attributes like product/services novelty, technology orientation, and openness towards innovations) and one possible operational measure of entrepreneurial performance (i.e., growth).

Although not all expectations materialize, growth aspirations have proven to be a good predictor of eventual growth (Davidsson & Wiklund, 1999; Liao & Welsch, 2003). At least part of the explanation for this phenomenon may be found in the characteristics of entrepreneurs' firms, especially with regard to the extent of their product/service novelty, technology orientation, and openness towards innovations. This paper proceeds as follows. After presenting the basic statistical data and theoretical background concerning gender in Slovenia, a theoretical framework is established for the study based on the review of prior research in the area. The section that follows outlines the research method. Finally, the findings of the research are presented, followed by conclusions and some policy implications arising from this investigation.

Background

Previous research has demonstrated that growth intentions and likely eventual growth impact are not evenly distributed across entrepreneurial firms' populations. The Global Entrepreneurship Monitor's (GEM) research on high-expectation entrepreneurship (Autio, 2005) indicated that high-aspiration entrepreneurs, who represented on average less than 10 percent of the population of nascent and new entrepreneurs in GEM countries, were responsible for up to 80 percent of total expected job creation by all entrepreneurs. In the United Kingdom, Storey (1994) found that a mere 4 percent of new firms established in any given year accounted for 50 percent of all the jobs created by the surviving firms within the cohort after 10 years had elapsed. Thus, it appears that the capability of an economy to grow and employ is significantly dependent on the capability of that economy to create gazelles (i.e., fastest growing firms). Autio (2005) reported that in the United States gazelles represented only about 3 percent of the firm population, but accounted for more than 70 percent of employment growth between 1992 and 1996. Similarly, in Finland, approximately 1 percent of top growing firms created about 40 percent of the aggregate impact over four years in terms of both sales and employment growth. Slovenia's 500 gazelles in 2003 created 7,940 new jobs between 1998 and 2002; in 1998, the average gazelle employed 24 workers and, by 2002, this number had risen to 40. Meanwhile, sales increased four times on average, while exports

increased 5.5 times in four years. Slovenian gazelles created 22,514 new jobs from 2003 to the end of 2007 (Psenicny, 2008), accounting for 60 percent of all new jobs created during this period, thereby increasing the value added per employee by almost 70 percent.

Entrepreneurship is a complex phenomenon involving the individual, the firm, and the environment in which it occurs (Begley 1995, in Solymossy, 1998). Although this is easy to recognize, the nature of the relationship among these three elements is not understood (Solymossy, 1998, p. 5). Our research concentrates on the relationship between three dimensions of entrepreneurship (i.e., product/service novelty, technology orientation, and openness towards innovation) and one possible operational measure of entrepreneurial performance (i.e., growth aspiration). A review of basic definitions emerging from the development of entrepreneurship and innovation theory demonstrates that it is much easier to find their common points than to define limits between any two of them; indeed, innovation and entrepreneurship are often regarded as a single phenomenon. The origin of this view lies in the work of Schumpeter (1934), who defined an entrepreneur as an individual who carries out new combinations—namely, innovations. The function of an entrepreneur is to innovate; as such, the Schumpeterian view is that the entrepreneur is not a risk bearer. A risk bearer is a capitalist who lends his funds to an entrepreneur. In the past, many definitions of entrepreneurship have been formulated in the economic literature on entrepreneurship, but taking them together, Davidsson (2003) distinguished two main social realities. The first is represented by the view of an entrepreneur as a self-employed person, in which certain elements of innovation are needed at start up and some degree of innovativeness is needed to survive over time; in other words, innovations are not central to this phenomenon. In the second view, entrepreneurship refers to the creation of new economic activities and organizations as well as the transformation of existing ones, making innovations central to this phenomenon.

Yet Schumpeter had no doubts: The one who innovates (i.e., introduces new combinations) is an entrepreneur. Schumpeter assigned to the entrepreneur the role of innovator and drew a demarcation line between invention and innovation. His definitions of entrepreneur and enterprise are clear: "The carrying out of new combinations we call 'enterprise'; the individuals whose function it is to carry them out we call 'entrepreneurs'" (Schumpeter, 1934, p. 74). The definition of enterprise as a carrying out of new combinations stresses the importance of a very specific human property: the ability to think, be creative, and innovate. For an enterprise to exist, an entrepreneur is needed. For an enterprise to grow, prosper, and develop, an entrepreneur must constantly carry out new combinations of resources at his/her disposal. He/she must innovate (Rebernik, 2002).

Shane (2004) identified five necessary conditions for entrepreneurship: (1) entrepreneurial opportunities, (2) difference between people in their ability and willingness to act upon an opportunity, (3) risk bearing, (4) organizing/exploiting opportunity, and (5) innovation. In other words, entrepreneurial activity depends upon the interaction between the characteristics of opportunity and the characteristics of the people who exploit them. Although the literature that explains different aspects of an individual's occupational choice and circumstances that lead to entrepreneurship is extensive (Evans & Jovanovic, 1989; Gupta et al., 2010; etc.), much less is known about the choice of an entrepreneur to aspire for growth, albeit much is known about the characteristics of growth-oriented entrepreneurs. For example, they are more likely than other entrepreneurs or the general population to be well educated, already employed full time, and part of the upper third of households regarding their income (Autio, 2007).

Small firm growth is neither a self-evident phenomenon nor a matter of chance. According to the literature, various factors affect firm growth. In line with the Penrosean theory of growth (Penrose, 1959) it is widely agreed that growth occurs when—in addition to motivation and opportunity—proper strategy and corresponding resources are also in place (Gilbert et al., 2006). Cassar (2006, 2007) showed that an entrepreneur's growth aspirations are influenced by opportunity costs related to the use of human and financial capital. Some recent studies (Autio & Acs, 2009) have also suggested that the deployment of human and financial capital is influenced by national conditions that regulate the appropriateness of expected returns from capital deployment.

Not all expectations materialize, yet growth aspirations have been shown to be a good predictor of eventual growth (Davidsson & Wiklund, 1999; Liao & Welsch, 2003). Growth aspirations of the entrepreneurial venture are a fundamental aspect of entrepreneurial behaviour (Davidsson et al., 2002) and a necessary precondition of entrepreneurial firm growth. Although high aspirations will not guarantee firm growth, it is rare for firms to grow in the absence of growth aspirations (Delmar & Wiklund, 2008). Thus, small business managers' growth motivation likely has a unique influence on firms' outcomes measured as growth in number of employees.

Issues and Hypothesis

From the policy implications' point of view it is very important that supporting measures not be directed towards general support of entrepreneurship, but rather be focused particularly on those who are motivated for growth and who have high growth aspirations. At least part of the answer to the question may be found in the characteristics of entrepreneurs' firms, especially regarding the extent of their products/services novelty, technology orientation, and openness towards innovation.

The growth aspirations of early-stage entrepreneurs are their goals; as they are self-estimated, they are not necessarily objectively possible. As such, it is very likely that entrepreneurs in the early stages of entrepreneurship are subjectively projecting higher potential growth than those who have been entrepreneurs for a longer period. This phenomenon is extensively explored in the literature (Bager & Schott, 2004; Tominc & Rebernik, 2007a, 2007b; Tominc et al., 2007). Research results indicate that some early-stage entrepreneurs estimate that their businesses have high growth potential for the wrong reasons (e.g., incompetence, over-optimism) whereas others are more modest. It is also more likely that the first group will sooner abandon their start-up business (Davidsson, 2006) than the latter.

Entrepreneurs can estimate future growth more realistically if the characteristics of their products/services, competition, etc., are taken into account. In our research, the potential of entrepreneurs' ventures to grow was based on their opinions about the creation of new markets and market expansion by their products/services and regarding the technology used. We tested whether early-stage entrepreneurs form their growth aspirations about future employment on the characteristics of their businesses that enable business growth. In other words, by increasing the competitive offering of new products and services and by using innovative and new technologies and procedures, entrepreneurs contribute towards greater market efficiency. In addition, many entrepreneurs are important agents of innovation (Bosma & Harding, 2007), and the growth potential of their businesses is expected to be higher on average. The following hypotheses (H1 and H2) were formed:

Hypothesis 1: *An entrepreneur's growth aspirations are associated with his/her estimation of the novelty of the products/services offered.*

Hypothesis 2: *An entrepreneur's growth aspirations are associated with his/her estimation of the age of the technologies used.*

Cooper and Kleinschmidt (1995, in de Jong et al., 2001, p. 14) stated that the availability of and ability to master both techniques and technologies create the precondition for innovativeness. This holds for both production- and service-intensive industries. A positive impact occurs between the achieved level of techniques and technologies used and the improvement of a company's innovation potential: The better equipped the company and the more knowledge it possesses, the more easily new knowledge and ideas will be accepted and successfully developed (de Jong & Brouwer, 1999). The special emphasis is on ICT, which enables the flow of data and information as well as gathering ideas from different sources (business to business [B2B], business to customer [B2C], customer to customer [C2C]) (Sundbo, 1998, 151).

Without modern technologies, new products that address the needs of sophisticated users can hardly be developed. Given the increase in the complexity of the competitive business world, development is often too risky, too slow, and too expensive, which is why companies (especially small ones) often buy new products as well as technologies for use. Such handling stimulates innovative ideas and novelties on the side of the product as well as on the side of the processes, organization, and leadership methods in working procedures (s.c. "reinventing" according to Rogers, 1995, p. 392).

In our paper, the focus is placed on identifying the specific ability of an individual—namely, his/her ability to innovate. If innovations are defined as the transformation of ideas or knowledge into a new or improved activity, process, or product, the ability to innovate must consist of at least two parts: the "willing" part or the motivation to innovate (innovation stimulus) as well as the "can" part—the presence of opportunities and potential to innovate (innovation capacity). In this context, the definition of an organization's innovation capacity (Prajogo & Ahmed, 2006) as well as a country's innovation capacity (Furman et al., 2002; Radosevic, 2004) can be found in the economic literature. However, innovation stimulus and the innovation capacity of an individual as factors connected to his/her decision to grow a business have not yet been discussed in the literature, to our knowledge. The measurement of the innovation capacity of a given country or firm is usually performed using a set of proxy variables, but a measurement tool that calculates the individual's willingness and potential to innovate has not yet been developed. With the purpose to include this meaning of innovation as a factor connected to an individual's entrepreneurial activity, the proxy included in our model is an individual's *openness towards innovation* (which may have some weaknesses). Although the innovation capacity of a firm or business may be measured, for example, by the skills and strengths of a firm's R&D and technology (Prajogo & Ahmed, 2006), in our paper an individual's openness towards innovation is used as the proxy for the individual's "will" to innovate. The "can" part of an individual's ability may be partly measured by the individual's level of education, but this does not fall within the scope of our paper.

An analysis of openness towards innovation among individuals was first conducted in 2007 in GEM research (Levie, 2008). The analysis of receptivity of citizens in a country to innovations was based on Bhide's (2008) suggestion that this could be one reason for the relative economic success of the United States compared with Europe. This statement is based on the assumption that innovative entrepreneurs need customers who are willing to buy new products and services and to try products and services that use new technology. Customers receptive to such innovations tend to believe they will improve their lives. The research results (Levie, 2008) demonstrated that innovation confidence was greater among individuals showing any form of individual engagement in entrepreneurial activity. However, this general pattern was not observable in every nation (12 countries participated in this part of the GEM research).

We expect that individuals who express a higher level of innovation confidence (openness towards innovation) are also more likely to have high growth aspirations. Hence, the third hypothesis (H3) is formed:

Hypothesis 3: *An entrepreneur's growth aspirations are associated with his/her level of innovation confidence (openness towards innovation).*

All three hypotheses were tested for male and female early-stage entrepreneurs.

In general, entrepreneurship is often viewed as a male domain (DiMaggio, 1997). Risk taking with leadership, a sense of adventure, and aggressiveness are among the job requirements of entrepreneurship, and all are assumed to be masculine as men seem to be more comfortable taking risks than women (Arch, 1993). Males are "more likely to see a challenge that calls for participation" in a risky situation, whereas females more commonly perceive such activities as threatening and try to avoid them. In this context, we can also expect female entrepreneurs to be more realistic, whereas male entrepreneurs are expected to be more over-optimistic. Thus, we expect that some gender differences regarding the associations tested by H1, H2, and H3 will occur.

Previous studies on differences of growth aspirations among female and male entrepreneurs in Slovenia reveal that, although women are on average less likely to be involved in entrepreneurship than men, their growth aspirations do not significantly differ from those of men (Tominc & Rebernik 2006, 2007b). For example, results for growth aspiration regarding employment, which is found among those early-stage entrepreneurs who intend to increase the number of jobs by six or more in the next five years, indicated that such growth aspirations existed in an average of 42.45 percent of male and 37.25 percent of female early-stage entrepreneurs in Slovenia—a difference that is not statistically significant. It may also be worth mentioning that women in Slovenia tend to be less likely to start an entrepreneurial career, but once started they generally have growth aspirations as high as those of men. However, the role of gender in a company's growth remains vague. Liao and Welsch (2003) reported on a study of Norwegian entrepreneurs by Kolvereid (1992) that found no significant relationship between growth aspirations of entrepreneurs and their experience, gender, location, or size of their business. Other researchers claim that gender is an influential feature for a company's growth; being female is supposed to have a negative effect on growth, and female entrepreneurs rarely become "growth entrepreneurs" (Kjeldsen & Nielsen, 2004). Research results from Latvia even suggest that women entrepreneurs have higher growth aspirations than their male counterparts (Aidis & Mickiewicz, 2005) while the actual growth regarding financial performance of firms run by male entrepreneurs is lower than for female entrepreneurs (Aidis et al., 2008). Figure 1 presents the frame of our research as described in this section of the paper.

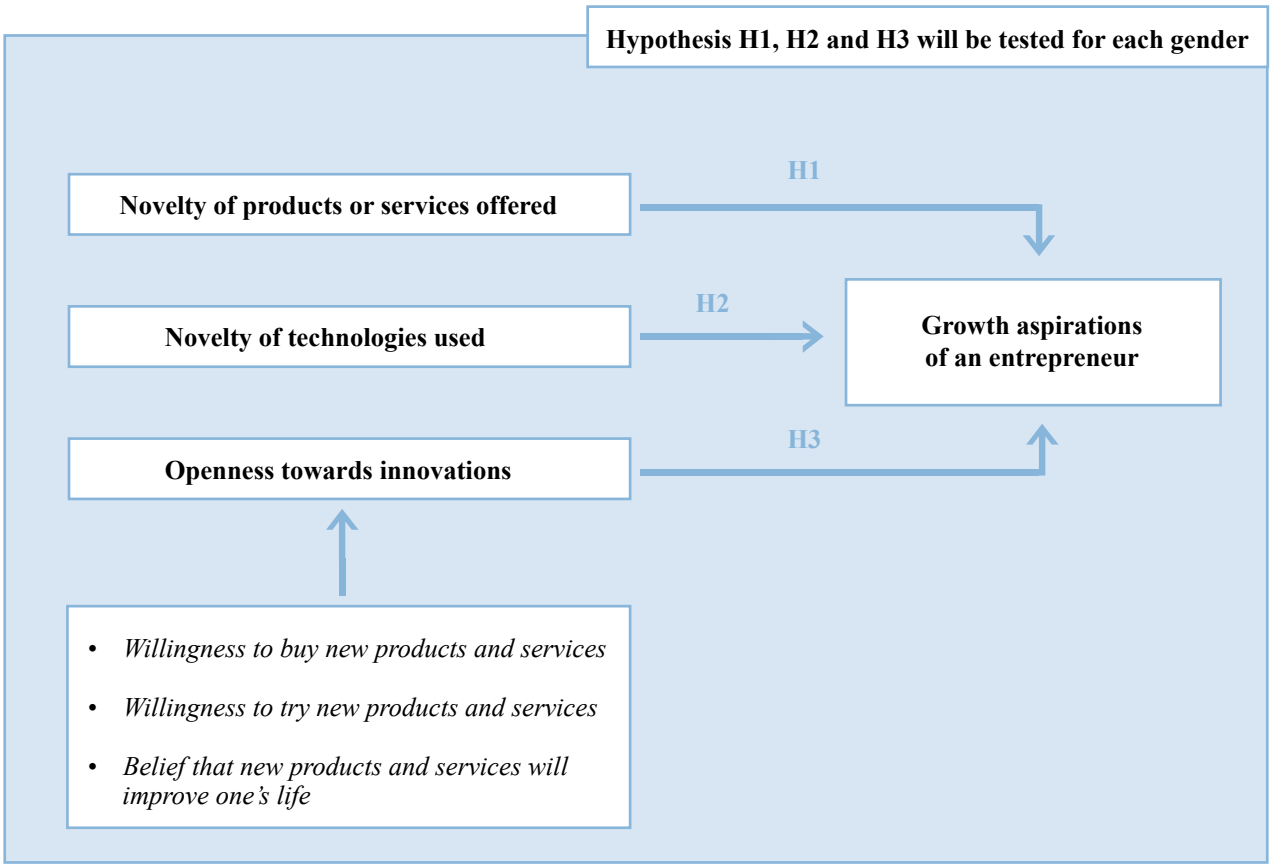

Figure 1. The frame of the research.

Variables, Data, and Methodology

Variables

This section describes measurements for all investigated categories, which have been drawn from existing research literature. The discussion will further review the testing, which culminates in the selection of measures for examining the elements of companies' novelty of products/services offered, technology orientation, and openness towards innovation.

Growth aspirations of early-stage entrepreneurs were assessed by considering their anticipation of an increase in the number of new jobs. All identified early-stage entrepreneurs were asked the following two questions:

- *Right now, how many people—not counting the owners but including exclusive subcontractors—are working for this business?*
- *How many people—not counting the owners but including all exclusive subcontractors— will be working for this business when it is five years old?*

The difference between the two numbers represents the entrepreneur's anticipation of an increase in the number of new jobs.

Variables that are expected to be associated with the growth aspirations of early-stage entrepreneurs are novelty of products/services offered, technology orientation, and openness towards innovations.

The novelty of products/services offered by an early-stage entrepreneur was assessed by determining the early-stage entrepreneur's opinion of how many of his/her potential customers considered the product/service unfamiliar. For this purpose, all respondents identified as early-stage entrepreneurs were asked the following question:

- *Will all, some, or none of your potential customers consider this product or service to be new and unfamiliar?*

Possible values of the variable were 1 (if all potential customers consider the product or service to be new and unfamiliar), 2 (if some consider the product or service to be new and unfamiliar), and 3 (if none of the potential customers consider it to be new and unfamiliar).

Technology orientation was measured by the novelty of the technologies used by an early-stage entrepreneur. It was assessed by asking respondents identified as an early-stage entrepreneur about the age of the technology used:

- *Have the technologies or procedures required for this product or service been available for less than a year, between one and five years, or more than five years?*

Possible values of the variable were 1 (less than a year), 2 (one to five years), and 3 (more than five years). It should be noted that the question should be understood exactly as it is used in GEM research—that is, the focus is on the critical, unique procedures or technological features for the production of products/services. Any new way of producing a standardized product/service—no matter how simple or complicated—would qualify. Thus, the word *available* refers to the respondents and their community or, as GEM methodology puts it, "the fact that it was only recently available in rural Brazil is the significant fact for a respondent in rural Brazil, not that it was available in Portugal 5 years ago".

Openness towards innovation was described by three items, with each measured on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree):

a) Willingness to buy new products and services was assessed by asking respondents if they agreed with the statement:
   - *In the next six months you are likely to buy products or services that are new to the market.*

b) Willingness to try new products and services that involve new technologies was assessed by asking respondents if they agreed with the statement:
   - *In the next six months you are likely to try products or services that use new technologies for the first time.*

c) Belief that new products and services will improve one's life was assessed by asking respondents if they agreed with the statement:
   - *In the next six months new products and services will improve your life.*

The variable measuring openness towards innovation was formed by factor analysis (on sample data described in the next pharagraph), which revealed that three items describing openness towards innovation can be loaded into a single factor. EFA revealed the results shown in Table 1. Therefore, the three items describing openness towards innovation were reformed into a single factor (Cronbach's Alpha equals 0.795).

Table 1. Openness towards innovation – EFA

	Initial eigenvalues			**Component matrix**
Factor	**Total**	**% of variance**	**Cumulative % of variance explained**	**factor 1 – Openness towards innovation**
1	2.128	70.943	70.943	0.837
2	0.473	15.777	86.720	0.860
3	0.398	13.280	100.000	0.830

Data

Data for our research were derived from the GEM research. Full explanation of the content and procedures of the GEM study is to be found in Reynolds et al. (2005). In 2009, GEM conducted a survey of 54 countries, gathering data from adult-population data surveys with a minimum of 2000 respondents. In Slovenia, 3030 adults between 18 and 65 years of age (51.3 percent males and 48.7 percent females) were interviewed. Interviews were conducted using the Computer Assisted Telephone Interviewing (CATI) method. In 2009, 5.36 percent of individuals were involved in early-stage entrepreneurial activity. Analysis herein is based on the sample of 125 male and 38 female early-stage entrepreneurs.

Methodology

The current study utilized quantitative business research methods. An extensive review of the literature and empirical research was conducted to determine the current stage of knowledge regarding the determinants of companies' products/services novelty, technology orientation, and openness towards innovation. To measure the association or correlation between variables, we used the Pearson correlation for data in the form of measurements of quantitative variables. For the purpose of comparing averages between different groups, we used an independent sample *t*-test for quantitative variables. In the case of nominal variables, the chi-square test was used to test the independence of two variables. The general criterion for accepting the hypothesis is that the difference is statistically significant at the 5 percent level (two-tailed test). For data reduction, we performed a factor analysis.

Solutions and Recommendations

The results of our research indicated that the average number of new jobs expected in the next five years is 5.98 according to male and 4.66 according to female Slovenian early-stage entrepreneurs. Although the average number of new jobs anticipated is higher for males, the difference is not significant ($p>0.05$).

Similar results were found regarding the novelty of products/services offered, age of technology used, and openness towards innovation. The majority of male (50.6 percent) and female (53.1 percent) early-stage entrepreneurs found that their products or services were known by all their potential customers. A rather small proportion (15.3 percent of male and 20.1 percent of female early-stage entrepreneurs) believed that they are offering a product or service that is new to all potential customers. Again, the gender difference is not significant ($p>0.05$).

The research also revealed that 11.8 percent of male and 7.0 percent of female early-stage entrepreneurs in Slovenia estimated that they are using the very latest technologies. Although the percentage is again higher among males, the difference is not significant ($p>0.05$). Meanwhile, 67.4 percent of male and 71.8 percent of female early-stage entrepreneurs in Slovenia estimated that the technology they use is old (i.e., available for more than five years). The results regarding openness towards innovation reveal that the mean value of the factor equals 0.278 for males and 0.439 for females. Thus, female early-stage entrepreneurs in the sample tend to be more open towards innovation than males, but the difference between men and women is not significant ($p>0.05$).

These results are consistent with those found in a recent GEM research report on women and entrepreneurship (Allen et al., 2007). In all participating countries, consistent with the entrepreneurial focus of their male counterparts, the majority of women's businesses offer products or services that are not new to the customers, and only a small fraction claim that what they offer is new to all customers. Judging by the expected growth potential of businesses based upon their use of the newest technologies, a similar pattern is evident for female and male early-stage entrepreneurs for all countries. Therefore, we can conclude that, regarding future employment, the use of the newest technologies as well as the novelty of products/services offered and openness towards innovations among female early-stage entrepreneurs does not differ significantly compared to their male counterparts.

The next step was to test H1, H2, and H3. The results are presented in Table 2.

Table 2. Results of testing H1, H2, and H3 for each gender

Entire sample		**Expected number of new jobs**
Novelty of products	Chi-square statistics	8.866
	Sig. (2-tailed)	0.181
MALE		
Novelty of products	Chi-square statistics	9.145
	Sig. (2-tailed)	0.166
FEMALE		
Novelty of products	Chi-square statistics	9.671
	Sig. (2-tailed)	0.139
		Expected number of new jobs
Entire sample		
Technology orientation	Chi-square statistics	**22.061**
	Sig. (2-tailed)	**0.001**
MALE		
Technology orientation	Chi-square statistics	**14.833**
	Sig. (2-tailed)	**0.022**
FEMALE		
Technology orientation	Chi-square statistics	**17.292**
	Sig. (2-tailed)	**0.008**
		Expected number of new jobs
Entire sample		
Openness towards innovation	Pearson correlation	**0.175**
	Sig. (2-tailed)	**0.031**
MALE		
Openness towards innovation	Pearson correlation	0.160
	Sig. (2-tailed)	0.086
FEMALE		
Openness towards innovation	Pearson correlation	0.225
	Sig. (2-tailed)	0.190

As the results indicate, the novelty of products/services offered does not seem to be important for either male or female early-stage entrepreneurs when estimating future employment of their businesses. An explanation for this result may be found in the lower percentage of early-stage entrepreneurs who believe that they are offering a product/service that is new to all potential customers. The result is consistent with the findings on the state of innovation activity in Slovenia (Stres et al., 2009), claiming that Slovenia scores 30 percent behind EU innovation leaders (SE, CH, FI, DK, DE, UK) with the negative trend. Furthermore, it can be argued that the characteristic of the pattern affects the results. Early-stage companies are very young (max. 42 months). During this period, many companies have not been able to develop innovative products; therefore, in this development phase, the novelty of products/services offered is not the best indicator for assessment of employment growth aspirations.

Yet the situation is rather different when analyzing the impact of the estimation of the novelty of the technologies used. Slovenian early-stage entrepreneurs assess their growth aspirations as strongly connected to the level of sophistication of the technology they are using. It can be assumed that those who heavily invest in new technology equipment expect higher employment growth. The situation could be partially explained by the requirements often set by the investors. Normally one of the strongest criteria for judging the appropriateness of subsidizing SMEs projects lies in the creation of new employment.

The results of the third hypothesis tested suggest that female early-stage entrepreneurs in the sample are more open towards innovation than males (although not significantly so). The indicator "openness towards innovation" expresses willingness in buy and try new products/services and the belief that they might improve one's life. This personal attitude is in line with the nature of female entrepreneurs, who—according to previous research—express a greater need for achievement (Sirec, 2007) than their male counterparts. This might also be related to the fact that, in Slovenia, we have a high proportion of women with higher education (e.g., professional, university, specialist, master's, and doctoral degrees). In 2008 in Slovenia, 58 percent of university graduates were women (Statistical Office of the Republic of Slovenia, 2009). Yet women still occupy fields that are less technology oriented. As they seem to be less comfortable taking risks than men (Arch, 1993; Sirec 2007), they may find their current technology level less familiar than men, making it more important for the future growth of their businesses than men.

The results are consistent with our expectations that some gender differences will be found. H1 can be rejected for both male and female early-stage entrepreneurs, whereas hypothesis H2 is not rejected for either male or female early-stage Slovenian entrepreneurs. H3 is not rejected when analyzing the entire sample of early-stage entrepreneurs; when analyzing males and females separately, the correlation is not significant.

We have identified a rather limited statistically significant correlation among early-stage Slovenian entrepreneurs' products/services novelty, technology orientation, and openness towards innovation and their employment growth aspirations. This gives us important information—namely, that perceived novelty of products/services offered and openness towards innovation are not necessarily related with intentions to increase the number of new jobs. On the other hand, we found significant correlations between novelties of technology used and early-stage entrepreneur's aspired growth. This suggests that the exploitation of new technologies contributes to companies' efficient use of their resources (which can lead to increasing the number of employees and generate more sophisticated, value-added products/services in the next stage of companies' evolvement).

Conclusions and Future Research Directions

Innovativeness, technology orientation, and firm growth aspirations—the focus of our research—are complex, multidimensional issues in both scope and character. Thus, increased understanding of the described phenomena is important for different target groups. From a theoretical perspective, such knowledge is needed for strengthening the empirical micro-level basis of theories of entrepreneurship and theories of innovation. From a societal perspective, there is good reason to seek more knowledge about the factors that promote and impede entrepreneurship and innovativeness in SMEs. From the policy implications' point of view, it is necessary that supportive measures not be targeted at entrepreneurship in general, but be more focused, selective, and gender specific towards those individuals and companies motivated for growth and with high growth aspirations.

Overall, the analysis of certain characteristics of early-stage businesses, regarding products/services novelty, technology orientation, and openness towards innovation reveals that growth potential articulated by early-stage entrepreneurs in Slovenia differs between genders. No significant differences emerged in the group of early-stage entrepreneurs regarding the growth expressed by future employment and the novelty of products/services they are offering. One

possible explanation of such results lies in the overall well-known lag of Slovenian companies behind EU innovation leaders and the deficit of innovation potential. Other explanations may be found in the company's age. Forty-two months is a time period in which many companies have not been able to develop innovative products yet; thus, we may expect them to be developed in coming years, when the company life cycle is going to force them to change their products/services in order to be competitive and survive in global economy. We should also take into account that the Slovenian economy is semi-developed, and many business opportunities still exist in the area of traditional, well-proven products and services. For a company to survive and grow there is still no urge to have new innovative products/services. Still another reason may lie in the very nature of entrepreneurial process. As stated by the GEM data, a great majority of entrepreneurs have established their companies while still employed (Rebernik et al., 2010). Being an entrepreneur is initially more like a test of entrepreneurial abilities and earned income from entrepreneurial activity more like a bonus to a regular salary. We should also not reject the fact that, if an early-stage entrepreneur is a full-time employee, it is more convenient to be engaged in additional activity that does not occupy too much time and energy, which is the case for new innovative products/services that still have to be developed.

Both male and female early-stage Slovenian entrepreneurs base their assumptions on future employment on the age of the technologies they are using. The newest technology demands higher investments, which normally need justification for the company's expected growth. In our case, it is measured by employment growth. The findings can be explained by companies' age, as some previous researchers (for example, Bager & Schott, 2004) are demonstrating that entrepreneurial aspirations seem to be higher in nascent/new entrepreneurs than among established entrepreneurs. Various explanations about these phenomena exist in the literature, such as the survival of ventures and learning. A large number of new ventures do not survive, and it is likely that they do not have the highest and most unreal expectations. It is also very likely that nascent/new entrepreneurs acquire specific knowledge and skills about enterprises and the entrepreneurial environment that subsequently lower their expectations. This situation underscores the special need for a well-developed entrepreneurial environment that stimulates potential entrepreneurs to follow and exploit opportunities. Finally, when analyzing the relation between openness towards innovation and companies' growth aspirations, we have indeed defined a statistically significant correlation for the entire sample. However, the gender-specific analysis did not reveal a statistically significant correlation.

Our findings are consistent with many social feminist theory (Fisher et al., 1993) issues, yet leave room for further investigation. Policymakers need to bear in mind that in some fields (especially in high-growth, ambitious, technology-oriented companies), differences among genders do exist. Therefore, the 'high-growth entrepreneurship policy' and 'gender-specific policy' present an imperative as firms that want to grow have many specific needs that must be addressed with flexibility and agility. Thus, policymakers should focus on encouraging entrepreneurship among well-educated individuals who might have the potential to establish pro-growth, technologically oriented companies.

To activate the entrepreneurial potential of these individuals, it is important to promote technological and growth-oriented entrepreneurship. Establishing the right incentives and promoting role models are crucial. Growth is significantly based on the mindset of the entrepreneur. A decision to grow must be accepted first, followed by the whole array of activities to be undertaken. Policymakers should also consider that mindsets are different and that many different cultural, economic, and social factors influence their formation. Entrepreneurs are different, and further research is needed to distinguish policy instruments for both early-stage and established entrepreneurs as well as for growth-oriented entrepreneurship. According to our research, they express different aspirations and need to be treated separately; to support high-growth ventures with women as lead entrepreneurs, their characteristics should also be considered.

The conclusions of this paper lead us to establish a series of proposals for future studies. A possible line of research would be its extension on comparison between selected countries (for example Eastern European countries). In order to verify the reliability of the self-reported measures of growth aspirations included in study, the calculation

of correlation between these measures and objective measures of growth (sales, employment and assets growth) would be recommendable. The development of a longitudinal study would allow us to use multiple clocks to evaluate the influence of several variables on entrepreneurs' growth aspirations. The focus of our research was early stage entrepreneurs. It would be interesting to make a comparison between different groups of entrepreneurs (for example established entrepreneurs, serial entrepreneurs or different age groups of entrepreneurs). Finally, we consider it to be of great importance to study in depth, from a configurational approach, the relationship between early stage aspirations of entrepreneurs and their companies' long term success.

Endnotes

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CHAPTER 9

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Technological Collaboration Devised to Benefit Small and Medium-Sized Firms

Abstract

The objective of this paper is to analyze the factors that determine the success of research and development collaboration when small and medium-sized firms establish cooperative agreements with research organizations. Business partners like these, with excellent ideas for launching new products but who lack the resources and experience to utilize them, are ideal candidates for technological collaboration agreements that allow partners to take advantage of the complementary attributes that they offer. The analysis of 228 cooperative agreements demonstrates that the variables with the greatest impact on success are: the clear and precise definition of objectives and the reputation of partners.

Keywords: *Cooperative agreement, Development collaboration, Research collaboration, Small and medium-sized firm, Technological Collaboration.*

Introduction

Economic globalization and increased competitiveness worldwide, along with the internationalization of technology and the growing demand for product and process innovation are some of the reasons that explain the growing number of technological or R&D collaboration agreements, among which an increasing number of cooperative relationships between companies and research organizations are found[4] (Ahn, 1995; Cyert & Goodman, 1997). Empirical evidence shows that this type of cooperation allows partners to access complementary resources, obtain financing, create new products and processes, maintain and improve their competitive advantage as well as improve their image, prestige and reputation (Rappert et al., 1999; Senker & Senker, 1997).

This is especially important when the business partner is a small or medium-sized firm (Gomes-Casseres, 1997). Firms of this type play a key role in the development and transference of certain technologies, which is why they are of great interest in the process of technological development (Acs & Preston, 1997; Buckley, 1997). Nevertheless, although small and medium-sized firms usually generate good and innovative ideas, in some cases they can not utilize or commercialize them because of a lack of resources. For this reason, the survival and growth of small firms depend on their ability to adapt to their environment, which may be improved through cooperation (Hanna & Walsh, 2002).

Therefore, among the different types of cooperation, collaboration with research organizations encourages the growth and development of small technology-based firms, since it allows them to develop and improve their business management, it increases their effectiveness in the market, and helps them to survive and grow (Klofsten & Jones-Evans, 1996; Street & Cameron, 2007). For these reasons, such agreements allow smaller-sized firms to generate innovative elements to which value is added by their partners and well-timed collaboration facilitates the creation of products and processes in the developmental stage (Barnir & Smith, 2002; Miles et al., 1999). In fact, the traditional view of the small independent firm is being replaced by the concept of networks that link small and medium-sized firms together (Hanna & Walsh, 2002).

The growing technological collaboration and its importance are accompanied by an increase in the number of studies devoted to analyzing the success of these types of agreements (Bonaccorsi & Piccaluga, 1994; Phillips et al., 2000). Nevertheless, and despite the benefits that cooperation offers to small and medium-sized firms, it is interesting to note that the majority of the existing literature has concentrated on the analysis of the strategic alliances between large corporations (Hanna & Walsh, 2002; Human & Provan, 1997). Only a few studies have analyzed the success of cooperation relationships when the business partner is a smaller-sized firm (Goldberg et al., 2003; Lee & Osteryoung, 2004; Miles et al., 1999; Reijnders & Verhallen, 1996; Sherer, 2003). Unfortunately these studies lack empirical evidence (and analysis of the evidence) about the success of the agreements between small and medium-sized firms and another type of partner, such as research organizations. In addition, they do not extensively examine the determining factors—especially those related to the beginning of the relationship—which to a great extent affect the continuity of the agreement.

For this reason, the objective of this paper is to identify the most relevant factors in the initial stages of the cooperation agreements and empirically evaluate their effect on the success of collaboration relationships between small and medium-sized firms and research organizations. This choice is justified because many of the barriers that hinder cooperative relationships appear in the early stages of the agreement (Kelly, Schaan, & Joncas, 2002). This makes it clear that attention needs to be focused on those aspects which are more closely related to the design and planning of the alliance. After reviewing the existing literature, in order to reach this objective the following key factors that are very important in the initial stage of establishing an agreement were selected: previous experience in cooperation, partner reputation, proximity between partners and the definition of objectives (Cyert & Goodman, 1997; Davenport et al., 1999; Goldberg et al., 2003; Häusler et al., 1994; Jones-Evans & Klofsten, 1998). These factors are the initial conditions of the agreement that make up the planned frame of reference from which the future relationship between partners should develop.

Therefore, this paper makes an important contribution to the theoretical and empirical development of two main fields of strategic development: first, the study of the behavior and evolution of small and medium-sized firms; and second, the choice of the growth method to be used when implementing the corporate strategy, in this particular case, through a specific type of collaboration developed between small and medium-sized firms and research organizations.

Therefore, this study is structured in the following way: first the contextual factors of that have an influence on the success of the relationship are analyzed, and then the hypotheses are formulated. Next, the sample and measurements that were used for each one of the variables are discussed. Lastly, the authors discuss the findings along with the conclusions and implications derived from them and propose future lines of research.

Background

Contextual Factors and Successful Collaboration

Previous Experience in Collaboration

Previous experience in cooperation refers to whether or not the partners currently involved in cooperation have participated in any cooperative relationships in the past (Gulati, 1995). The relative success of learning that occurs in a cooperative relationship is a factor of whether organizations have collaborated in the past and have had some experience with cooperation (Hamel, 1991). There are three types of learning which are of interest: learning about cooperative relationships, learning about partner behaviour, and learning about the activities involved in a collaborative agreement (Reuer et al., 2002).

The first type of learning includes everything related to the dynamics and functioning of a cooperative agreement between several partners, such as for example: making joint decisions, teamwork, and how to adapt to some loss of autonomy, etc. Learning about the process of cooperation has beneficial effects on the new relationships with other partners.

Secondly, learning about partner behavior refers to the combined knowledge of the parties as a result of their past experiences (Gulati, 1995; Reuer et al., 2002; Saxton, 1997). Although this combined knowledge is essential in the event that both parties cooperate again in the future, it will be of little use if the new collaborations are carried out with different partners.

Finally, learning about the activities involved in an agreement assumes that the parties have control over certain types of activities, knowledge or skills (Simonin, 1999), as a result of their repeated collaboration in these activities. Therefore, when the activities involved in the current cooperative agreement are similar to those of past collaborations, learning done by partners in the previous collaboration will greatly benefit the new relationship. This is a matter of an accumulation of experiences in alliances of specific activities (Reuer et al., 2002).

There are several studies that postulate that the results of cooperative relationships will be better if partners have had previous experience in cooperation, both in the inter-organizational relationship framework in general (Saxton, 1997; Simonin, 1999), and in collaboration between firms and research organizations (Cyert &Goodman, 1997; Davenport et al., 1999; Geisler, 1995; Geisler et al., 1991). Regarding the nature of the cooperative agreement, if the activities of the previous cooperative relationships are related to those of the current cooperative agreement, it will be more successful. Conversely, if the activities of the previous cooperative agreements are not related in any way to the activities of the current agreement, the previous experience will have much less influence on the success of the new cooperative agreement.

Likewise, as far as the characteristics of the partners are concerned, if any type of positive collaboration took place in the past between the parties that are now cooperating, there is a much higher probability of success (Park & Russo, 1996). Nevertheless, if the previous experience was with a different partner than the current one, we can make a distinction between two different situations. In the case that the firm or the research organization had collaborated with a partner of a different kind, there will be a higher probability of success than if the previous collaboration took place between partners of identical nature, such as between firms or between research organizations. The effect that previous experience has on the success of the relationship will be greater if it took place between different kinds of partners.

Based on all of these arguments and the evidence supporting them, we propose, with the first hypothesis, that the agreement will be more successful if partners have had previous experience in cooperation, whether or not they have cooperated with the same partner or a different one (either of the same type or not) and in the same or a different type of activity.

Hypothesis 1: *Previous experience in cooperation has a positive influence on the success of cooperative agreements between small and medium-sized firms and research organizations.*

Reputation of Partners

Reputation is a factor related to the individual characteristics of the partners that intend to cooperate and refers to the information about these partners that is common knowledge, in other words, known by the rest of the agents that participate in a specific sector or activity. This information reflects characteristics of the organizations regarding their management, product quality and financial standing (Dollinger et al., 1997). The reputation of a particular partner depends on their past accomplishments as well as the prestige of the people who make up the organization. Therefore, two different dimensions of this factor were included in the analysis: organizational reputation and personal reputation. In the first place, the organizational reputation of a partner refers to the past accomplishments and actions of the firm as a whole, in other words, its technological, productive and commercial excellence (Gray, 1985; De Laat, 1997). Secondly, personal reputation refers to the professional careers (the academic reputation, acknowledged experience, and intellectual excellence) of the associates who work at the organization (De Laat, 1997; Barnir & Smith, 2002).

In this respect, literature has emphasized the importance of the reputation of partners when initiating a cooperative relationship (De Laat, 1997; Dollinger et al., 1997). In addition and despite the importance of reputation in managing alliances between smaller-sized partners, few small firms follow strategies that are oriented towards establishing a good reputation (Goldberg et al., 2003).

Therefore, partner reputation is a factor that has an influence not only on the success of cooperative relationships in general (De Laat, 1997; Saxton, 1997) but particularly, on the success of cooperative agreements between firms and research organizations (Bloedon & Stokes, 1994; Geisler et al., 1991; Martínez Sánchez & Pastor Tejedor, 1995). In order for a cooperative firm-research organization relationship to be effective, and for the technological transference process to be successful, executives should have ample knowledge concerning research and production along with experience in innovation in their sector (Gee, 1993; Goldhor & Lund, 1983). Bloedon and Stokes (1994), Martínez Sánchez and Pastor Tejedor (1995) also assert that one of the keys to successful collaboration between firms and research organizations is the intellectual excellence of the parties, or in other words their acknowledged experience. Klofsten and Jones-Evans (1996) found this factor to be essential in relationships with small firms, and therefore better results were obtained when the board members had recognized experience with small businesses and possessed specific know-how. Based on these arguments and evidence, in the following hypothesis we propose that the reputation of partners has a positive effect on the success of a cooperative agreement.

Hypothesis 2: *The reputation of partners has a positive influence on the success of cooperative agreements between small and medium-sized firms and research organizations.*

Definition of Objectives

The definition of objectives refers to the need to clearly and precisely express the objectives that will be pursued through the cooperative agreement, on an individual basis for each of the participating partners, and on a common basis for the relationship itself (Häusler et al., 1994; Klofsten & Jones-Evans, 1996). In this respect, there are three fundamental issues regarding the definition of objectives: the requirements of the objectives, the identification of individual objectives in contrast to common objectives, and a comparison between the defined objectives and the results obtained.

In the first place, regarding the requirements that the objectives must fulfil, they must be known and accepted (Chisholm, 1996), clear (Burnham, 1997; Häusler et al., 1994; Jones-Evans & Klofsten, 1998), accurate (Geisler et al., 1990), flexible (Ghoshal et al., 1992), well-defined, real and relevant (Cukor, 1992). Defining goals clearly also requires that the tasks and responsibilities of collaborating partners be properly defined.

Secondly, define objectives to address two levels (Häusler et al., 1994; Klofsten & Jones-Evans, 1996). On an individual level, partners must define their own objectives before entering collaborative relationships. On an inter-organizational level, efforts must be made to define common objectives for two reasons. First, this forces the parties to reveal their respective interests openly and explicitly. Second, if objectives differ, knowing each partner's individual objectives may help to determine areas where they agree and to determine those areas where objectives differ and hence to spot those tasks that should be performed in order for the collaboration to be more effective. In this respect, there may be greater discrepancy between the partners' objectives when two very different organizations cooperate, as in the case of firms and research organizations (Burnham, 1997). Lastly, some studies emphasize the importance of a relevant definition of desired objectives in order to compare them afterwards with the results that were actually obtained (Cukor, 1992). Moreover, in order to have an appropriate control of partner activities, a clear definition of objectives is required both in the individual and inter-organizational sphere.

A clear definition of objectives is an essential factor in the proper development of cooperative relationships (Kelly et al., 2002). The direction of all inter-organizational relationships should be defined in terms of objectives, to be known and accepted by all of the organizations participating in the relationship (Chisholm, 1996). Flexibility when formulating objectives (Ghoshal et al., 1992), the clear definition of responsibilities, goals and tasks of the parties as well as the existence of objectives and common goals contribute to the success of cooperative relationships between firms and research organizations (Davenport et al., 1999; Geisler et al., 1991; Jones-Evans & Klofsten, 1998; Lee & Osteryoung, 2004). In the case of relationships with small firms, the study by Klofsten and Jones-Evans (1996) reveals that the existence of a clear objective is of vital importance to the success of an agreement. Based on this evidence, in hypothesis 3 we propose that a clear definition of objectives has an effect on the success of cooperative agreements between firms and research organizations.

Hypothesis 3: *The clear definition of objectives has a positive influence on the success of cooperative agreements between small and medium-sized firms and research organizations.*

Proximity between Partners

Proximity between partners refers to the physical distance that separates cooperating partners (Mansfield & Lee, 1996). In other words, the location of one of the parties with respect to the other (Fritsch & Schwirten, 1999). This factor is usually identified as geographical proximity[5], such that if the parties are close to one another, the geographical proximity between them will be more favorable: the closer the better (McDonald & Gieser, 1987). This is especially relevant in cooperative relationships between small organizations (Human & Provan, 1997). This factor has three dimensions: the location of cooperating partners, the physical distance between them and the time that partners spend travelling.

Location refers to the geographical point where the cooperating partners are located. Authors such as McDonald and Gieser (1987), and Sherer (2003) define the location of the partners in the same city or metropolitan area as geographical proximity. According to Landry, Traore, and Godin (1996), whether or not the firm is located within the same city or area as the university where researchers work is what defines the degree of geographical proximity so that the proximity is higher/greater if the firm and researcher are located in the same city and lesser when they are not located within the same area. Other studies such as those by Vedovello (1997), Westhead (1997), and Lindelöf and Löfsten (2006) define geographical proximity according to whether or not the collaborating firms and research organizations are located within the same scientific park.
With respect to the physical distance between the parties, the majority of studies express the distance in kilometres or miles, depending on what country the collaboration has taken place in (Beise & Stahl, 1999; Katz, 1994; Mansfield & Lee, 1996). Finally, the amount of time that partners spend travelling to their partner's location is another aspect used to define the proximity between cooperating parties. Therefore, the lesser the amount of time partners spend travelling, the greater the proximity between them. Katz (1994) asserts that the greater the distance separating the cooperating partners the greater the time consumption. Similarly, the study by Mansfield and Lee (1996) found that executives from several U.S. firms showed a preference for collaborating with universities that were located at a distance of two hours or less. Nevertheless, this does not always occur, given that it will depend on the infrastructure (communications, transportation, etc) or the overall size of each country.

Geographical proximity aids in the development and establishment of cooperative relationships between different partners (Gray, 1985; Sherer, 2003). If the partners are geographically near to one another, contact and communication among partners will be more effective, and better results will be obtained (Dill, 1990; Katz, 1994). This greater effectiveness in the relationship between partners is generated as a result of the reductions/savings in travel, communication and information costs as well as a lower use of time (Fritsch & Schwirten, 1999; Katz, 1994; Landry et al., 1996). Moreover, the proximity between parties has a positive impact on the productivity of the collaboration between a firm and a research organization (Bonaccorsi & Piccaluga, 1994; Cukor, 1992; Geisler & Furino, 1993; McDonald & Gieser, 1987; Vedovello, 1997), especially when a greater number of partners are involved (Landry et al., 1996). Based on these studies and the arguments derived from them, in the fourth hypothesis we propose that geographical proximity has a positive influence on the success of the cooperative agreement.

Hypothesis 4: *Proximity between partners has a positive influence on cooperative agreements between small and medium-sized firms and research organizations.*

Methodology

Sample

Considering that the majority of cooperative agreements between firms and research organizations take place mainly in the areas of R&D and technology, our study population is made up of the domestic R&D cooperative agreements managed in Spain by The Centre for the Development of Industrial Technology (CDTI) between firms and external organizations that specialize in research and providing technology services. The total sample that was selected is made up of 630 cooperative agreements in which at least two partners participated: one small or medium-sized firm (with less than 500 employees) and a research organization (university, research institute, public or private research association, and technological centre).

As a source of information, in the first place, a database was elaborated with secondary information from the CDTI, and after that, in order to obtain primary information from the firm partners a questionnaire was sent to them— in order to measure the variables of the study. The valid response rate obtained was 36.19% (from 228 cooperative agreements). The non-response bias analysis did not detect any significant differences between the first and the second questionnaires.

Measurements

Regarding the dependent variable, two measurements were used to determine the success of the relationship. The first measurement is the evolution of the relationship, where different evolutionary possibilities are investigated ranging over five categories: at the beginning of the range it asks whether the agreement was broken off before reaching the objectives, then it moves successively to whether the objectives indeed reached and finally it moves to: "Did the partners continue to collaborate?" — once the objectives were reached, and the agreement was finalized (Davenport et al., 1999; Geisler, 1995; Shamdasani & Sheth, 1995).

The second measurement is the partners' satisfaction with the cooperative agreement (Anderson & Narus, 1990; Ariño, 2003; Geringer & Hebert, 1991; Glaister & Buckley, 1999; Mohr & Spekman, 1994; Saxton, 1997). This measurement has often been used in studies on inter-organizational relationships. Specifically, we have used four different items (variation ranking from 1 to 7) that express satisfaction with the project results, with the general functioning of the project, whether or not the project results fulfilled the initial expectations, and, lastly, whether or not the project provided balanced results for the partners. The reliability analysis of this scale produced a Cronbach's Alpha of 0.913.

Regarding the independent variables, previous experience was measured through three items that represent whether or not partners have had any past cooperative agreements, whether they have had any prior contact with the same partner, and whether or not they have had experience with collaboration in the same area (Reuer & Ariño, 2002). Cronbach's Alpha of this average was 0.561, a value slightly lower than desired, which may be due to the fact that although the three items represent the existence of previous experience, each item measures a different aspect and not all of them may be present at the same time (Saxton, 1997). All the same, we prefer to retain the information of the three items given that they contribute information on different aspects of previous experience in cooperation. Regarding partner reputation, this was measured by a scale made up of three items that measure corporate excellence through the organizational reputation and the reputation of those working for the organization (De Laat, 1997; Gee, 1993; Martínez Sánchez & Pastor Tejedor, 1995). The respective Cronbach's Alpha indicates that it is a reliable measurement since it has a value of 0.858.

Using the studies by Cukor (1992), Chisholm (1996), Geisler et al. (1991), Gray (1985), and Jones-Evans and Klofsten (1998) as a reference, the measurement of soundness of the definition of objectives is made up of three items that evaluate these aspects - whether or not the objectives are clear and precise, are known and accepted by the partners, and lastly, if the tasks and responsibilities of the parties are known and accepted by the partners. Its Cronbach's Alpha was 0.840. Finally, taking the studies by Beise and Stahl (1999), Katz (1994), and Mansfield and Lee (1996) as a reference, we have proposed a scale made up of two indicators (distance and time) in order to measure the effect of that proximity between partners has on the success of cooperative agreements. In this case, the Cronbach's Alpha was 0.957.

Two control variables were used: the number of partners participating in the cooperative agreement, and the technological area of its principal activity.

In order to reduce the dimensionality of the measurements and generate independent variables to analyze the proposed relationships, we carried out a confirmatory factor analysis of the independent variables and the dependent variable with a varimax rotation (Table 1). In the first place, the factor analysis of the independent variables is significant, with a Kaiser-Meyer-Olkin value of 0.667 and a χ^2 1,206.18 (significance level 0.000) in Bartlett's test of sphericity, allowing for an explanation of 75.37% of the variation in four factors that group together each one of the items that correspond to the object variables of the study. These factors have been named: Previous Experience Factor, Reputation Factor, Definition of Objectives Factor and Proximity Factor. As for the factor analysis of the dependent variable (Table 1), it has generated a factor that explains 80.50% of the variation and is significant with a Kaiser-Meyer-Olkin value of 0.797 and a χ^2 of 723.503 (significance level of 0.000) in Bartlett's test of sphericity. This factor has been named Satisfaction Factor.

Table 1. Factor analysis of the variables.

Previous Experience Factor	0.843 0.782 0.551	0.072 -0.123 0.085	-0.056 0.126 0.009	-0.004 0.113 -0.274	
Reputation Factor	0.069 -0.011 -0.011	0.892 0.860 0.829	0.888 0.853 0.809	0.038 0.021 0.005	
Definition of Objectives Factor	0.017 0.142 -0.072	0.144 0.167 0.255	0.888 0.853 0.809	-0.037 -0.059 -0.010	
Proximity Factor	-0.011 -0.084	0.031 0.041	-0.031 -0.062	0.974 0.960	
Satisfaction Factor					0.942 0.916 0.866 0.852

Next, in order to explore the existence of differences in behavior of the firms in the sample according to their size, an ANOVA test was used. Next the sample was divided into two parts according to the number of employees: into 176 small firms (with up to 250 employees), and 52 medium-sized firms (with between 250 and 500 employees). This distribution allows us to detect the greater importance of small firms in the establishment and development of cooperative agreements for technological innovation and reflect the reasons for cooperation previously mentioned such as a greater specialization and a need to access complementary resources in order to take on certain projects with higher risk and uncertainty.

Results in Table 2 show that significant differences in means do not exist in the case of reputation and definition of objectives, while there are significant differences in the previous experience (significance level of 0.05), proximity and satisfaction variables (significance level of 0.000). Based on this data, it was thought that individual deviations to the hypotheses would be interesting and would enrich the analysis of results, not only for the total sample, but also for each one of the subsamples derived when considering the size of the firm.

The authors are aware of the reduced size of the subsample of medium-sized firms (52 firms), and therefore the derived conclusions will be evaluated with more caution and with less possible generalization. Nevertheless, despite this disadvantage, this complementary analysis has been included because any additional information that it can provide is considered relevant in order to more precisely identify which factors effect, and to what extent, the success of agreements between small or medium-sized firms and research organizations.

Table 2. Differences in Means according to the size of the partner firm.

Firm Type	Previous Experience Factor	Reputation Factor	Definition of Objectives Factor	Proximity Factor	Satisfaction Factor
Small Firm	-0.0728	0.0273	0.0156	-0.0940	0.1574
Medium-Sized Firm	0.2464	-0.0925	-0.0530	0.3183	-0.5327
F	4.1470	0.5760	0.1890	7.0060	20.7890
Significance Level	0.0430	0.4490	0.6640	0.0090	0.0000

Results

In order to analyze the relationship between the independent variables and the degree of partner satisfaction on one hand, and the progress of the cooperative agreements on the other, different multiple regression analysis were carried out. In Tables 3 and 4, the results are shown for both the total sample and the subsamples of small and medium-sized firms for each of the variables representing the success of the agreement. All of the models are shown to be significant, offering on one hand, a deeper explanation of the satisfaction variable; and, on the other hand, a comparison of the models of both subsamples and the total sample for each dependent variable.

A first look at the results allows us to confirm two of the four hypotheses proposed in this study on the basis of the analysis done on the total sample. Specifically, the influence on success of the definition of objectives (Davenport et al., 1999; Lee & Osteryoung, 2004) and the reputation of partners (De Laat, 1997; Geisler et al., 1991). However, a significant effect of previous experience on success was not found, and contrary to what was proposed in our model, proximity between partners is a variable that negatively affects the results of the agreement. Considering the results of the models of the subsamples, these overall results are also confirmed in a different way, according to size and depending on the variable representing success. For this reason, we are going to discuss the results obtained in the different cases for each one of the variables that were considered.

Table 3. Results of the regression models with the satisfaction variable

Variable	Total Sample	Small Firm Sample	Medium-Sized Firm Sample
Previous Experience Factor	0.055	0.121*	0.041
Reputation Factor	0.267***	0.305***	0.016
Definition of Objectives Factor	0.361***	0.338***	0.533***
Proximity Factor	-0.149**	-0.185***	0.108
Number of Partners	-0.042	-0.008	-0.31**
Technological Area	-0.055	-0.037	0.034
R	0.473	0.499	0.586
R^2	0.223	0.249	0.343
F	21.466***	18.990***	12.875***

*Significance level:*0.1; **0.05; ***0.001*

Table 4. Results of the regression models with the evolution of the relationship variable.

Variable	Total Sample	Small Firm Sample	Medium-Sized Firm Sample
Previous Experience Factor	0.060	0.067*	0.101
Reputation Factor	0.215***	0.288***	-0.008
Definition of Objectives Factor	0.663***	-0.042	0.464***
Proximity Factor	-0.191**	-0.252***	-0.074
Number of Partners	0.100	0.123*	0.097
Technological Area	-0.110	-0.094	-0.064
R	0.288	0.388	0.464
R^2	0.083	0.150	0.215
F	10.146***	15.287***	13.689***

*Significance level:*0.1; **0.05; ***0.001*

First of all, Hypothesis 1 proposed that there is a significant relationship between the existence of cooperating firms' previous experience and the success of the cooperation, supported by a long line of previous research on the role this factor plays in the establishment and success of collaboration between organizations. Based on the results, this hypothesis can only be partially confirmed in the case of small firms, with a significance level of 0.10, having a greater impact on the degree of partner satisfaction (0.121) than the evolution of the relationship (0.067).

A priori, these results are not very satisfactory if compared to the results from earlier studies which led us to expect an important impact of this variable on the success of the alliance. Therefore, a more detailed analysis of these studies has allowed us to detect that in the majority of cases the evaluation of previous experience was only carried out using one of the three aspects that the present study has considered: previous experience with the same partner. In this study we propose a more complete analysis of the effect of learning derived from previous experiences that include both learning from cooperating not only with the same partner, but also the management knowledge and skill derived from having participated in any form of cooperation, whether in the same activity or not and with the same partner or a different one (Reuer et al., 2002). This analysis is a contribution made by this study to the literature. The compilation of different and complementary information regarding the same sole variable could have conditioned the response about the overall effect of previous experience on the success of the alliance. In this respect, future studies should analyze the individual effect of each one of the three dimensions of previous experience in order to detect if each one of them independently and significantly affects success and which one has the greatest effect. Regarding Hypothesis 2, which considers the influence of the reputation of partners on the success of the cooperation, the results obtained corroborate the existing empirical evidence on the matter and confirm this hypothesis (De Laat, 1997; Geisler et al., 1991; Saxton, 1997). The results of the total sample produce impact coefficients of 0.267 for the degree of partner satisfaction and 0.215 for the evolution of the relationship. Although this variable is not significant in the subsample of medium-sized firms, this hypothesis is confirmed with regression coefficient values that are higher than those of the total sample, being 0.305 for satisfaction and 0.288 for the evolution of the relationship. These results confirm the fact that one of the keys to success in the collaboration between small and medium-sized firms and research organizations is the intellectual excellence of the partners and their recognized experience. A good academic reputation, as well as experience in research, development, and innovation is fundamental for the development and successful transference of technology among partners involved in a cooperative agreement (Goldhor & Lund, 1983).

Hypothesis 3 proposed a positive influence of the thoroughness and precision of defining the objectives that the partners plan to achieve by means of the cooperative agreement, and the actual success achieved. The results obtained are consistent with the empirical evidence and allow for the confirmation of the impact of a good definition of objectives on the success of the cooperation (Davenport et al., 1999; Geisler et al., 1991; Lee & Osteryoung, 2004). The results of the total sample show impact coefficients of 0.361 for the degree of partner satisfaction and 0.663 for the evolution of the relationship. Regarding the subsample of small firms, this variable significantly affects the degree of partner satisfaction (0.338) and in the case of medium-sized firms; coefficients of 0.533 for satisfaction and 0.464 for the evolution of the relationship were obtained. Therefore, this is the variable that most affects the success of cooperation between small and medium-sized firms and research organizations. It is clear from these results that both the common and individual objectives must be defined in a clear, precise and coherent way, so that once they are impeccably formulated they will facilitate the clear definition of tasks partners must undertake to achieve these goals, and allow them to concentrate all of their efforts on reaching them (Chisholm, 1996; Jones-Evans & Klofsten, 1998).

In Hypothesis 4, it was proposed that the proximity between partners would have a positive impact on the success of the cooperation. This geographical proximity derived from the physical distance between partners has been considered by some authors to be a determining variable in the development of cooperative agreements (Bonaccorsi & Piccaluga, 1994; Geisler & Furino, 1993; Sherer, 2003), and particularly relevant in the case of relationships where one (or more) of the partners is a smaller-sized organizations (Human & Provan, 1997). Nevertheless, the results obtained did not allow this hypothesis to be confirmed, since it did not turn out to be significant for medium-sized firms, but is significant in a way opposite to what was expected in the case of small firms and the total sample.

The concept of proximity between partners is a relative aspect that depends on many factors, explaining why sometimes the results have been contradictory. Mansfield and Lee (1996), and Beise and Stahl (1999) obtained contradictory results regarding the influence of geographical proximity in cooperative relationships as a result of the characteristics of the country that was analyzed (in the studies referred to they were United States and Germany, respectively). Other studies such as the one by Fritsch and Schwirten (1999) suggest that each territory should be treated on an individual basis according to its size and the percentage of its population employed in the sector being studied. It is true that geographical proximity aids in the development and establishment of cooperative relationships between different partners (Sherer, 2003). Nevertheless, the progress being made currently in the telecommunications sector is overcoming obstacles generated by geographical separation (Castells, 1991; Malecki, 1991; Mansfield & Lee, 1996). This leads us to question the importance of proximity between partners in order to have successful cooperative agreements. In fact, authors such as McDonald and Gieser (1987) assert that while closeness between parties can improve the results of cooperative relationships in research and development between firms and research organizations, it is no longer essential once several projects exist that are successfully carried out between parties that were not close to one another.

Finally, regarding the control variables, the area of technology did not turn out to be significant and the number of partners involved in the agreement has a significant positive influence on the partner satisfaction in the case of medium-sized firms (0.310) and on the evolution of the relationship for small firms (0.123).

Conclusions and Implications

The objective of this paper was to analyze the impact that a combination of factors relating to the context in which a cooperative agreement is established has on its success when the agreement is made between small and/or medium-sized firms and research organizations. The findings make important contributions in that they allow us to offer different recommendations in the field of academics as well as from a practical viewpoint, for the management of these types of cooperative relationships. Therefore, after reviewing the literature on the factors that affect inter-organizational relationships in general, and in particular those between firms and partners of a different nature, such as universities and research organizations, we reached the following conclusions: on one hand, that sufficient empirical evidence does

not exist about this type of agreement, that such co-operation is usually generated by the necessity that partners have to access complementary resources in order to develop activities dependent upon research and technological development, that they agree upon the key factors for success; and on the other hand, empirical evidence has not yet been unearthed or analyzed to discover the specific behavior of small and medium-sized firms in the development of these relationships, nor has this been compared with the behavior of large firms. Such analyses may result in different conclusions regarding the relevant factors for the successful development of cooperative agreements and ventures between firms —particularly small- and medium-sized firms—and research institutions.

For this reason, the main contributions of this paper are, on one hand, the identification of key factors affecting success that are conditioned by the context in which this type of growth strategy is decided upon: the partners' previous experience of collaboration, the reputation of partners, the thoroughness of the definition of the objectives that partners wish to achieve through the agreement, and the degree of proximity between partners; and, on the other hand, the contribution of empirical evidence on cooperative relationships in research and development between small and medium-sized firms and research organizations.

Therefore, after analyzing the data collected about 228 cooperative agreements we have observed that the variables with the greatest impact are: a clear and precise definition of objectives and the reputation of partners. These findings have allowed us to totally confirm two of the four proposed hypotheses and partially confirm the impact of previous experience in collaboration on the success of the agreement. Therefore, these results show that in order for collaborating partners to remain united and be satisfied with the results and outcome of the agreement, it is of vital importance that they know and specify the objectives and tasks that should be developed and that they join forces in order to reach the common goal and simultaneously satisfy their individual interests within the cooperative agreement.

On the other hand, for a successful development as well as an effective cooperative relationship and technology transfer between research organizations and small or medium-sized firms, the parties' past experience and knowledge about research and production in their sector is very important since that is what is reflected by their reputation as an organization based on their acknowledged experience and excellence. Thus, all of this contributes to the results and the degree of partner satisfaction with the outcome of the cooperative agreement.

In conclusion, our results produce a series of practical recommendations that may be truly useful for the running and management of cooperative ventures between small or medium-sized firms and research organizations. More specifically, during the initial stages the basic requirements are a clear definition of objectives, and selection of partners who enjoy a good reputation to develop agreements with. Moreover, the more previous co-operative venture links one has had the greater the chance of success. Geographic proximity is not a factor that determines success. Although this finding is congruent with other studies, we recommend a deeper analysis of this factor, especially in order to consider further aspects of proximity.

The results obtained have allowed us to accomplish the objective of our study, but they have also allowed us to detect a number of interesting questions that require further investigation and analysis. The results relating to the effect of previous experience of cooperation lead us to propose future investigation where the individual effect of each of these dimensions on the success of a cooperative agreement can be independently analyzed. On the other hand, given the (lack of) impact of 'the proximity between partners' variable, contrary to what was expected, we feel it is necessary to investigate this relationship again using additional samples in order to confirm whether or not this relationship is positive or negative, or simply circumstantial — depending on the type of sample, country or specific additional characteristics of the context in which the collaboration is defined and developed, and to consider other dimensions of this variable such as social or cultural proximity. Further study, that considers size as a determining aspect when analyzing success, is needed. Gomes-Casseres (1997) proposes the consideration of size not as an absolute scale

(number of employees, sales volume, assets…) but rather as a relative measurement related to the market in which the firm operates. We assume that firms will initiate alliances when their size is small relative to that of their rivals.

We believe it would be interesting to consider the project or cooperative agreement as a unit of analysis and compare the information acquired by each of the partners to the agreement. Lastly, in order to help generalize the results obtained, the contrast of these relationships with other samples of technological cooperative agreements on an international basis would be of great importance given the growing relevance that this type of cooperation has in the context of the European Union's Framework Program.

Endnotes

[1] Complutense University of Madrid, Spain
[2] Rey Juan Carlos University, Spain
[3] Rey Juan Carlos University, Spain
[4] For the purposes of this study, this type of cooperation is defined as the link that ties basic research (done in universities, laboratories and research centres) to applied research (done by industry). As a result of their combined activities, synergies are created that allow a country to increase its economic and technological potential and therefore improve its level of competitiveness.
[5] Even though we can find different aspects of these factors in the literature (such as physical, psychic, cognitive, organizational, cultural, social), in this paper we focus on the proximity as a physical element, that is, the geographical proximity.

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CHAPTER 10

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Job Enrichment – A Pattern for Innovative SMEs

Abstract

One of the most significant developments in the field of organization is the increasing importance given to human resources. Also, more and more attention is given to the workplace as it is closely tied to the employee. Thus, the development of the workplace could finally enhance innovativeness. Keeping this in mind, this chapter discusses the possibilities of job enrichment in inspiring innovative behavior. The purpose of this chapter is to highlight the importance of job enrichment as one of the powerful tools for organizational innovation. The goals are (a) to understand the importance of organizational innovativeness; (b) to determine the current expectations from the workplace; and (c) to introduce job enrichment as a managerial tool to intensify the innovation process in SMEs. Finally, job enrichment could be interesting for companies that strive to find tools that will ensure non-imitation conditions and business success.

Keywords: *Human resources, Innovativeness, Job enrichment, Organizational innovativeness, Workplace.*

Introduction

The vision of organizational innovativeness (Gjerding & Rasmussen, 2007) is a phenomenon that occurs through a combination of institutional management (organization, job design), group management (cooperation, team work), and self-management (task, work environment). Working together in creating shared definitions of reality implies that organizational innovation involves the combination of different goal systems and methods of management at the same time. But as Read (2000, p. 98) said, in absence of a general innovation theory, Amabile's (1988) idea that "the organization (innovation) process occurs at the level of a system: a large number of individuals working together in different units on different aspects of the very general problem of implementing a new idea" (p. 163) could also be considered for this discussion.

West and Rickards (Rose, 2005, p. 85) defined innovation as the intentional introduction and application within a job, work team, or organization of ideas, products, or procedures that are new to that job, work team, or organization and that are designed to benefit the job, work team, or organization. Innovation for Zairi (1995, p. 133) in a modern

business context was about an organization's ability to provide the extra dimension of quality that will differentiate a product or service through newness and originality. So, it is more important that companies recognize the importance of human capital and skills as drivers of innovation. Ensuring creativity, innovation, and entrepreneurial thinking should be a part of all companies' strategies; indeed, without continued innovation, companies will cease to be competitive (Ricardo 2010, p. 12). Since much creativity comes out of collaborative efforts carried out by different individuals, organizations should promote internal diversity and work environments that enhance the opportunity to exchange ideas. Creating an environment where employees and management collectively work together will substantially increase the chances of long-term corporate success. For Qingrui et al. (2007), creativity and commitment are the greatest resource for innovation. But the creativity and diversity of people remain the strength of each organization. Management guru Theodore Levitt gave a clear proposal on how to look upon innovation (Sieczka, 2011): "Creativity is thinking up new things. Innovation is doing new things". (p. 76) To get a better understanding of what creativity is (or is not), we turn to the work of Leonard (1998, p. 2-8), who dispelled seven common myths surrounding innovation (Goh, 2002):

1. Its output depends on a few, often flamboyantly different individuals.
   A creative group is not the same as a group of "creatives".
2. It is a solitary process.
   Innovation in business is a group experience.
3. Intelligence is more important than creativity.
   Beyond a certain level, all individuals are capable of creative thought.
4. It can't really be managed.
   Managerial efforts can enhance the creativity of an already productive group.
5. Creative groups are found only in "The Arts" or in high-technology companies.
   Many innovative companies (e.g. Nike, IKEA) do not belong to these two categories.
6. It is relevant only to big ideas.
   Creativity can happen in small ideas, too, though the scope of change is less.
7. It only involves coming up with new ideas.

Another possible view on organizational innovation was given by Jin et al. (2004) (Figure 1). They recognized four types of organization, non-innovator, adopter, creator, and all-round innovator, depending on the level of soft and hard innovativeness.

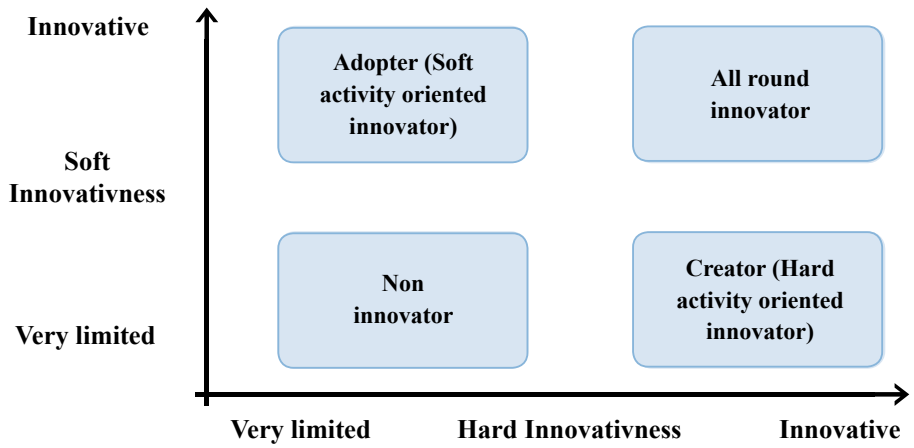

Figure 1. A quadric typology of organization innovation (Jin et al., 2004).

Kumar's (2010, p. 50) study showed that SMEs have taken a defensive position, introducing products that involve low novelty of innovation and that a small number of SMEs were able to innovate successfully in all product categories. So if the company is a non-innovator, or has low range of innovations, the question is: What are the preconditions to transform a non-innovative into an innovative SME? One model is available – Nørager's (2009) model, (Nørager, 2009) which explained that this can be achieved either by changing human resources management or by changing the strategy that will be followed by structure and HRM (Figure 2). In both cases, human resources are included and play a significant role.

Initial position Characteristics of the non-innovative SMEs	**The transformation process (Characteristics of the needed transformation process)**	**New position Characteristics of the innovative SMEs**
Internal labour market approach to HRM. Hierarchical structure, predetermined rules, no cross-disciplinary activities, not creating new knowledge or capabilities. Employees are into long employment, promotion from within, only job specific training, emphasis on seniority and rules, thereby creating repetitive quality products/services	→ Changing HRM attitude from "hard" towards "soft" (e.g. from internal labour market to high commitment HRM) → → OR → Changing strategy (e.g. from analyser to prospector) which will be followed by a change in structure and a new HRM contracting system. A system going from internal labour market towards SHRM. →	SHRM or high commitment HRM approch to HRM. Organic structure, handling cross-disciplinary activities and creating individual development through learning, knowledge and capabilities. Employees are self-managing and flexible working in the best interest of the company and taking on assignments different from normal work thereby creating new product/ services.

Figure 2. The transformation process from non–innovative to innovative SMEs (Nørager, 2009).

There is another characteristic of SMEs and this is stated in Ghobadian and Gallear (1997) that SMEs are more likely to be people-oriented than system oriented (McAdam et al., 2004). Hence, people in an organization and working conditions are the main points that have to be changed and transformed if a company wants to enhance innovativeness. So, it is the firm that has to foster intangible resources that it employs in order to boost innovativeness and assure competitiveness.

Next, we will consider how SMEs nurture and structure intangible resources to overcome limited tangible resources and achieve premium business success by using the method of job enrichment.

Discussion

SME: Reaching Innovative Organization

Organizational innovation is a gradual, reflective process that engages employees throughout the organization (Totterdill, 2007, p. 14). According to OECD (2005), organizational innovation is the implementation of a new organizational method in the firm's business practices, workplace organization, or external relations. Organizational innovations have a tendency to increase by reducing administrative and transaction costs, improving workplace satisfaction (and thus labor productivity), gaining access to non-tradable assets (such as non-codified external knowledge), or reducing the cost of supplies. To cope with this challenging objective, organizations have to continuously renew themselves, to rethink their mission, to achieve ever-stretching knowledge, to enhance their innovation and creativity orientation, and to increase their flexibility, elasticity, and agility (Negri, 2000). It is, therefore, natural when an overwhelming majority of business executives (more than 80%) see innovations as a cornerstone of their growth and competition strategies, as a study by McKinsey suggested (Tiwari et al. 2007, p. 451). Organizational innovation (Rubalcaba et al., 2011) can be also considered as efficiency of internal organization; articulation of control and co-ordination processes; improvement of human factor selection, training and utilization; and improvements in different functional specializations. The same group of authors also introduced classification of organizational innovativeness in which they confronted types of organizational innovation (structural or procedural) with a focus on intra or inter organizational innovation (Figure 3). They also suggested job enrichment as an intra-organizational, procedural method to enhance organizational innovativeness.

		Focus or Organizational Innovation	
		Intra - Organizational	**Inter - organizational**
Type of Organizational Innovation	Structural Innovation	Team work in production Cross-functional teams Decentralization of planning, operating and controling functions Manufacturing cells or segments Reduction of hierarchical levels	Cooperation /networks / alliances (R&D, production, service, sales, etc.) Make or buy / Outsourcing Off shoring / relocation
	Procedural Innovation	Job enrichment / job enlargement Simultaneous engineering / concurrent engineering continuous improvement Process / Kaizen Quality circles Quality audits / cerficitation (ISO) Environmental audits (ISO) Zero-buffer-principles (KANBAN) Preventive maintenance	Just-in-time (to customers, with suppliers) Single / dual sourcing Supply chain management Customer quality audits

Figure 3. Classification of organizational innovation (Rubalcaba et al., 2011).

An experiment on organizational innovations was conducted in 2009, with almost the same indicators (issues) as those covered by Rubalcaba et al. (2011), so we present the reliability of the presented classification in the Croatian context. The research was conducted on 89 manufacturing companies in the entire manufacturing industry, and the return rate was 8%. The findings are presented below.

		Focus or Organizational Innovation	
		Intra - Organizational	**Inter - organizational**
Type of Organizational Innovation	Structural Innovation	Team work in production Temporary cross-functional project teams Shop floor segmentation Financial participation by employees Flexible work time arrangements Teleworking Alpha = .632	Supply chain with suppliers / customers RFID used in logistic Automated warehouse management Alpha = .432
	Procedural Innovation	Task integration Virtual reality / simulation Tranining programmes Quality circle ISO 9000 Internal zero-buffer principle Total costs of ownership Knowledge base systems Alpha = .7337	Cooperation in innovation Productions offshoring abroad in 1999-2006 Production backshoring in 1999-2006 Outsourcing Alpha = .2308

Figure 4. Focus on organizational innovations in Croatian manufacturing industry.

As can be seen from Figure 4, the reliabilities measured by the Cronbach alpha coefficients are fairly good and properly describe the intra-organizational innovations. Therefore, we will focus on these issues. First, we looked into the average year of adoption of these concepts in the manufacturing companies.

	First year of adoption of organizational innovation	
	Intra - Organizational	**Inter - organizational**
Structural Innovation	Teamwork in production 1992 Temporary cross-functional project teams 1997 Shop floor segmentation 1998 Financial participation by employees 2011 Flexible work time arrangements 1998 Teleworking 1993	Supply chain with suppliers / customers 2002 RFID used in logistic n/a Automated warehouse management 2001
Procedural Innovation	Task integration 1995 Virtual reality / simulation 2004 Tranining programmes 2001 Quality circle 2000 ISO 9000 2002 Internal zero-buffer principle 2001 Total costs of ownership 1991 Knowledge base systems 2001	Cooperation in innovation Productions offshoring abroad in 1999-2006 Production backshoring in 1999-2006 Outsourcing

Figure 5. First year of adoption of organizational innovations in Croatian manufacturing sector.

Intra-organizational structural innovations (shown in Figure 5) are already well established in companies; the detailed data show that teamwork has been present from 1992; task integration, which is a part of job enrichment, since 1995 and well established in the companies' temporary cross-functional project teams since 1997; shop floor segmentation and flexible work time arrangements since 1998; total cost of ownership since 1999; and other concepts such as knowledge-based systems, supply chain ISO 9000, teleworking, ; etc., the companies started to use in 2000.

The research results on the used potential of organizational innovativeness were measured by a three-item scale (1-low, 2-medium and 3-high) and showed that all the concepts are used at a medium to high level. A detailed overview includes: shop floor segmentation (2.9); ISO 9000 (2.4); quality circle (2.3); manufacturing execution system (2.3); task integration (2.3); flexible work time arrangements (2.3); teamwork in production (2.2) – except for RFID used in logistics (0.00), which is not used at all. This is probably due to the high cost of RFID tags, so that these companies still use a bar-code system instead.

These organizational concepts are thought to be used for innovation purposes; however, our analysis shows different reasons why companies use these concepts. Table 1 presents the percentages of companies that use the concepts for reasons of quality, productivity, flexibility, or innovation.

Table 1. Reasons for using organizational innovation concepts.

	For quality	For productivity	For flexibility	For innovation
Teamwork in production	46.3	82.1	37.3	14.9
Task integration	66.7	68.9	33.3	11.1
Temporary cross-functional project teams	41.4	58.6	48.3	55.2
Shop floor segmentation	43.5	60.9	60.9	19.6
Internal zero-buffer principle	58.3	75.0	50.0	16.7
Quality circle	92.6	37.0	11.1	18.5
Knowledge based systems	63.6	68.2	36.4	27.3
ISO 9000	94.1	39.2	19.6	17.6
Flexible work time arrangements	29.4	72.5	49.0	9.8
Team performance incentives	63.3	90.0	30.0	20.0
Financial participation by employees	46.7	93.3	33.3	20.0
Training programs	58.7	67.4	39.1	21.7
Rapid prototyping / tooling	40.0	20.0	40.0	30.0
Supply chain with suppliers / customers	36.4	63.6	72.7	27.3
Manufacturing executions system	55.0	70.0	40.0	10.0
Virtual reality / simulation	44.4	22.2	55.6	55.6

Upon examining the above results, it becomes obvious that the most important reasons for applying these concepts are not innovation, but quality and productivity. For task integration, as a part of job enrichment, was primarily used to enhance (1) productivity; (2) quality; (3) flexibility and (4) innovativeness. This is closely connected with strategic reasons. The analysis of the strategic intentions reveals that Croatian companies dominantly compete on the grounds of quality. However, the results also show some very important facts, such as that 60% of companies launched a new product in the last two years, and that 29% of companies launched a product that is new to the Croatian market. The average revenues generated by these new products are: 29% of revenues are generated by new (modified) products, while 22% of revenues are generated by products new to the market. These percentages of revenues apply only to companies that launched new products.

To investigate further which organizational innovation fosters innovation, two regression analyses were conducted. First, we conducted the logistic regression where the dependent variable was dichotomous value 1 if the company launched a new product or 0 if it didn't. The logistic model was found to be significant (Chi-square=48.2, Sig= .007), accounting for 83% of the cases. However, while looking at the Wald coefficient and appropriate significances, one sees that the usage of novel materials and the ISO 9000 certificate have the greatest impact on launching a new product. The total cost of ownership, which is a new concept by which the use of the product is sold and not the product itself, has a significant Wald value but Exp(B)=0, which means that if something is changed in the total cost of ownership it would not augment the probability of launching a new product.

Table 2. First year of adoption of organizational innovations in Croatian manufacturing sector.

	B	S.E	Wald	df	sig.	Exp(B)
Novel materials	3.2	1.6	3.9	1	0.049	25.3
Total costs of ownership	-4.1	1.7	.2	1	0.012	0.0
ISO 9000	2.3	1.1	4.5	1	0.034	9.9

The same logistic regression was done where the dependent variable was dichotomous value 1 if the company launched a new product (new to the market) or 0 if it didn't. The logistic model was found not to be significant (Chi-square=20.451, Sig=.117), accounting for 76% of the cases. However, looking at the Wald coefficient and appropriate significances one sees that neither concept increases the probability of launching a product new to the market.

Finally, if we look only at the companies that launched new products and generated revenues from these new products – the following concepts are important:

- For launching a new product (new to the firm but not new to the market) the model's R=0. 769 and R Square =0. 591 meaning that the variables in the model account for 59.1% of changes in revenues, which is fairly high. However, the model itself is not significant (F=1.177; Sig.=0.351) and when looking at the Beta coefficients and their significances, team performance incentives use was found as a significant predictor.
- For launching a new product (new to the market), the model is R=0.867 and R Square =0.751, meaning that the variables in the model account for 75.1% of changes in revenues, which is fairly high. Again, the model itself is not significant (F=1.939; Sig.=0.160) and when looking at the Beta coefficients and their significances, only the use of ISO 9000 was found to be a significant predictor of revenues from these new products.

The results shown were only stimulating factors for a deeper analysis that can be done to potentially invoke job enrichment. Below, we present a further discussion on innovation.

In everyday life, the word "innovation" invokes a picture of resources, such as rich lab settings, science parks, university research teams, and large corporation research. However, the reality of small business innovation is quite different. For small businesses, the market is the "lab"; all employees (business owners, managers, and employees) are innovation specialists (King & Ockels, 2009). Also, resources in a small business are scarce (King & Ockels, 2009), but despite the constraints, or perhaps because of them, small business innovation thrives. King and Ockels (2009, p.3) identified that the drivers of small business innovation fall into three broad categories:

- Necessity – pressures to meet payroll, reduce price and costs, provide customer value, respond to customer complaints, etc.
- Opportunity – because they are closer to their customers, and have owners and decision makers that are closely involved, small businesses are well positioned to see and pursue new opportunities.
- Ingenuity – many small businesses spring from desire or something that doesn't exist. So as Guy Kawasaki said, to "build something you need or want to use".

If a company sets innovation as a company strategy, there is also a need to demonstrate this aspect through business strategy, employee role behavior, and HRM policies (Table 3).

Table 3. Innovation, employee role behavior and HRM policies.

Strategy	Employee role behavior	HRM policies
Innovation	A high degree of creative behavior Longer-term focus A relatively high level of co-operative, interdependent behavior A moderate degree of concern for quality A moderate concern for quantity; an equal degree of concern for process and results A greater degree of risk taking; a higher tolerance of ambiguity and unpredictability	Jobs that require close interaction and coordination among groups and individuals Performance appraisals that are more likely to reflect longer-term and group-based achievements Jobs that allow employees to develop skills that can be used in other positions in the firm Compensation systems that emphasize internal equity rather than external or market-based equity Pay rates that tend to below, but that allow employees to be stockholders and have more freedom to choose the mix of components that make up their pay package Broad career paths to reinforce the development of abroad range of skills

Source: Adapted from Torrington et al. (2009), p. 255.

Innovation seeks from the employee that they behave creatively; have a longer-term focus, a relatively high level of cooperative, interdependent behavior; a moderate degree of concern for quality; a moderate concern for quantity; and an equal degree of concern for process and results. On the other hand, HRM policy is accomplished through jobs that require close interaction and coordination among groups and individuals; performance appraisals that are more likely to reflect longer-term and group-based achievements; and jobs that allow employees to develop skills that can be used in other positions in the firm. In other words, it is a merging of hard (necessary measures for operating a contemporary organization in terms of labor market relations, salary system, health, etc.) and soft components (including human relations techniques based on reformulation of theories on human relations and organizational design) of HRM (Gjerding & Rasmussen, 2007). Innovation (Dauda, 2010) is important in the life of any company, as it enables it to move along with the changing condition. But SMEs, rather than calling it innovation, simply describe what they're doing and the results they are looking for, so words such as "tweak", "adjust", "improve", and "change" roll off their tongue (King & Ockels, 2009). They are actually talking about experimenting, improvising, and trying ideas (King & Ockels, 2009). To ensure that the employee is invited to experiment, improvise, and try, it is necessary to ensure that such a workplace has certain characteristics. SMEs (small businesses), also because of their size, business agility, and deep customer understanding, have several inherent innovation advantages over large corporations (King & Ockels, 2009). Small business innovation enablers include personal passion, customer connection, agility and adaptation, experimentation and improvisation, resource limitation, and information sharing and collaboration (King & Ockels, 2009). Corporations must train and develop employees on how to look beyond the "now" and be future thinkers (Ricardo 2010, p. 17). King and Ockels (2009) explained that if you ask any business owners to describe their innovation, it is very likely that they would tell you: they had an idea, saw a way to do it better, recognized an opportunity, found a way to meet their customers' needs, or creatively solved a problem. But in fact, each is an innovator, introducing a new product, idea, method, or approach (King & Ockels, 2009).

On the other hand, global competitiveness is putting pressure on organizations' abilities to attract, retain, and motivate staff to be innovative. Buck's (2007) presentations about demographic change showed us that demographic changes (i.e. an aging workforce) will affect organizations and Buck provided new points of viewing organizations for the future. The main expectation from an organization is competitiveness – based on competent and capable workers (Figure 6).

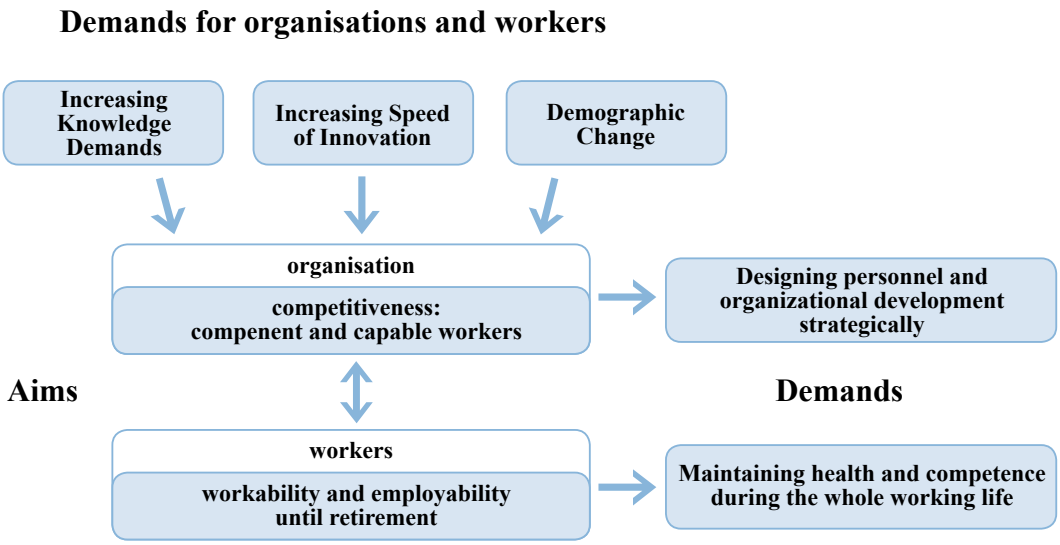

Figure 6. Demands for organizations and workers (Buck, 2007).

Therefore, more than ever organizations focus on creative and innovative ways to enrich the jobs of their employees. Due to the fact that firms' characteristics raise new challenges for companies, huge attention is paid to how to change a firm's ability to find new business solutions that will ensure competitiveness. In the end, innovation is connected with organizational outcomes and it is not always a question of product/service, but also a question of better internal processes that ensure well-being, commitment to work, and job satisfaction that influences clients and stakeholders**.** On the whole, it is a question of overall job enrichment. Furthermore, innovation is based on the thought that customers expect from companies better products/services, often only small changes, small redesigns, and different distribution. More often than not, innovation's substantial gain for companies is improving everyday work, implementing a new infrastructure, improving human capital conditions, and efficiency of labor.

According to the Gallup Organization (2009), the strategic initiatives to support innovation are:

1. Sought-after skills to support innovation – General communication skills and capacity for team work were the skills most enterprises looked for when hiring or training their current employees; also creativity and negotiation skills were mentioned by almost half of enterprises.
2. All these skills were more likely to be the focus of recruitment or training activities in the larger enterprise segments and by enterprises that had an international aspect in their core activities.
3. In terms of integrating internal activities and systems to support innovation, the EU enterprises were most likely to say that they had introduced mechanisms to support the collection of innovative ideas from employees (48%), while 40% have used staff rotations and secondments to bring new perspectives to work processes. The gap between the largest and the smallest enterprises is the widest in the extent to which they utilize specialized knowledge management systems (small firms: 32%; large companies: 56%) and the extent to which enterprises create cross-functional/departmental teams in innovation projects (small: 28%, large: 69%).
4. Firms were slightly more liable to involve potential customers or clients in product testing (26%) or in in-house innovation activities (24%) than in actually sharing or exchanging intellectual property (22%).

Conversely, Barroso (2011, p. 2) suggested that strategic approach to innovation is the following: (a) innovation is the overarching policy objective driving all other policies (education, skills, labor markets, etc.); (b) innovation policy is steered and monitored at the highest level; and (c) massive investments in skills, research, and innovation especially through "recovery" packages.

The need for new forms of work organization as a good base for a high performance workplace is considered to be the key element and an integral part of the Lisbon Strategy. Dauda (2010) stated that innovation can be nurtured through effective human resources management. He also pointed out that innovative and creative individuals tend to maintain their motivation to the extent that their desire to excel is given encouragement and a climate to operate. Encouraging innovation as an outcome poses a major challenge for human resource management, to guide and develop leadership, policy, knowledge creation, information systems, practices, processes, and strategy that support the creativity and implementation of innovation (Rose, 2005, p. 85). As stated by Wagner and Hollenbeck (2010, p. 3), some consultants say that many of today's jobs are so simple, monotonous, and uninteresting that they dampen employee motivation and fulfillment. Chaneta et al. (2011) presented factors that make significant contributions to people's views about boredom:

- Constraints in the job – having to carry out certain tasks that management has seen as essential, but which that employees have found uninteresting (e.g., form-filling, figure work, etc.).
- Meaningless tasks – tasks that have to be done regardless of whether they have been thought to be a waste of time by the employees.
- Lack of interest and challenge – clerical workers have found undemanding tasks such as filing and form filling very boring.
- Repetition – repetitive tasks have been seen as the major source of boredom for workers.
- Never-ending nature of job – the public sector staff has said that boredom has risen from lack of any sense of completion of the task – that is, although much work is achieved during the day, there is always more to come.

Consequently, employees become so bored and resentful that productivity falls off. The consultant recommends redesigning your firm's jobs in order to make them more complex, stimulating, and fulfilling (Wagner & Hollenbeck, 2010, p. 3). Thus, new forms of work organization have potential to increase innovation that may add value to products or services (Vasková, 2007).

Workplace Innovation

Workplace innovation (Rose, 2005, p. 10) is a voluntary behavior that can provide a competitive advantage to organizations. Totterdill (2007a) recommended sustainable, "win-win" approaches to work organization: (a) employees should be regarded as active partners, treated as responsible people who will react constructively and would contribute to the full extent of their individual capabilities; (b) workplace culture should be established on value: participation and involvement; (c) participation and involvement at the workplace level are linked to the development of new competencies i.e. innovation; (d) if organizational innovation is initiated in the workplace, employees can see immediately that it is directly related to the achievement of transparent performance measures; (e) new forms of work organization are explicitly informed by a win/win perspective, worker should recognize and influence the potential for improvements in job quality and working life; and (f) employees have some control over their work environment, including the ability to strike a balance between routine tasks and more demanding roles. Employees' creativity can be enhanced when they are recognized and appreciated, and when they are given freedom to work in areas of their biggest interests (Dauda, 2010). Creating an environment that stimulates employees and managers to be entrepreneurial, innovative, and creative is also critical to an organization's sustainability and competitive edge (Ricardo 2010, p. 12). Managers (must) enhance employees' motivation, especially in the context of jobs to "ensure" space for innovativeness. In the most recent management literature, workplace conditions include inevitable work delegation in which employees "see" and "feel" their importance and belonging to an organization, which enhances their commitment to everyday work.

Job performance is formally defined as the value of the set of employee behaviors that contribute, either positively or negatively, to organizational goal accomplishment (Colquitt et al., 2011, p. 35). One of the possibilities is task performance (Colquitt et al., 2011), which includes employee behaviors that are directly involved in the transformation of organizational resources into the goods or services that the organization produces (Colquitt et al., 2011, p. 36). But task performance differs widely from one job to another. Management can make task performance routine, adaptive, and creative, and only creative task performance is the level at which individuals develop ideas or physical outcomes that are both novel and useful (Colquitt et al., 2011, p. 37). As we already said, it is believed that creative task performances are relevant to jobs as artist or inventors, and this emphasis has been increasing across a wide variety of jobs (Colquitt et al., 2011, p. 37). In this context, employee creativity is necessary to spark the types of innovations that enable organizations to stay ahead of their competition (Colquitt et al., 2011, p. 37). Many organizations ask their employees to perform tasks that their competitors do not so their workforce perform their jobs in a unique and valuable way. But if an employee has few tasks and a higher accent on needs, the right strategy for them is job enrichment (Figure 7).

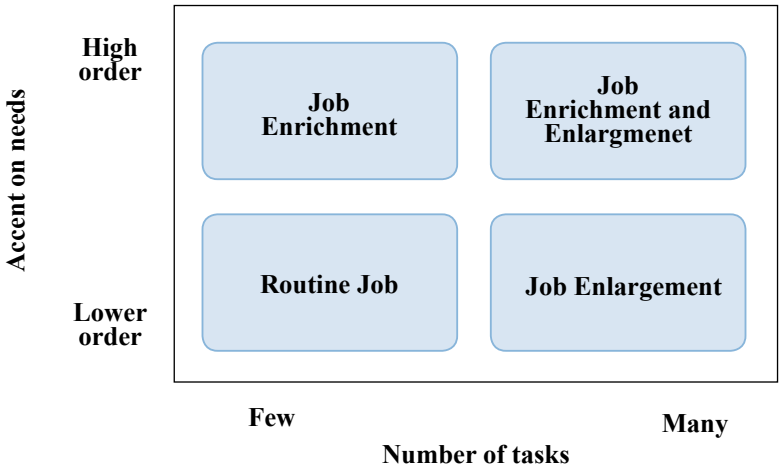

Figure 7. Differences between job enlargement and job enrichment (Katz & Coleman, 2001).

More attention should be given to the workplace also because of social trends, such as an aging workforce, a longer working life, etc. If we consider that there is an increasing proportion of older workers in organizations, this can lead to some problems in the future, such as more lost working days; more people with restricted performance; restricted deployment flexibility; and know-how gaps if no measures are taken (Buck, 2007). So, ISO suggested that a job design objective should be promoting good health, motivation, and qualifications throughout people's working lives (Figure 8). Job enrichment is suggested as one of the actions for achieving these objectives.

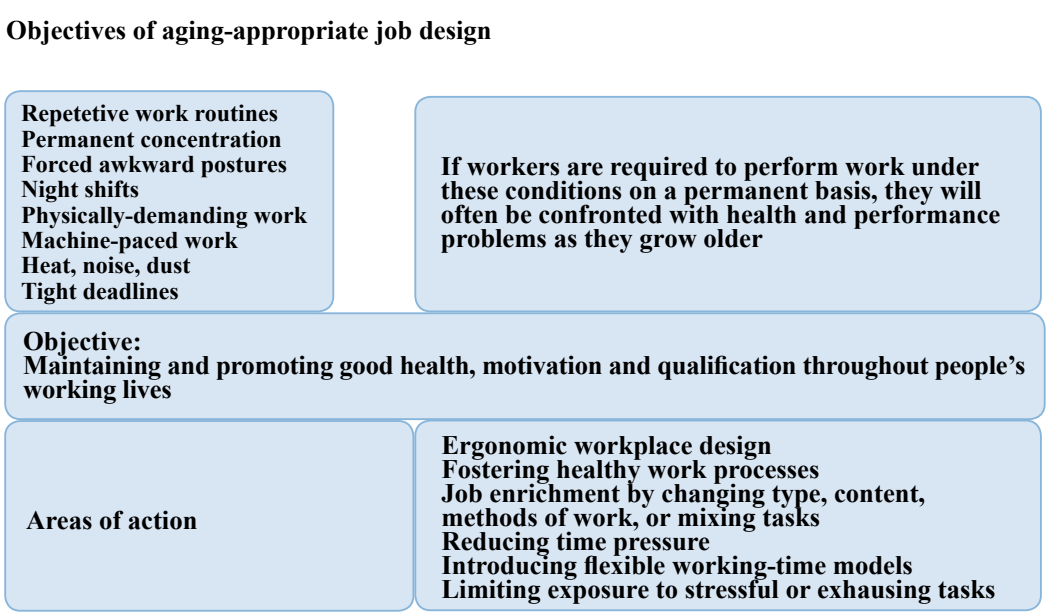

Figure 8. Objectives of aging-appropriate job design (Buck, 2007).

A successful organization is the one that is constantly focused on innovation generated from talented, motivated, and satisfied employees. People's attitudes and behavior regarding their jobs can be shaped as much by the structure of the company within which they work as by the personalities that they possess and the groups and teams of which they are a part (Buchanan & Huczynski, 2011). In the context of the changing workplace, Totterdill (2007, p. 14) identified three key arenas of learning and innovation characteristic of the "high road", posing real challenges and choices for each organization:

- Knowledge, innovation, and creativity are all valued and placed close to the heart of the work process at all levels of the organization.
- Partnership and dialogue establish the preconditions for a workplace environment in which the instigation and ownership of innovation are widely distributed.
- Team working becomes a defining characteristic of all aspects of work, both routine and developmental. In this sense, it emerges less as a formulaic model than as an approach to work organization, which broadens job design and challenges both hierarchical and horizontal demarcations in order to optimize levels of agility and innovation. It also provides the day-to-day context for enhancing quality of working life.

A major study conducted by the Chartered Management Institute investigated the future of work and management in 2018 (Mullins, 2010) under the clear idea that "no single study can be all-embracing since every organization is unique…" (p. 801). But among the recommendations tailored for leaders, six cluster opportunities were spotted, each potentially leading to an organizational capability enhancement. Among them, the organizational agility should ensure that the inherent potential and energy of the employees will be utilized, while organizational innovativeness should encompass the ability to nurture and use natural creativity, developing new ideas and realizing them. Also, the results of a study conducted by Sadikoglu and Zehir in 2010 showed that employee performance has a significant and positive effect on innovation performance and benefits the overall firm performance. Employees who are satisfied in their jobs are more willing to accept organizational goals and values; they also are more motivated and more willing to exert effort for the company (Schmidt, 2007). In order to build a culture that fosters innovation, an organization must hire for innovation talent, build teams that are diverse in talent, and fit individuals to the right role to drive success (Krieger, 2010).

Human capital (Ricardo, 2010) is the most expensive resource any corporation can possess; it is the people who do the work. Every new product, service, or idea is a coordinated effort by humans, so keeping an employee's mind focused on work is an important function of the organization (Ricardo, 2010). Managers (must) boost subordinates expectancy levels and motivation by providing training so that people have all the expertise needed for high performance and increasing their levels of autonomy and responsibility as well as gaining experience so that they have the freedom to do what it takes to perform at a high level (Ricardo, 2010, p. 14, according to Jones & George, 2010, p. 300). This new state of mind encourages people to be (Negri, 2000) job owners, team players, and motivated contributors who don't simply execute a task, but think about it, release ideas, make decisions, and carry out proper initiatives. The key to Lowe's recipe (Lowe, 2001) is a "bundle« of human resources and work organization practices he calls workplace innovation. Lowe (2000, p. 15) defined workplace innovation through (a) functional flexibility (% of unit's non-managerial employees participating in one or more of job enrichment, job enlargement, multi-skilling/job rotation, self-directed work teams, quality circles/ problem solving teams); (b) flexible schedules (regular use of flexible working hours); (c) training (% of unit's employees trained in past year); (d) formal participation programs (% of unit's non-managerial employees taking part in one or more of employee suggestion programs, attitude surveys, direct information sharing); and (e) information sharing (on strategic planning, budgets, workforce reductions, and quality issues at an early stage in the process). But "there is no single prescription that will work for every workplace, that's why it's important to decentralize responsibility to the unit manager and his or her workers, to tap their creative potential" (Lowe, 2001, p.2). Managers, therefore, need to provide an enabling work environment that enhances collaboration and team networking to encourage employee initiative to innovate (Dauda, 2010) and managers should possess and practice leadership and team management skills that include the following: settings directions; effective communication; motivating and inspiring team members; publicity acknowledging and showing appreciation for contribution of team members; considering the interests of others when making decision or planning, building trusting relationship; mobilizing full participation of team members; continuously communicating organizational team vision; influencing and motivating the external partners to collaborate; and representing strategies (of organization, team, project) to other stakeholders in the organizations and demonstrating respect for people.

Apart from the above stated individual characteristics, compensatory activities play an important role. According to Sell (1983), the following characteristics are crucial for a job to satisfy human needs: degree of autonomy; responsibility; permit to variations in task, pace, and method; performance feedback; job competition; degree of social contact; learning opportunities; and job goals (Chaneta et al., 2011). The right organizational conditions can make a breakthrough more likely (Dyer et al., 2009, p. 62). According to Kelly Services (2010), in all regions (North America – 33%; Asia Pacific – 40%, and mostly in Europe – 42%) the main expectations from a workplace is more interesting/challenging work, and higher salary/benefits are in the second place (North America – 27%; Europe – 21% and Asia Pacific – 20%), so job enrichment is a "natural pathway".

Job Enrichment

The concepts of job enrichment (Grose, 1976, p. 84) were introduced by Frederick Herzberg in 1959 in *The Motivation to Work*. One of Herzberg`s major premises is that job satisfaction and dissatisfaction are not necessarily opposites. In his view, the opposite of job dissatisfaction is no job dissatisfaction. Factors of dissatisfaction represent a psychologically unhealthy work environment, so are labeled as hygiene. Poor work hygiene results in poor job attitude. Factors of hygiene include supervision, administrative policies, interpersonal relations, physical work conditions, salary, staff benefits, and job security. When these factors drop to a level that the employee considers unacceptable, job dissatisfaction occurs. But an upgrading of these factors to a high level does not ensure the state of job satisfaction; it only creates no dissatisfaction. For Herzberg, the factors that result in an improved level of satisfaction are related to the employee's need for self-realization. These improvement factors are motivators and include job controls, responsibility, decision-making power, and accountability. Both hygiene and motivators are factors that meet employee's needs, but only motivators can result in long-term levels of job satisfaction. Herzberg's conclusion was to use vertical loading factors in order to achieve job

enrichment. Those factors are methods for enriching work and improving motivation by removing controls, increasing accountability, providing feedback, new tasks, creating natural work units, and special assignments, and offering additional authority. But really, the described approach, at that time called job enlargement, began with an initiative of IBM in the mid-1940s, which included both enlargement and enrichment of the jobs, intending to introduce more interest, variety, and significance into the work (Jacko, 2004, according to Miner, 2002).

Within the structure of any job there are certain characteristics that are amenable to change: variety, interaction, responsibility, pay, knowledge and skills, working conditions, and feedback. But only a few of these can enhance job satisfaction and the attitude of the employee toward work. Those employees who desire job esteem and self-realization from their jobs are excellent candidates for job enrichment. Job enrichment places a certain degree of stress in the psychological environment of the employee because of its emphasis on increased responsibility and higher accountability. Job enrichment offers a solution to "donkey work" (Grose, 1976, p. 84).

According to the work of Hackman et al. (1975, p. 57), which began with the pioneering work of Herzberg and his associates, job enrichment is enthusiastic, sometimes even messianic, about what it can accomplish. Moreover, job enrichment (Hackman et al., 1975, p. 57-60) has been described as yet another "management fad," as "nothing new," even as a fraud; on the other hand, job enrichment is assumed by management to be the solution to "people problems" on the job and is implemented even though there has been no diagnostic activity to indicate that the root of the problem is, in fact, how the work is designed. Hackman et al. (1975, p. 60-65) developed a "new technology" for use in job enrichment – a set of diagnostic tools that are useful in evaluating jobs and people's reactions to them prior to change and in pinpointing exactly what aspects of specific jobs are most critical to a successful change attempt. And more importantly, they introduced five "implementing concepts" for job enrichment as a specific action step aimed at improving both the quality of the working experience for the individual and their work productivity, which are:

1. *Forming natural work units.* The principle underlying natural unit of work, by contrast, is "ownership"—a worker's sense of continuing responsibility for an identifiable body of work.
2. *Combining tasks.* The principle of combining tasks, then, suggests that whenever possible existing and fractionalized tasks should be put together to form new and larger modules of work. Some tasks, if combined into a meaningfully large module of work, would be more than an individual could do by themself.
3. *Establishing client relationships.* One consequence of fractionalization is that the typical worker has little or no contact with (or even awareness of) the ultimate user of their product or service. By encouraging and enabling employees to establish direct relationships with the clients of their work, improvements often can be realized simultaneously on three of the core dimensions. Feedback increases because of additional opportunities for the individual to receive praise or criticism for their work outputs directly. Skill variety often increases, because of the necessity to develop and exercise one's interpersonal skills in maintaining the client relationship. The contact between worker and client should be as great as possible and as frequent as necessary.
4. *Vertical loading.* Typically, the split between the "doing" of a job and the "planning" and "controlling" of the work has evolved along with horizontal fractionalization. Its rationale, once again, has been "efficiency through specialization." And once again, the excess of specialization that has emerged has resulted in unexpected but significant costs in motivation, morale, and work quality. In vertical loading, the intent is to partially close the gap between the doing and the controlling parts of the job – and thereby reap some important motivational advantages. When a job is vertically loaded, it will inevitably increase in autonomy.
5. *Opening feedback channels.* In virtually all jobs, there are ways to open channels of feedback to individuals or teams to help them learn whether their performance is improving, deteriorating, or remaining at a constant level. While there are numerous channels through which information about performance can be provided, it is generally better for a worker to learn about this performance directly as they do their job, rather than from management on an occasional basis. Exactly what should be done to open channels for job-provided feedback will vary from

> job to job and organization to organization. Yet in many cases, the changes involve simply reinventing existing blocks that isolate the worker from naturally occurring data about performance rather than generating entirely new feedback mechanisms. Many organizations simply have not recognized the importance of feedback as a motivator. Data on quality and other aspects of performance are viewed as being of interest only to management. Worse still, the standards for acceptable performance often are kept from workers as well.

The implementing concepts are tied directly to the diagnostic tools; the output of the diagnostic activity specifies which action steps are likely to have the most impact in a particular situation.
The main question that arises is: *Is the job enrichment theory correct?*

In general, the answer seems to be yes. At the time, research results were dramatic (Hackman et al., 1975, p. 69): quantity of work was increased by 39.6%; by the end of the study, the number of operators with poor performance had dropped from 11.1% to 5.5%; the experimental group registered a 24.1% decline in absences and the experimental group's overall satisfaction score rose 16.5%.

Job enrichment in the academic library offers great opportunities for change, with improvement in staff morale, greater utilization of personnel, and improved services as the result (Grose, 1976), so it can enhance innovative work. The job enrichment theory we may follow is the work of Martell and Untawale (1983, p. 340) when they described job enrichment as a process by which a person gains greater control over those factors that directly affect his or her job. It also stresses the humanizing and self-fulfilling potential of an expanded organizational role, including: *scheduling* (when you do what during the day); *decision making* (meaningful involvement in the decisions that affect your tasks, your job, and your role); *meaning* (who does your work help and how important does it seem to you); and *feedback* (the information that you receive on how your efforts contribute to the goals of your unit, users, etc.). In the work of Cunningham and Eberle (1990), job enrichment is one of the alternatives to traditional methods for job design and redesign that can have a negative impact on productivity and employee morale and the main focus is on job content. Job enrichment (Kamery, 2004; Robbins et al., 2010) refers to the vertical expansion of jobs that provides for increased worker responsibility (i.e., planning and evaluating duties, etc.). It increases the degree to which the worker controls the planning execution and evaluation of the work. According to Kamery (2004, p. 141), greater responsibility increases job depth (worker control) and results in employee empowerment, and this empowerment often leads to a higher quality of output and employee motivation since workers feel connected to their jobs. Hereafter, job enrichment could be a mixture of empowerment upgraded with responsibility in order to oversee the whole process of a certain role. Job enrichment (McShane & Von Glinow, 2005, p. 189) occurs when employees are given more responsibility for scheduling, coordinating, and planning their own work.

Therefore, a job should be organized in a way to allow the employee to do a complete activity. An enriched job organizes task so as to allow the worker to do a complete activity, increases the employee's freedom and independence, increases responsibility, and provides feedback so individuals will be able to assess and correct their own performance (Robbins et al., 2010, p. 176). Job enrichment is a tool for improving employee motivation through satisfying a need for more challenge (Erven, 2010). Job enrichment increases the complexity of the work (Mullins, 2010). Giving employees the responsibilities normally allocated to supervisors offers individuals more autonomy by removing the supervisory role or redesigning it to involve other activities more in line with their talent and offering greater opportunities for psychological growth.

But in the end, it is important to establish a "job fit" with the work that candidate enjoys. Then an employee becomes a better judge of their own actions, striving for active participation and innovative thinking towards betterment of the organization and personal growth. Job enrichment (Accel Team, 2005) is one of the main tools in the managers' toolbox for motivating the team, with other tools including: approval, praise and recognition; financial initiatives; and good

communications. Job enrichment is likely to be counterproductive when employees do not have these higher-level needs and such employees are likely to see job enrichment as a little more than employers trying to take advantage of them and frustrating them unnecessarily (Erven, 2010). So, critics argue that workers may dislike enrichment for several reasons – some employees may prefer a "Taylorist workplace" because of the "intensification of work"; employee security is conditioned by market success; no job description; and entrepreneurial role.

Job enrichment includes a number of different workplace practices, such as quality circles, self-directed teams, job rotation, information-sharing, and others. Enriched jobs, by encouraging workers to learn and innovate at work, increase the motivating potential of work. The enlargement and enrichment of jobs allow employees more control over their working environment and greater opportunities for innovation, enhanced learning, workplace health, and quality of working life (Totterdill, 2007). Having more control over a task, the employee is more disposed and more open to innovativeness (Saavedra & Kwun, 2000; Dodd & Ganster, 1996). Oladele et al. (2010) stated that structuring jobs and roles correctly is very important in elevating the motivation of employees, which is addressed by job enrichment. Effective job enrichment mechanisms that can encourage (technology) innovation are those based on and are of the following types (Dauda, 2010, according to Blauner, 1972):

- A complete piece of work in the sense that the engineers and scientists can identify tasks or activities that end in a recognizable and definable product and services – *focus is on self-teams;*
- A job that affords the employee as much variety, decision-making responsibility and control as possible in carrying out the work – *focus is on engagement*;
- Direct feedbacks are provided through the work itself on how well the employee is doing the job – *focus is on feedback* (open communication).

Therefore, the main element which management should pay attention to is job design. Job design (Chaneta et al., 2011) has two aims: (a) to satisfy the requirements of the organization for productivity, operational efficiency and quality of product or services; and (b) to satisfy the needs of the individual for interest challenge and accomplishment. In terms of job design, the main approaches to achieve increased job satisfaction are job rotation, job enlargement, autonomous work group, and job enrichment. People need to be motivated in achieving organizational goals in order to achieve their own goals. To have a positive impact, some of the gains of employee involvement must be transferred to employees in the way of stable employment, better pay, and /or greater job satisfaction (González, 2009). The aim is to ensure a job that will be interesting, that will seek new opportunities, rely on self-teams, self-control, people's trust, responsibility, and open communication, and that will be focused on the well-being of their employees, a healthy environment, etc.

Van Gyes (Gonzáles, 2009), on the other hand, concluded that there is a link between direct participation and innovation, and that direct participation is more likely to be more extensive in the presence of indirect participation – although this latter connection does not apply to SMEs. So, direct participation means: insights and commitment to business goals; autonomy to make suggestions and improvements; enhancement to knowledge flows; enrichment of management decision; and culture of commitment and support. And indirect participation means: guidance for employees during process of change; conflict arbitration; feedback opportunity for management; and a driver and defender of innovation. Job enrichment (Erven, 2010) is a response to employees ready for more responsibility, variety, and challenge. For job enrichment success, the key settings are (Erven, 2010): employee attitude – wanting more; employees must be able to handle the enriched jobs that are being developed for them; managers need to consider carefully each employee's physical capabilities: and mental skills, organizational competence, and capacity for learning before inviting an employee to take on an enriched job.

Job enrichment that goes beyond job enlargement to add greater autonomy and responsibility to a job is based on the job characteristics approach (Chaneta et al., 2011, according to Turner & Lawrence, 1985). Job enrichment aims to maximize the interest and challenge of work by providing the employee with a variety of tasks. It is not just increasing

the number or variety of tasks, nor is it the provision of opportunity for job rotation. Job enrichment pays more attention to employee needs than to the needs of the business – in particular, it responds to the employee need for achievement, self-esteem, and self-fulfillment (Erven, 2010). The advocates of job enrichment claim that these approaches may relieve boredom. Job enrichment (Ashraf, 2008) must redesign jobs to provide opportunities for achievement, recognition, responsibility, and growth. For Ashraf (2008), it is comprised of a variety in work contents, greater use of skills, and opportunity for growth by providing employees with a complete unit of work and increased authority.

Numerous researches have investigated what managers can do to facilitate innovation inside organizations and found that individuals whose work has characteristics of meaningful decision making and autonomy are more innovative (Aiman-Smith et al., 2005). The authors (Aiman-Smith et al., 2005) also suggested a Value Innovation Potential Assessment Tool, which contains validity and reliability and measures important factors leading to value innovation. One of these factors (among risk-taking culture, customer orientation, agile decision-making, open communication, and empowerment) is meaningful work – work that each person knows has impact in the organization and with customers. The research showed that meaningful work plays a crucial role in individual professional development and innovation (Aiman-Smith et al., 2005). Job enrichment (Wagner & Hollenbeck, 2010, p. 119) methods include many techniques designed to add complexity and meaning to a person's work. As the term enrichment suggests, this kind of intervention targets jobs that are boring because of their repetitive nature or low scope. Although enrichment cannot always improve all employees' reactions to work, it can prove very useful (Wagner & Hollenbeck, 2010, p. 119).

McShane and Von Glinow (2005) suggested that there are two ways to enrich jobs: clustering task into natural groups (stitches highly interdependent tasks into one job) and establishing client relationship (involves putting employees in direct contact with their clients rather than using the supervisor as a go-between), but the heart of the job enrichment philosophy is to give employees more autonomy over their work. Mohr and Zoghi (2006) suggested enrichment strategies such as job rotation, information sharing, teams, quality circles, and classroom training as all positively associated with job satisfaction and proposed the following enrichment practices:

- Participate in employee survey;
- Participate in suggestion program;
- Participate in job rotation;
- Be informed about workplace changes;
- Participate in task team;
- Participate in quality circle;
- Be a part of self-directed workgroup; and
- Receive classroom training.

These practices have been neglected in working and managing SMEs over the years. Another research study (Oladele et al., 2010, p. 2923) suggested the utilization of the following job enrichment techniques:

- Removal of control of a subordinate;
- Assign a complete unit of work that can be done by a subordinate without following job procedure;
- Provision of feedback directly to employee by supervisor;
- Assignment of new or specialized tasks;
- Rotating assignments or job schedules;
- Implementing participative management;
- Removal of difficult section of assignments;
- Adjusting performance target;
- Reduction of control of a subordinate;
- Provision of additional authority to subordinates;
- Increasing the degree of decision making of subordinates;

- Encouraging increased use of techniques;
- Increasing the amount of recognition for a job well done;
- Involvement of subordinates in the identification and solution of problems that affect them and the organization;
- Provision of employees with the feelings of belonging; and
- Combination and /or rearrangement of tasks to be more challenging.

If we know that the main expectation from a workplace is more interesting/challenging work (Kelly Services, 2010), we will encourage enterprises to make efforts and apply some of these job enrichment techniques, strategies, and practices. Certainly, in the beginning it may take some time and effort for an employee to accept the change, but in the end the result will be job satisfaction and enhanced innovation. We should bear in mind that no employee wants to be worthless to their organization. They need fulfillment, which is what job enrichment can ensure, and the key lies in the measures that should be the vision of each organization.

Issues, Controversies, Problems

After 40 years, job enrichment once again becomes an organizational issue because the survival of any business depends on employee performance and companies thrive to give value to the everyday working environment and to innovate the workplace. Although in practice we are using words such as team work, participative management, empowerment, etc., they are really used to enrich the job. Have enterprises reached collectivity using team work? Are all employees actively involved in innovation? Is innovation harmonious? …or are these just words with no meaning!? Human capital, not financial, must be a starting point and ongoing foundation of a successful strategy (Bartlett & Ghoshal, 2002). According to Gibs et al. (2006), empirical evidence from large organizations (Cohen & Bailey, 1997; Lawler et al., 2001) suggests a trend toward teams and human resource practices associated with "job enrichment" (i.e., multitasking instead of specialization and greater employee discretion), but there is no evidence that the same practice can enhance innovativeness in SMEs. Aiman (Smith et al., 2005, p. 37) stated that numerous researches confirmed that individuals whose work is meaningful and who have autonomy to make decisions and speak about issues are more innovative. However, the problem is how to achieve making that work meaningful and what level of autonomy to grant employees. To wit, is it possible to use job enrichment techniques in order to foster SMEs' innovativeness? The question is also how to explain to companies that job enrichment is not a "social" interference in an organization, but a positive investment that will – along with other necessary changes with respect to morals, ethics, and social responsibility – foster innovativeness in every employee.

Solutions and Recommendations

The starting point of this work in order to catch up with Enterprise 2020 is in changing the workplace. Moreover, SMEs should start with a new approach to innovation introduced as Total Innovation Management (Qingrui et al., 2007), in which innovation is not a simple call for every employee to get involved in the process of innovation, but should be a process that involves five types of transformation (Qingrui et al., 2007):

- From specialist innovation to collective innovation (let everyone be an innovator);
- From "force me to innovate" to "I want to innovate" (let everyone take part in innovation actively and proactively);
- From isolated innovations to harmonious innovation (integrating everyone's innovative action into the organization);
- From focusing on development of the organization to co-development of the organization and individual (to drive a firm's growth and satisfy staff needs at the same time); and
- From single-function innovations to multi-function innovations (to maximize the impact of innovation).

As Bill Hewlett (one of the co-founders of HP) once said, "Men and women want to do a good job, a creative job, and if they are provided the proper environment, they will do so" (Qingrui et al., 2007, p. 19). So we suggest job enrichment as a non-imitable job design that depends on organizational culture, enterprise size, level of used enrichment techniques, etc. Gibs et al. (2006) also explained that job design is a fundamental issue in organization design. It indicates which task should be put together in the same job, what skills and training are needed, what decisions the employee is allowed to make, and with whom the employee works – all are crucial for efficiency and innovation. These issues have long been a focus of job enrichment, but from the point of view of social psychology. So job enrichment from an organizational perspective can ensure dynamic organization in the future (Liu, 2007) in order to encourage employees to be more creative, innovative, and work harder. According to Liu (2007), it should be recognized that the key point for the development of small and medium enterprises (as it is in China) is dependent on whether the enterprise is attractive enough for more talent and whether the enterprise can keep them in the future. Burton et al. (2005) suggested that a high performance workplace focuses on increasing people's influence on business as well as the impact of processes, methods, physical environment, and tools and technology that enhance their work and implement a so-called holistic organizational approach, which means featuring flat hierarchical structures, job rotation, self-responsible teams, multi-tasking, and a greater involvement of lower-level employees in decision-making (Vaskova, 2007).

Future Research Directions

Job enrichment needs in everyday practice merit a detailed analysis. This chapter has demonstrated the theoretical link between organizational innovativeness, workplace innovativeness, and job enrichment in order to encourage enterprises to strategically use job enrichment as a managerial tool to enhance organizational innovativeness. It further reinforces the need to understand if job enrichment is really applicable; if it is accepted in SMEs; to define which job enrichment strategies and/or techniques enable employees to be innovative; to differentiate job enrichment techniques for service and for the manufacturing sector; and to understand if it is a job enrichment strategy and/or a technique dependent on gender, etc. So future research could usefully expand the range of factors investigated to focus on more positive factors that may be related to enrichment. This may also help to elucidate the method of job enrichment. Finally, while there is much research on general motivational factors that can be used for employee motivation, this study suggests a need for more understanding of the ways in which job design and workplace innovation can enhance employee innovativeness. This will require case studies as well as field research for which this theoretical research may be useful.

Conclusion

Today's jobs are really complex and often employees' expectation are that jobs should be organized in a way to allow the employee to do a complete activity. Most employees seek – because of motivational factors – autonomy, responsibility, and their own control. In return, they are commited, innovative, and overall interested in the work they do. Companies must also be aware that job enrichment can be counterproductive when employees do not have these higher-level needs because of the aggravation of every day work, employee security that depends on market success/customer satisfaction, no job description, entrepreneurial roles, etc. But the main expectation from a workplace is more interesting/challenging work (Kelly Services, 2010), so job enrichment should be considered a solution for that.

The experiment conducted in Croatia on organizational innovations in the entire manufacturing industry showed that Croatian manufacturing companies use innovative organizational concepts and are not new to them. They use them at a medium to high level, but those concepts are used more for improving quality and productivity than for innovation activities. Intra-organizational structural innovations are already well established in companies; for example, teamwork has been in use since 1992 and task integration has been a part of job enrichment since 1995 and used as a potential to enhance innovativeness. However, companies must be aware of the fact that task integration is only a small part of job enrichment techniques, so future companies' intentions should take into consideration other elements of job enrichment.

It is positive that the companies are aware that if they want to attract good, committed, innovative employees and keep them, they should transform the workplace from simple, monotonous, and uninteresting to an interesting, complex, stimulating, and fulfilling one, all this aiming at increasing innovation that may add new value, ensure competitiveness, and bring business success for the company.

Job enrichment is a process that potentially fosters greater responsibility at work, allowing employees the authority over work, flexible working time, part-time schedules, etc. In other words, in an economic sense, it is a holistic organizational theory**.** Job enrichment is one of the alternatives to traditional methods for job design and redesign and the main focus is on job content (Cunningham & Eberle, 1990). It refers to the vertical expansion of jobs (Kamery, 2004; Robbins et al., 2010); could be a mixture of empowerment upgraded with responsibility in order to oversee the whole process of a certain role (McShane & Von Glinow, 2005, p. 189); is a tool for improving employee motivation through satisfying a need for more challenge (Erven, 2010); and increases complexity of the work (Mullins, 2010). Main characteristics of job enrichment could be (a) *autonomy* which gives power and includes the degree of freedom, independence and decision-making which helps in completing tasks of each employee; (b) *responsibility* helps to speed up work processes by enabling the employee to make decisions, especially today when people want 24/7 services; (c) *client connections* because feedback represents information about job performance is obtained by the employee environment ; and (d) *grouping employees into teams* and allowing them to plan, make decisions, and complete their goals. But all stated places a certain degree of stress in the psychological environment of the employee because of its emphasis on increased responsibility and higher accountability, especially if people are not ready (i.e., older employees) for new workplace demands. The very purpose of job enrichment is to improve the quality of an employee and motivate them to accomplish more. For job enrichment success, the key settings are (Erven, 2010): employee attitude – wanting more; employees must be able to handle the enriched jobs that are being developed for them; managers need to consider carefully each employee's physical capabilities and mental skills, organizational competence, and capacity for learning before inviting an employee to take on an enriched job.

Although many companies are providing training sessions or team work or collective decision making, there is always the question: Are their employees aware of that? Is the change real? We cannot always talk about only job enrichment. But, there is no doubt that organizational innovativeness needs to be a new organizational method in firms' business practices for workplace organization (OECD, 2005). Rubalcaba et al. (2011) suggested job enrichment as an intra-organizational, procedural method to enhance organizational innovativeness. This new state of mind encourages people to be (Negri, 2000) job owners, team players, and motivated contributors that don't simply execute a task, but think about it, release ideas, make decisions, and carry out proper initiatives. If we know that a new form of work organization is considered to be the key element and an integral part of the Lisbon Strategy, European companies should seek an innovative workplace to meet environmental expectations.

Nowadays in enterprises, too often restrictions do not allow employees to perform tasks in unique and valuable ways, but if enterprises provide more control over a task, the employee is more disposed and more open to innovativeness (Saavedra & Kwun, 2000; Dodd & Ganster, 1996). SMEs are specific because their innovations are their work (experimenting, improvising and trying ideas) and this work is based on personal passion, customer connection, agility and adaptation, experimentation and improvisation, resource limitation, information sharing, and collaboration (King & Ockels, 2009). In other words, SMEs naturally and unintentionally use lots of job enrichment strategies (i.e., the market is their "lab" (client relationship), all employees are innovation specialists, combining tasks because of the small number of employees, etc.) SMEs utilize employees' creativity as well, which can be enhanced and appreciated by granting them the freedom to work in areas of their own interest (Dauda, 2010) – that is, to "see" and "feel" their importance and belonging to the organization and enhance their commitment to everyday work. In the end, we can conclude that although every organization is unique, job enrichment in different enterprises is influenced by various factors and conditions, but could be a pattern toward innovation for SMEs.

Endnotes

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CHAPTER 11

Vojko Potocan[1], Zlatko Nedelko[2]

Influence of Employees' Values on Organizational Innovativeness

Abstract

In the current economic conditions all organizations and especially small and medium enterprises (SMEs) must, as the most important or frequent carriers of entrepreneurial activities in societies, continually innovate their working and behavior. The level of possible innovativeness of SMEs depends on synergetic combination of external and internal factors. In most cases organizations have no important influence on external factors. For that reason we focus our research on internal factors, and within that framework, on research of employee's (i.e. of SME stakeholders) understanding and/or perception of innovative working and creation of innovations in SMEs. From the content-related viewpoint, the ability of SME stakeholders to improve innovativeness depends on getting subjective and objective factors to act in one accord. In the paper we treat one of the subjective factors – i.e. some selected values – as a basis to research and understand differences between SME stakeholders' perception about innovativeness of organizations for chosen SMEs in specific areas of research. The present contribution considers two basic problems: (1) How to create a more holistic approach to improving the innovativeness of SMEs by applying a general framework process model for invention-innovation-diffusion process (IIDP) to foster innovation, and (2) How SMEs stakeholders understand/evaluate innovativeness in their SMEs, based on considered selected values.

Keywords: *Employees, Innovation, Innovativeness, Organization, Personal values.*

Introduction

Twenty percent of humankind live in advanced, innovative societie whereas the remaining 80% are too-poorly-innovative 80 % (Hage & Meeus, 2009; Fink & Kraus, 2009; Potocan & Mulej, 2009; Rebernik et al., 2010). The European Union (see EU, 2004, p. 4) defined innovation as "every novelty found beneficial in experience and judgment of its users". It is not up to authors of new ideas about product/service, process, management, etc. to define which novelty is an innovation, but up to its users/customers. For that reason, we can conclude, that innovation = invention + successful commercialization/use (Afuah, 1998; Rogers, 2003; Fagerberg et al., 2006).

Development of societies in an era of globalization demands their ongoing care to assure that innovation occurs in their work. The key role in modern societies belongs to enterprises as business systems (BSs), as the most influential group of institutions (Schumpeter 1934; Casson, 1982; Kuratko, 2008; Shane, 2008; etc.). Enterprises can also be considered as human, ecological, technical, legal, managerial, etc. systems — in which case other parts of their attributes are focused on. Most BSs are the small and medium enterprises (SMEs); in Europe about 99 % of all enterprises are SMEs, employing more than 50 % employees (Korten, 2009; Tidd & Bessant, 2009; Rebernik et al., 2010). SMEs try to satisfy needs and demands of their social and business environments connected to efficiency, quality, range, uniqueness, innovativeness, sustainability, and social responsibility of working (Hebert & Link, 1989; Katz, 2003; Lester & Piore, 2004; Potocan & Mulej, 2007; Conway & Steward, 2009; Fink & Kraus, 2009; etc.).

SMEs try to create and implement thinking of everything crucial on the same level, or even better, than the bigger enterprises. Due to limited resources and given conditions of work, SMEs can improve their work by innovating their working style and behavior through realization of the technological and, even more, non-technological innovations.

Why are innovations (and especially non-technological innovations) so important for SMEs? An SME itself is only an empty legal shell — an organizational structure. Owners (and other stakeholders) of SMEs are the ones define aims and direct their work. From a content viewpoint an SME is a product of the owners' or managers' endeavor to exploit a business opportunity and to capitalize on it. Most entrepreneurs plan and perform in the way that matches their work with the innovative and constructive image that humans usually have of economic entrepreneurship (Baumol, 1990; Drucker, 1993; Baumol, 2001; Barabba, 2004; Sheshimski et al., 2007). Meeting these requirements depends also on influential stakeholders of SMEs (and their subjective and objective factors); it does not only depend on the institutional order alone (Rhinesmith, 1999; Swedberg, 2000; Mullins, 2006; Huczynski & Buchanan, 2007).

Management of SMEs is a complex process, and the entrepreneur who runs it has to play many different roles (Lawrence & Weber, 2007; Kuratko, 2008; Greene, 2009; Pyka & Scharnhorst, 2009; etc.). If we wish to understand the human side of SMEs' working and behavior, we must consider the mutual interdependence and synergetic integration of several objectives and subjective factors of all important stakeholders of an SME on all important organizational-hierarchy levels of their working relationship (i.e. individual, group, organizational, and environment levels).

Based on our current research, data on SMEs, innovations, IIDP, innovation management (Potocan & Mulej, 2007; Potocan, 2008; Potocan, 2009; Potocan & Mulej, 2009), and cognitions from relevant literature (Rhinesmith, 1999; Drucker, 1993; Gloor, 2006; Huczynski & Buchanan, 2007) we propose the following theses:

1. The SMEs' innovativeness can be increased with the development of more holistic process models of general framework for IIDP/innovations.
2. The innovativeness of SMEs largely depends on the values of SME stakeholders. The SME stakeholders' attitude towards the IIDP/innovations is importantly influenced by their VCEN and especially their system of values. It is also closely related to their entrepreneurial spirit resulting in entrepreneurship.

Innovativeness and Entrepreneurship of SMEs

The literature provides numerous different notions and definitions of entrepreneurship. On the basis of purpose and selected goals, entrepreneurship can be considered from several viewpoints, as e.g. a legal feature (Davila et al., 2006; Gloor, 2006; Potocan & Mulej, 2007; Tidd & Bessant, 2009), an economic feature (Schumpeter, 1934; Casson, 1982; Kuratko, 2008), and as displaying psychological and sociological attributes of the entrepreneurs' personalities (Robbins, 2002; Whittaker & Cole, 2006; Daghfous, 2007; Hage & Meeus, 2009).

Entrepreneurs and/or other entrepreneurial humans support IIDP/innovations (Lester & Piore, 2004; Leydesforff, 2006; Chesbrough, 2009). In the current economic circumstances, actual SMEs must be viewed as inventions that are supposed to become innovations. This approach goes beyond merely managing the SMEs' products. All influential stakeholders must be persuaded in a process for the transition from invention to innovation to happen.

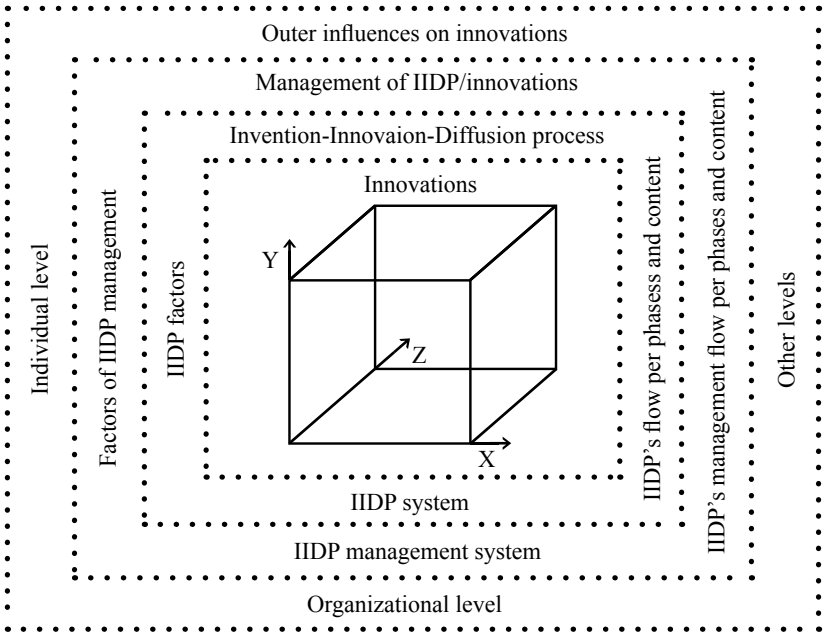
The formation of the innovative work of SMEs depends on most SMEs' stakeholders' cognitions and understanding of the role and importance of innovation. Often, owners, entrepreneurs, and managers of SMEs are specialists in their professional (especially engineering) area(s) with less knowledge and experience about: interdisciplinary cooperation, holistic understanding of IIDP, innovations and management of IIDP. The possibilities of SMEs to innovatively design their work also depend on several objective factors, e.g.: persons running SMEs often do not have many co-workers or do not have enough co-workers from different business areas; they are very good in e.g. engineering, but less good in running a business like a SME; the needed sources for innovative work / transformation of SMEs (for example human, financial, etc.) are limited (Katz, 2003; Gloor, 2006; Fink & Kraus, 2009). In many cases a genuine entrepreneur produces an enterprise rather than a product, etc. (McGregor, 2006; Greene, 2009).

Both in theory and business practice many different models of innovation, innovation of business, and management of IIDP/innovation have been developed. The basic goal of these models is to assure the needed additional knowledge and support for innovative work of BSs and/or SMEs (Rhinesmith, 1999; Huston & Sakkab, 2006; Smith, 2006; Huczynski & Buchanan, 2007; Skarzynski & Gibson, 2008; Conway & Steward, 2009).

Below we present our new process model of the management of IIDP/innovation developed (see e.g. Potocan & Mulej, 2010) in the frame of the research about the influence of innovation on companies. Why do we need another model for consideration of innovations? Neither theory nor practice offer a solution for trying to consider this topic more holistically. On the other hand, in business reality, SMEs try to simultaneously learn and define similarities between different cognitions of innovation managers in order to define the requisite unification of consideration, to learn to know, and to quite objectively clarify differences among different theoretical cognitions (e.g. definitions, theories, models) as bases for understanding the potential differences in consideration of IIDP/innovations.

Our general framework for research of innovations management of SMEs/BSs is requisitely holistic and unified. The general framework of the model is meant to match the needs of mastering of the process with the chosen cognitions and their model presentations on IIDP/innovations, and innovation management.

Managers try to attain unification of consideration of the tackled problems by using four criteria (as viewpoints of consideration) defining the general framework for innovation management, which are: Innovations, IIDP, Management of IIDP/innovation, and outer influences on innovations (for more information see e.g. Potocan, 2008; Potocan, 2009; Potocan & Mulej, 2009; Nedelko & Potocan, 2010; Potocan & Mulej, 2010). (See Figure 1).



X - FACTORS OF INNOVATIONS
- internal factors (e.g. human resources, structure, technology, products/services, culture, etc.)
- external factors (e.g. market conditions, legislation, etc.)

Y - CHARACTERISTICS OF INNOVATIONS
- types of innovations
- sorts of innovations
- forms of innovations
- extent of innovations
- importance of innovations
- etc.

Z - CONDITIONS FOR INNOVATIONS
- considered internal conditions
- considered external conditions

Figure 1. The model of general framework for research of innovations management of SMEs.

We start designing and defining the general and hence unifying framework of the management of IIDP/innovation with the discussion about innovations. Our basic goal is to form a unified content-related treatment of innovations to more easily study IIDP in a given organization. Innovations are defined in our model on the basis of their chosen factors, characteristics, and (pre)conditions. The cognitions about innovations are used to enable the choice of the most appropriate theoretical model for content-related discussion of IIDP and as content-related framework for the use of the chosen model. The presented model can also be used for inventions, but now we do not research the activities for the realization of the entire IIDP.

The next phase covers the process discussion of the same IIDP/innovations. The research of process innovation is unified/generalized based on: the research of IIDP factors (all important individual, group-specific, and general factors), the IIDP system (definition of the chosen system approach, resulting definition of the IIDP system), and IIDP's flow per phases and content. Thus, our demands and needs for mastering of the given IIDP, as well as criteria for the selection of the most suitable IIDP model for further work are defined. The IIDP takes place with the use of the chosen process model (as both the whole basic process and its parts).

To reach the aims, IIDP must be managed. The unified/generalized preparation of the IIDP management is defined on the basis of the research of the factors of IIDP management (all important individual, group-specific, and general factors of management), IIDP management system (definition of the chosen system approach to management, resulting definition of the IIDP management system), and IIDP's management flow per phase and content. Thus, our needs and demands for the research and definition of criteria for the selection of the most suitable model of IIDP management are defined. After this step, one chooses the management model and uses the chosen model to research the IIDP management (both management as whole and its basic parts/phases).

The next viewpoint of mastering of the general framework requires mastering of the information flows serving the IIDP as the selected basic process and its management. We will not consider this part of the entire process in any detail here. We are limiting ourselves to consideration of IIDP management in terms of the research of external and internal influences, which importantly define (directly or indirectly) characteristics and flow of IIDP. A unified model of influence on IIDP is defined on the basis of research of the (chosen) important factors of influence on individual, organizational (organization as whole and /or parts of organization), and broader, e.g. the community's, social levels. Which levels of the influence are included in the model and to what extent each single level is researched, depends on the researchers' intention and characteristics of the researched field.

Synergetic influences on the general framework of IIDP, its management and information are reflected in the chosen models; all levels of research combine subjective (e.g. knowledge, values, emotions, talents) and objective factors (e.g. needs in the market, possibilities in organization) of all crucial participants/stakeholders.

In other words: SMEs become more innovative mainly on the basis of innovative working and behavior of their stakeholders. Improving the level of innovativeness of stakeholders also crucially depends on innovativeness of all SME's stakeholders, and their current VCEN, especially their personal values.

The following question arises: how can we change an SME's stakeholders if the SME wants to work more innovatively? From a broad range of topics/viewpoints about the role and importance of VCEN for SMEs' innovativeness, we focused on the consideration of relations between values connected with innovativeness of SME's stakeholders and SME's innovativeness, and the needs to innovate both of them.

The Role of Values for Innovativeness of SMEs

There are two main approaches to values (and/or whole VCEN) of working/behavior of SMEs as BSs rather than biological, social, environmental, etc. systems. Some see SME's values as a complex unified group of values which mostly derive from society (and/or other important environments) via norms from prevailing VCEN (Swedberg, 2000; Mullins, 2006; Huczynski & Buchanan, 2007; Conway & Steward, 2009). This approach includes differences between social sciences (like philosophy, sociology, and psychology), and organization culture and other sciences (like business sciences, etc.). Other authors see SME's values just as a result of interests, motives, etc. of the most influential group within the organization (Robbins, 2002; Mullins, 2006; Huczynski & Buchanan, 2007; Fink & Klaus, 2009). This means that there are many different definitions of values of SMEs and/or SMEs stakeholders. No unification is easy to accept on a very general level.

For more about the role and importance of the entire VCEN of SMEs see, e.g. Becker and McClintock (1967), Rokeach (1973), Hofstede (1994), Schwartz (1992). For more about values in the innovation of working and behavior of SMEs, see e.g. Swedberg (2000), Cavanagh (2005), Potocan and Mulej (2007), and Chesbrough (2009). But this presents a problem: understanding the possibilities for changing values and, hence, changing VCEN. Leaving aside the current knowledge and theories in philosophy and sociology, our research is based on findings from psychological research, chiefly the work of Rokeach (1973) and Schwartz (1994). These researchers focus on empirically detecting the real state of values and responses to issues related to the topic of values.

Various authors share a relatively unified understanding and definition of the basic functions of values (Rokeach, 1968; Hofstede, 1994; Schwartz, 1994). They claim that the values' basic functions direct individuals' behavior, the solving of conflicts, decision making, and motivation. Every person has a relatively personal and possibly broad set of values, which he/she forms as a hierarchy of values, i.e. a value system. In the same way values on all levels of the human action can be worked on.

An individual's value system (including all forms of his/her actions on various societal levels) is a relatively durable and stable organization of his/her values; but their hierarchy can change along with changes in society, culture, personal experience, etc., which influence the changing of the relative importance of single values for the given individual (and the organized forms of his/her actions) (see Rokeach, 1973, p. 11). Of course, changing of values is a complex and long-lasting process; it can support or hinder IIDP. Our consideration of it is based on the findings of many theorists that the process of changing of values comprises only, or mostly, changes of the relative importance of single values inside the value system rather than changes in the structure (content related) of the value system itself (Becker & McClintock, 1967; Rokeach, 1973; Schwartz, 1992; Hofstede, 2001).

For SMEs and/or SME stakeholders the values (and other parts of VCEN) make important building blocks/elements of working and behavior of SMEs' stakeholders (Schwartz, 1992; Cavanagh, 2005; Mullins, 2006; Potocan, 2009). Figure 2 presents building blocks of ability (Adapted from Mullins, 2006). From SMEs' viewpoint, the IIDP is primarily based on knowledge, experiences and competences, but SMEs also try to improve other basic blocks of their working – e.g. values of SMEs' stakeholders.

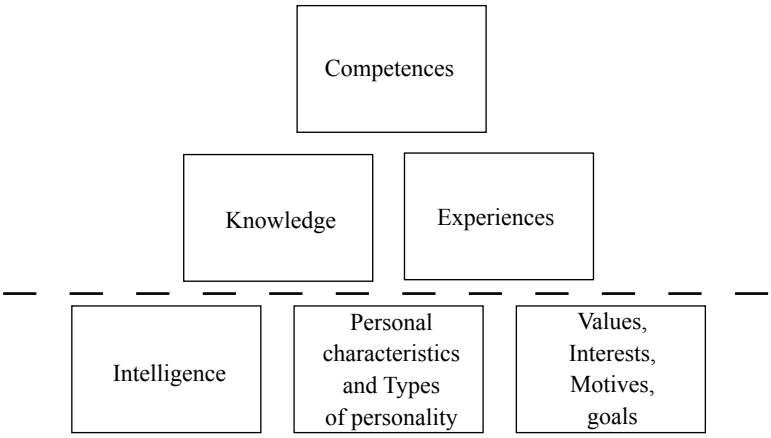


Figure 2. Building blocks of ability.

Importance of SMEs' stakeholders' values for understanding of their innovativeness is acknowledged both in literature on, and practice of, SMEs and/or innovativeness of SMEs. But there is no shared opinion on the way in SMEs should transmit values to SMEs' stakeholders, and vice versa, to cause VCEN from the influential ones' values to prevail.

SMEs' stakeholders' attributes can, most generally, be defined on the basis of attributes of their working and behavior in SMEs (Becker & McClintock, 1967; Rokeach, 1973; Potocan & Mulej, 2007; Potocan, 2008; Potocan, 2009). In line with the findings of various authors we may conclude that working/behavior of SMEs' stakeholders is first of all impacted by their cognitive bases and values (and/or entire VCEN and/or parts of VCEN). Inside this framework it is generally true, that the crucial personal values of SMEs' stakeholders influence the attributes of their working/behavior. The cognitive bases of VCEN of SMEs' stakeholders can influence their SME in two ways:

- The crucial VCEN of stakeholders (and especially the values of stakeholders) influences the SME's process indirectly, through the SMEs stakeholders' cognitive bases; or
- A synergetic impact of the cognitive bases and values of SMEs stakeholders (and/or all their VCEN) takes place.

For a requisitely, rather than (the impossible) totally, holistic consideration of working/behavior of stakeholders in SMEs one must take into account at least a further three groups of factors: impacts from SMEs' environments, bounded rationality and irrationality of individuals, and their selective perceptions (Potocan & Mulej, 2007; Potocan, 2008; Potocan, 2009). The influence of values/VCEN on SMEs, SMEs IIDP and SMEs stakeholders is presented in Figure 3.

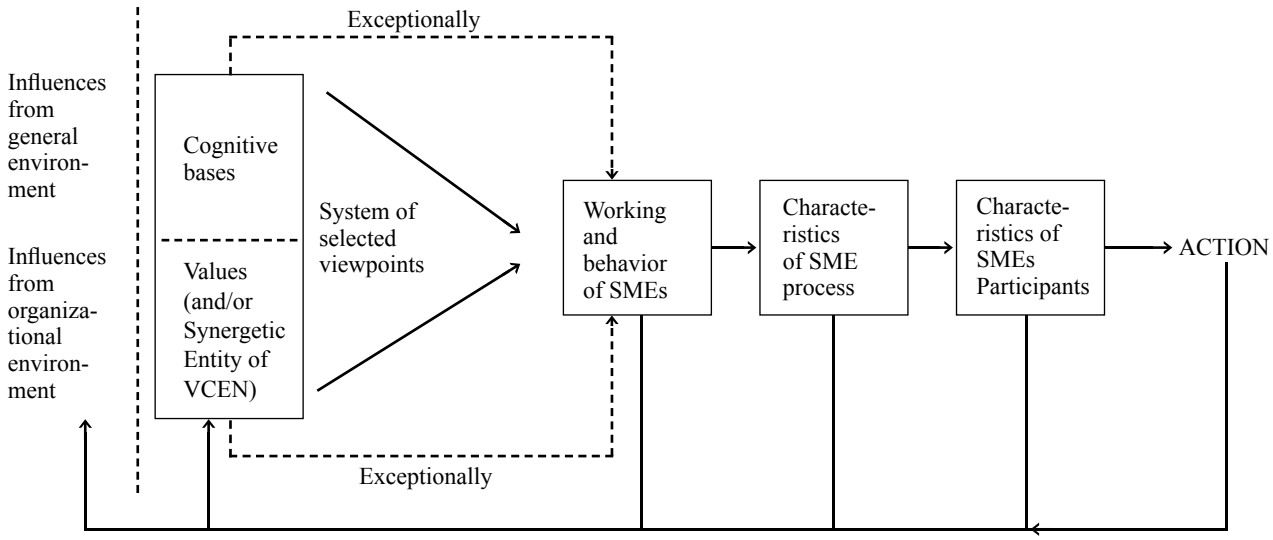


Figure 3. Influence of SME stakeholders on SMEs process.

Figure 3 allows us to conclude that SME stakeholders' values (inside his/her VCEN) have an essential (but not exclusive) impact on the realization of the SME's IIDP: 1) indirectly by determining the perspective on important topics; and 2) as the values of SME stakeholders influence their own working and behavior, which indirectly impacts on the SMEs' IIDP and characteristics (such as values) of stakeholders.

Survey about Innovativeness of SMEs Stakeholders

The impact of SME stakeholders' personal values on perceptions of IIDP/innovations has been widely recognized in literature as well as in business practice (Swedberg, 2000; Gloor, 2006; Potocan & Mulej, 2007; Sheshimski et al., 2007; Skarzynski & Gibson, 2008). In that frame several authors focused their research on examining the relationship between perceptions of IIDP/innovations and SME stakeholder's personal values.

Our work is based on the following assumptions: perceptions of IIDP/innovations are driven by the cognitive basis and VCEN of SME's stakeholders; selected important SME's stakeholder personal values importantly determine (and/or influence) their perceptions of IIDP/innovations. For more about the importance of selected personal value for SME's stakeholders perceptions of IIDP/innovations see e.g. Hage & Dewar (1973), O'Reilly et al. (1991), Chatman & Jehn (1994), Potocan & Mulej (2007), Potocan (2008), and Tidd & Bessant (2009).

Different authors measuring relations between single criteria of innovativeness (of SME's stakeholder) and assigned personal values (of SME's stakeholder) were tested and validated (for more details see O'Reilly et al., 1991; Russell & Russell, 1992; Cavanagh, 2005; Potocan & Mulej, 2007; and Nedelko & Potocan, 2010).

In that frame we focus on examination of importance of the selected SME's stakeholder personal values (See e.g. Schwartz (1992), Schwartz (1994)): (1) Creativity, (2) An exciting life, (3) A varied life, and (4) Ambitious.

Methods

Our data were obtained through a field survey of personal values of SME stakeholders' in Slovenian and Croatian SMEs in 2010. The Slovenian part of the sample consisted of 111 stakeholders in small enterprises (less than 50 employees) and 62 stakeholders in middle-size enterprises (i.e. 50 to 249 employees), altogether 173 SME's stakeholders. The Croatian part of the sample consists of 124 stakeholders in small enterprises and 102 stakeholders in middle-size enterprises, altogether 226 SME's stakeholders. Micro enterprises were not considered in our research in either country. Samples in both countries were relatively representative. There were organizations from all areas - i.e. we had a relatively representative regional coverage; the sample matched the basic-activity structure of organizations, with a good fit to the industry-based structure of both economies.

In line with the proposed hypotheses we measured the importance of SME stakeholders' personal values which importantly influence SME's stakeholders' perceptions about IIDP/innovations. For measuring personal values of SME's stakeholders "The Schwartz Value Survey (SVS)" was used (Schwartz, 1994). Respondents rate each personal value, using a 9-point Likert-type scale, ranging from "opposed to my values" (-1) to "of supreme importance" (7) (See also Ralston et al., 1997; Yammarino et al., 2005).

We started our research by the testing normality of distribution for variables considered in our research (see Table 1).

Table 1. One-Sample Kolmogorov-Smirnov test for testing normality of distribution.

		An exciting life	Creativity	A varied life	Ambitious	Working experience
N		397	398	397	397	392
Normal parameters[a,,b]	Mean	3.26	4.82	4.24	4.70	1.49
	Std. Deviation	2.072	1.521	1.815	1.547	.500
Most extreme ifferences	Absolute	.143	.173	.183	.202	.348
	Positive	.094	.121	.098	.119	.348
	Negative	-.143	-.173	-.183	-.202	-.334
Kolmogorov-Smirnov Z		2.856	3.446	3.653	4.028	6.882
Asymp. Sig. (2-tailed)		.000	.000	.000	.000	.000

a. Test distribution is normal. b. Calculated from data.

Table 2 presents descriptive statistics for personal values of SMEs' stakeholders.

Table 2. Descriptive statistics for personal values of SME's stakeholders.

	N	Mini-mum	Maxi-mum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
An exciting life	397	-1	7	3.26	2.072	-.282	.122	-.849	.244
Creativity	398	-1	7	4.82	1.521	-.900	.122	.989	.244
A varied life	397	-1	8	4.24	1.815	-.595	.122	-.148	.244
mbitious	397	-1	8	4.70	1.547	-.831	.122	.798	.244
AValid N (listwise)	387								

Based on the Kolmogorov-Smirnov Z test we can conclude that variables are not normally distributed. But regarding research practice violation of normality the distribution was not markedly violated (see Ralston et al., 1997; Leech et al., 2008). To test Hypothesis 1 (and it's further four partial hypotheses) we therefore chose the Mann-Whitney U test for two independent samples.

In some cases the assumption of homogeneity of variances has been violated. This problem could be regarded as less important since SPSS uses the regression approach to calculate ANOVA (more about that see Leech et al., 2008). To test Hypothesis 2 (and its further four hypotheses) we used factorial ANOVA due to the requirements for testing hypotheses. Factorial ANOVA is a robust test in case of a slight violation of normality; therefore it could be used in our case. Only hypothesis 2 is empirically tested (see Chapter Introduction).

Hypothesis 2a: Differences exists regarding SME stakeholders' perception of innovativeness between employees of SMEs in Slovenia and Croatia.

In the frame of the above presented starting points, H2a is further divided in several (partial) hypotheses; for each personal value of an SME's stakeholder there is one hypothesis. SPSS output for Mann-Whitney U Test for selected values is presented in Tables 3 and 4.

Table 3. Results of Mann-Whitney Test for Selected personal values of SME stakeholders.

Ranks				
	COUNTRY	**N**	**Mean Rank**	**Sum of Ranks**
Creativity	Croatia	225	184.98	41,619.50
	Slovenia	173	218.39	37,781.50
	Total	398		
An exciting life	Croatia	224	222.53	49,846.50
	Slovenia	173	168.53	29,156.50
	Total	397		
A varied life	Croatia	224	177.33	39,722.00
	Slovenia	173	227.06	39,281.00
	Total	397		
Ambitious	Croatia	224	186.10	41,685.50
	Slovenia	173	215.71	37,317.50
	Total	397		

Table 4. Test Statistics for Selected Personal Values of SME's stakeholders.

	An exciting life	**Creativity**	**A varied life**	**Ambitious**
Mann-Whitney U	14,105.500	16,194.500	14,522.000	16,485.500
Wilcoxon W	29,156.500	41,619.500	39,722.000	41,685.500
Z	-4.704	-2.945	-4.353	-2.613
Asymp. Sig. (2-tailed)	.000	.003	.000	.009

Based on the results of Mann-Whitney U test and mean values for single personal values of SME's stakeholders we can conclude as follows:

- Creativity – the results indicate that there is a significant difference between median importance of value "Creativity" of Slovenian and Croatian SME's stakeholders (Mann-Whitney U statistics is 16,194.500, Z=-2.945, p=0.003). The mean values indicate that for Slovenian SME's stakeholders the value "Creativity" is more important (M=5.03) than for Croatian SME's stakeholders (M=4.66). Hypothesis H2a1 is supported.
- An exciting life – the results indicate that there is a significant difference between median importance of value "An exciting life" of Slovenian and Croatian SME stakeholders (Mann-Whitney U statistics is 14,105.500, Z=-4.704, p=0.000). The mean values indicate that for Croatian SME's stakeholders the value "An exciting life" is more important (M=3.71) than for Slovenian SME's stakeholders (M=2.67). Hypothesis H2a2 is supported.
- A varied life – the results indicate that there is a significant difference between median importance of value "A varied life" of Slovenian and Croatian SME's stakeholders (Mann-Whitney U statistics is 14,522.000, Z=-4.353, p=0.000). The mean values indicate that for Slovenian SME's stakeholders the value "A varied life" is more important (M=4.67) than for Croatian SME's stakeholders (M=3.91). Hypothesis H2a3 is supported.
- Ambitious – the results indicate that there is a significant difference between median importance of value "Ambitious" of Slovenian and Croatian SME's stakeholders (Mann-Whitney U statistics is 16,485.500, Z=-2.613, p=0.009). The mean values indicate that for Slovenian SME's stakeholders the value "Ambitious" is more important (M=4.91) than for Croatian SME's stakeholders (M=4.53). Hypothesis H2a4 is supported.

Hypothesis 2b: Differences exists in considered SME's stakeholders' personal values, regarding to the impact of: (1) country of origin, (2) SME's stakeholders work experiences, and (3) their interaction effect.

In the frame of above presented starting points, H2b is further divided into several (partial) hypotheses; for each personal value of SME's stakeholder one hypothesis.

Creativity – differences exists in considered SME's stakeholders' personal value "Creativity", regarding the impact of: (1) country of origin, (2) SME's stakeholders work experiences, and (3) their interaction effect. SPSS output for Factorial ANOVA are presented in Table 5, Table 6, and Table 7.

Table 5. Univariate analysis of variance – between-subjects factors.

		Value Label	N
COUNTRY	25	Croatia	218
	26	Slovenia	173
Working experience	1	Less than 19 years	201
	2	More than 19 years	190

Table 6. Levene's test of equality of error variances.

Dependent Variable: Creativity			
F	df1	df2	Sig.
.430	3	387	.732

Tests the null hypothesis that the error variance for the dependent variable is equal across groups.
Design: INTERCEPT + COUNTRY + EXPER + COUNTRY * EXPER

Table 7. Tests of between-subjects effects.

Dependent variable: Creativity								
Source	**Type III sum of squares**	**df**	**Mean square**	**F**	**Sig**	**Partial Eta squared**	**Noncent. parameter**	**Observed powerb**
Corrected model	18.300a	3	6.100	2.661	.048	.020	7.984	.648
Intercept	8,187.690	1	8,187.690	3,572.023	.000	.902	3,572.023	1.000
COUNTRY	12.795	1	12.795	5.582	0.19	0.14	5.582	0.654
EXPER	.505	1	.505	.220	.639	.001	.220	.075
COUNTRY * EXPER	2.185	1	2.185	.953	.330	.002	.953	.164
Error	887.070	387	2.292					
Total	9,964.000	391						
Corrected Total	905.371	390						

a. R Squared = ,020 (Adjusted R Squared = ,013)
b. Computed using alpha = ,05

Based on results (see Table 7) it is evident that the main effect of "Country" is significant, F(1,387) =5.582, p=0.019. From the Estimated Marginal Means, it can be seen that SME's stakeholders in Slovenian SMEs regard the value "Creativity" more important (M=5.050) than their Croatian counterparts (M=4.666) (see Table 8).

Table 8. Country of SMEs' stakeholder origin.

Dependent variable: Creativity				
COUNTRY	**Mean**	**Std. error**	**95% Confidence interval**	
			Lower bound	**Upper bound**
Croatia	4.666	.106	4.458	4.873
Slovenia	5.050	.124	4.807	5.293

While the main effect of "Working experience" is not significant, F(1,387)=0.220, p=0.639, from the Estimated Marginal Means, it can be seen that the difference in importance of the value of "Creativity" for SME's stakeholders with less than 19 years of work experience (M=4.820) is not significantly different from the importance of value "Creativity" for SME stakeholders with more than 19 years of work experience (M=4.896) (See Table 9).

Table 9. SMEs' stakeholder working experience.

Dependent variable: Creativity				
Working experiance	**Mean**	**Std. error**	**95% Confidence interval**	
			Lower bound	**Upper bound**
Less than 19 years	4.896	.108	4.683	5.109
More than 19 years	4.820	.121	4.581	5.058

Interaction effect of an SME's stakeholder country of origin and SME's stakeholders working experience is not significant, F(1,387)=0.953, p=0.330. Therefore we can conclude that the effect of SME's stakeholder country of origin on importance of value "Creativity" is not dependent upon the working experiences of SME's stakeholders.

Results reveal that SME's stakeholders in Slovenia with less than 19 years of work experience value "Creativity" lower than those with more than 19 years of work experience. Regardless of working experience, SME's stakeholders in Slovenia value "Creativity" higher than SME's stakeholders in Croatia. SME's stakeholders in Croatia with less than 19 years of work experience value "Creativity" higher than their counterparts with more than 19 years of work experience (see Table 10).

Table 10. Interaction effect of SMEs' stakeholder country of origin and working experience.

Dependent variable: Creativity					
Working experiance	**COUNTRY**	**Mean**	**Std. error**	**95% Confidence interval**	
				Lower bound	**Upper bound**
Less than 19 years	Croatia	4.783	.166	4.456	5.110
	Slovenia	5.008	.139	4.734	5.283
More than 19 years	Croatia	4.548	.130	4.292	4.804
	Slovenia	5.091	.204	4.690	5.492

We can conclude that the impact of SME stakeholders per country of origin has an important (i.e. significant) influence on SME's stakeholders' perception of the value "Creativity", while working experience does not have significant influence. Interaction effect is not significant.

A detailed presentation of statistics for next three (partial) hypotheses exceeds the allowed space for our contribution. The details of their characteristics for further statistics research can be obtained from authors upon request.

An Exciting Life

An exciting life – differences exists in SME stakeholders' personal value "An exciting life", regarding the impact of: (1) country of origin, (2) SME's stakeholders' work experience, and (3) their interaction effect.

The main effect of "Country" is significant, $F(1,386)=38.610$, $p=0.000$. From the Estimated Marginal Means, it can be seen that SME stakeholders in Croatian SMEs regard value "An exciting life" as more important ($M=3.822$) than their Slovenian counterparts ($M=2.511$).

The main effect of "Working experience" is significant, $F(1,386)=16.506$, $p=0.000$. From the Estimated Marginal Means, it can be seen that SME's stakeholders with less than 19 years of work experience regard value "An exciting life" as more important ($M=3.595$) than those SME's stakeholders with more than 19 years of working experience ($M=2.738$).

We can conclude that the impact of SME's stakeholder of country of origin has an important (i.e. significant) influence on SME's stakeholders' perception of value "An exciting life", as well as working experience. Interaction effect of Country and Work experience is not significant.

A Varied Life

A varied life – differences exists in SME's stakeholders' personal value "A varied life", regarding the impact of: (1) country of origin, (2) SME's stakeholders' work experience, and (3) their interaction effect.

The main effect of "Country" is significant, $F(1,386)=9.745$, $p=0.002$. From the Estimated Marginal Means, it can be seen that SME's stakeholders in Slovenian SMEs regard value "A varied life" as more important ($M=4.584$) than their Croatian counterparts ($M=3.998$).

The main effect of "Working experience" is significant, $F(1,386)=10.284$, $p=0.001$. From the Estimated Marginal Means, it can be seen that SME's stakeholders with less than 19 years of work experience regard value "A varied life" as more important ($M=4.592$) than those SME's stakeholders with more than 19 years of work experience ($M=3.990$).

We can conclude that the impact of SME's stakeholders per country of origin has important (i.e. significant) influence on SME's stakeholders' perception of value "Creativity", as well as working experience. The interaction effect of Country and Work experience is not significant.

Ambitious

Ambitious – differences exists in SME's stakeholder's personal value "Ambitious", regarding the impact of: (1) country of origin, (2) SME's stakeholders' works experience, and (3) their interaction effect.

The main effect of "Country" is not significant, $F(1,386)=2.990$, $p=0.085$. From the Estimated Marginal Means, it can be seen that the difference in the importance of value "Ambitious" for SME's stakeholders in Croatia ($M=4.541$) is not significantly different from the importance of value "Ambitious" for SME's stakeholders in Slovenia ($M=4.825$).

The main effect of "Working experience" is significant, $F(1,386)=3.894$, $p=0.049$. From the Estimated Marginal Means, it can be seen that SME's stakeholders with less than 19 years of work experiences regard value "Ambitious" as more important ($M=4.845$) than SME's stakeholders with more than 19 years of work experience ($M=4.521$).
We can conclude that impact of SME stakeholder of country of origin do not have important (i.e. significant) influence on SME stakeholders' perception of value "Ambitious". Working experiences have important (i.e. significant) influence on SME stakeholders' perception of value "Ambitious" regardless of SME's stakeholders' country of origin. Interaction effect of Country and Work experiences is not significant.

Some Conclusions

In our paper we tried to present the possible ways in which SMEs stakeholders (and other stakeholders') values influence innovativeness of organizations – i.e. SMEs. On the basis of selected theoretical models and hypotheses, we researched, developed and presented a more holistic approach to improving the innovativeness of SMEs with a process model of general framework for IIDP/innovations. On the basis of our experiences from business practice we compare our model with theoretical findings of other authors. Some parts of the presented model were verified using quantitative and quantitative analysis (see results of our other contribution e.g. Potocan, 2009; Potocan & Mulej, 2009; Nedelko & Potocan, 2010) on the basis of that we can conclude that our model offers a more holistic approach for improving the innovativeness of SMEs. We therefore support Hypothesis 1.

Next we examined relations between important values of SMEs stakeholders and innovativeness of SMEs. We first researched differences in SME's stakeholders' perception of innovativeness between employees of SMEs in Slovenia and Croatia. On the basis of four selected personal values of SME stakeholders we discovered differences of SME stakeholders' perception of innovativeness between employees of SME in Slovenia and Croatia. We continued our research by testing the differences of SME stakeholders' selected personal values, regarding the impact of: (1) country of origin, (2) SME stakeholders' work experiences, and (3) their interaction effect. The tests revealed differences in the considered SME stakeholders' personal values, regarding the impact of: (1) country of origin, (2) SME stakeholders' work experience, and (3) their interaction effect. We therefore support Hypothesis 2.

The above research findings present the basis for the future examination of relationships between SMEs stakeholder's personal values and innovativeness of SMEs.

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