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THE GLOBAL ECONOMIC CRISIS AND THE FUTURE OF EUROPEAN INTEGRATION

CREATING CONDITIONS FOR THE INNOVATION ACTIVITY OF SMALL AND MEDIUM-SIZED ENTERPRISES IN SLOVENIA

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Abstract: *The global economic crisis has exposed the structural weaknesses of Slovenian economy, which are reflected in the relatively low complexity and added value of products and services. The article stresses that an increase in added value can be achieved by strengthening the factors of innovation ability and human capital and by creating a stimulating environment for the operation of enterprises. An enterprise never innovates in isolation and hence one of the principal elements of the concept of innovation systems is the interconnection of the elements of an innovation system. It is not enough to merely analyze the elements of an innovation system; one must also explain their interconnections (networks), which in fact present a precondition for the transfer of knowledge among them. In light of the sufficient investments in research and development and in innovation and education, focus must be placed on increasing their effectiveness. Increasing innovation investments does not (necessarily) lead to increased innovation effectiveness. The article presents the conditions for successful implementation of the innovation activity of enterprises and explores how they are manifested in reality from the perspective of small and medium-sized enterprises in Slovenia.*

Keywords*: innovation activity, innovation system, knowledge, supportive environment, interconnections.*

1. Introduction

The global economic crisis has become part of our everyday life. Its consequences are clear. Consumers are increasingly rational in their behaviour and the process of purchase decision-making and, at the same time, they are more and more complex. On the

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other hand, providers are increasingly forced to ensure a comprehensive value and quality in a different manner from their competitors. This means that the necessity of constant changes is becoming an ever more important guideline in the operations of a company. If you have just developed a good product, your next thought should be how to improve that product. This kind of thinking means two things: you should strive to be competitive and actually beat the competition and, at the same time, compete with yourself and do new, better things every day - this forces us to make constant progress. And this is the essence of innovation activity. OECD (Oslo Manual, 2005, 47) defines innovation activity as all the scientific, technological, organisational, financial and commercial steps that (will) lead to the implementation of innovations.

Innovation activity starts as a complex thinking process which presents the development of an idea, and is constantly present in an individual. If these individuals are included in groups, there is mutual cooperation/action in the development of new ideas. Due to continuity and the number of participants, there are a lot of thinking processes, which is important for innovations. The creation of an idea presents the beginning of the process of innovation, whereas the innovation itself presents a successful launch of the idea on the market. On the one hand, the benefits of this idea are very clear and, on the other hand, there are only few introduced and implemented ideas (Drucker, 1992, 40). The main characteristic of innovation is that a society or system in which innovation exists does things in a different way rather than in the way that already exists.

Since innovation means a new feature with application value that can be measured, it is generally associated with the company as a market entity. This is understandable because the criterion of application and abilities of commercialisation are the most important for market entities, which connects the company with its existence. Of course, other conditions have to be met as well, which will be dealt with in this article.

The article presents results of the study conducted among Slovene small and medium-sized enterprises (SME) regarding conditions for a successful implementation of innovation activity. Firstly, let us explain in short the theoretical bases from which we derive: the national innovation system and the national innovation capacity, the Chesbrough concept of open innovation and networking in the field of innovation activity. This is followed by an analysis of the state in Slovenia and conclusions.

2. Theoretical Starting Points
National Innovation System (NIS)

The industry could not develop and use new technology anywhere, if institution did not ensure support services and qualified people. The same applies when technology is imported. This finding was transformed by the OECD into the definition of the National Innovation System (NIS), which was adopted in the 1990s. It is defined as "the system of institutions which together and separately contribute to the development of new technologies, and in the scope of which governments influence the innovation process by formulating and introducing policies.

The NIS includes five groups of organisations as follows: companies, universities, research institutions, organisations which promote scientific-technological progress and the state. If innovation is every useful thing, the aforementioned elements should be complemented by invention-innovation processes that are not part of R&D, the structure of

economic and non-economic activities besides industry, including innovation in the scope of the government, the prevailing culture / ethics / values rather than just knowledge (education and training) (Mulej, Žeko, 2004). The success of the NIS depends on the operation of individual institutions and especially the development of relationships and connections or a network of connections within the whole innovation system. Its development and an effective and successful operation of the NIS depends on the fluidity of knowledge flows. Therefore, we will analyse the context of cooperation between SMEs and other players of the NIS in Slovenia from the viewpoint of SMEs.

We will try to analyse if companies have the ability to learn (measured by investments in R&D), functional abilities (the implementation of the invention-innovation process) and strategic abilities – as well as the ability to understand the market and market demand. The limitation of the NIS approach is that it relatively neglects the question of the implementation of inventions (process), where an invention is confirmed on the market and becomes an innovation. For this critical factor, which is important for the decision of a company, to even enter the invention-innovation process, the (economic) motive for cooperation between SMEs and other players is the most important. Of course, we cannot disregard the support services within and outside a company.

National Innovative Capacity

In addition to certain characteristics of companies and the focus on innovations, the approach of national innovative capacity emphasises the importance of perception of potential partners for cooperation. National innovative capacity depends on three building blocks (Furman, Porter, Stern 2002, 905-907):

- *Common innovative infrastructure* (technological complexity and human and financial resources available for R&D): This involves the development of new technologies and public policy measures and related resources, such as investments in education and training, copyright protection, the tax measures associated with R&D and an openness to international trade.
- *Innovative environments of an individual country in clusters* (the environment in which concrete companies develop and commercialise their innovations): This involves conditions for demand, related and support industries, contextual conditions and levels of competition on the market or a company strategy.
- *The quality of connections between the aforementioned building blocks*: These connections can be provided by various institutions (e.g. universities, student clubs or commercial associations of a particular cluster). If there are not enough connections, it involves a risk that the benefits of scientific and technological discoveries will be reaped in other countries rather than being exploiting by the national economy.

The quality of connections is measured in the share of the whole expenditure of companies for R&D which is conducted by universities and the power of the venture capital market (Furman, Porter, Stern 2002, 909), or through the general quality of scientific-research institutions and the availability of venture capital for innovative, but risky projects (Porter, Stern, 2002, 7).

Our research primarily deals with realised cooperation, which is why this theoretical starting point has a limited benefit for us. Since we believe that the perception of the quality of a research organisation – as seen by SMEs – is definitely an important factor, we will check if SMEs find a research organisation an important source of information for innovation activity.

Open Innovation

Today, applicable knowledge is widely spread and companies cannot just effectively innovate, irrespective of their abilities or size. Chesbrough (2011) defines open innovation as the use of purpose-specific inflows and outflows of knowledge to accelerate internal innovations and expand the market for external use of innovations. His definition includes the external aspect of open innovation that refers to the introduction of ideas and technologies in a company and the internal aspect where the company's ideas and technologies that are not used or are used insufficiently are implemented in innovation processes outside the company. Open innovation is a more lucrative way of innovation for companies because it reduces their costs of development, increases the speed of entering the market, increases differentiation on the market and creates new sources of revenues.

Table 1: Differences among the principles of closed and open innovation

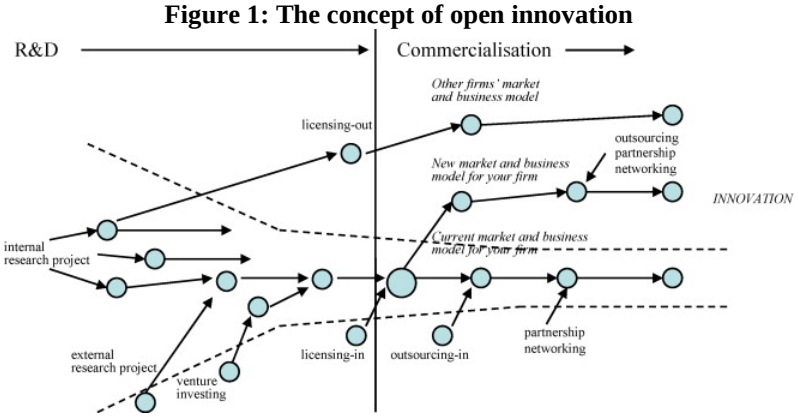
Closed Innovation Principles	Open Innovation Principles
The smart people in the field work for us.	If we create the most and the best ideas in the industry, we will win.
To profit from R&D, we must discover it, develop it, and ship it ourselves.	External R&D can create significant value: internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to the market first.	We don't have to originate the research to profit from it.
The company that gets an innovation to the market first will win.	Building a better business model is better than getting to the market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.

Source: http://www.openinnovation.eu/open-innovation/

According to Lee et al. (2010, 292), SMEs primarily use external sources as the way to access marketing and sales channels. The concept of open innovation is important for them because they have the necessary flexibility and specific knowledge, but they lack adequate capacities to manage innovation resources. The more complex the technology, the less management of the technology a company can ensure because the necessary knowledge is also outside the company. The figure below shows the concept of open innovation in SMEs, as defined by Lee et al. (2010).

SMEs use the concept of open innovation when they establish a partnership with another organisation that is actively involved in cooperation and significantly contributes to the innovation process, for example, by analysing the market, consumers and similar. Since SMEs face a lack of resources and capacities in open innovation, it is an important motive to cooperate with other organisations. At the same time, this is a limiting factor in seeking suitable partners to cooperate with. As an appropriate way of solving the problem of limitations, Lee et al. (2010, 293) propose an active role of an intermediary.

Figure 1: The concept of open innovation



Source: Lee et al., 2010, 292

A company can and should implement external ideas in the same way as internal ones because the central idea in the background of the open innovation concept is that companies cannot rely on their own research in the world where knowledge is so widely spread. Quite the contrary, companies should buy and licence processes and inventions, such as patents of other companies (Chesbrough, 2011).

In our opinion, the Chesbrough concept of open innovation shows that the understanding of the importance of knowledge outside a company is changing. If a company begins to act in accordance with the changed concept of knowledge, it facilitates more frequent cooperation with other organisations. Therefore, SMEs can solve the problem of limited resources if they know appropriate sources of knowledge. In the research, we explore if we can speak of open innovation in SMEs in Slovenia. In our opinion, greater staff mobility, the availability of venture capital and the technological progress contribute to increased co-creation and transfer of knowledge among social subsystems, which actually means open innovation.

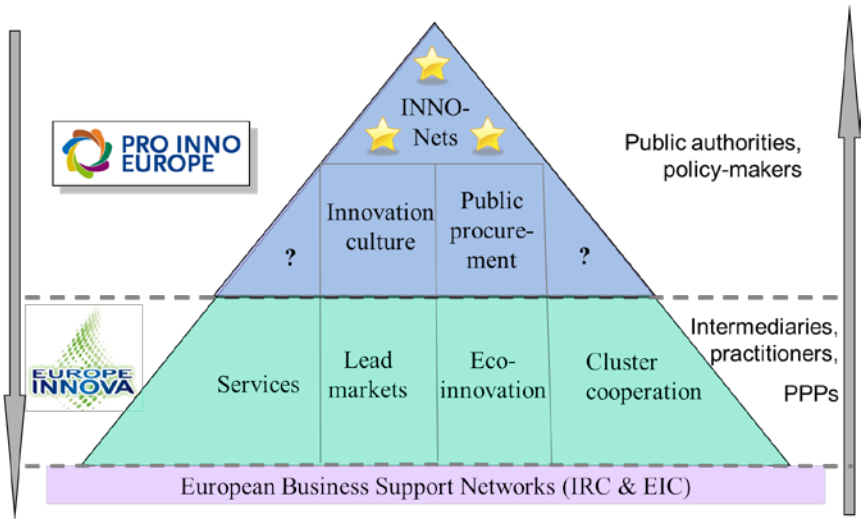
Networking (Mutual Cooperation) in the Field of the Innovation Activity of SMEs

When studying the network of connections on the inter-organisational market, attention should be paid to social capital. Lengnick-Hall (2003, 53) defines it as a network of relationships among employees and groups (within and outside companies) which provides information, helps solve problems, increases the base of buyers and other, meaning that it adds value and improves the strategic capabilities of a company. Bourdieu and co-authors (in McFadyen, Canella, 2004, 735) speak of social capital as mutual connections among people, and of resources embodied in these mutual relationships. Social capital is the key factor in understanding the process of creating knowledge. It directly influences the process of exchange and ensures a relatively easy access to the desired resources in the network.

With the aim of linking various players in an innovative environment and thus improve the competitiveness of the economy, Slovenia has established clusters,

technological networks, technological platforms and excellence centres that are mostly artificially created institutional organisations. A detailed analysis of the operation of these organisations in Slovenia was made in 2004 (Jaklič et al., 2004). With regard to the conclusions and proposals of the European Commission (2012), these organisations should be a lever to achieve the goal of the Europe 2020 strategy, i.e. the Innovation Union with innovative companies which create new high-value added jobs and innovative products that meet social needs and expectations.

Figure 2: The new innovation support pyramid



Source: Schierenbeck, 2007, 21

The horizontal connections in the form of clusters, excellence centres, technological networks, etc. are a particularly interesting approach for SMEs. SMEs can effectively replace their small size with greater flexibility and connections with others. In these forms of connections, it is important that a company is aware of its key competences and appropriately protects them. Mutual connections among companies can be manifested in numerous ways (Zajc, 2012, 42). Let us point out some of these connections: contracts on the implementation of R&D activity; the purchase of technology/prototypes developed at a university; informal networking – conferences, paper presentations and other similar events with the participation of representatives of the economy and the research sphere; joint companies or investments; various forms of temporary staff mobility in a public research organisation, such as staff substitution, sabbatical years and secondments; joint research studies and joint research programmes; the use of research premises and equipment at a university by companies, etc. *Why are SMEs interested in this kind of cooperation?* The table below lists the motives that lead representatives of both subsystems to cooperation.

Table 2: Groups of reasons for cooperation with a public research organisation (PRO) by companies and concrete motives

REASON	CONCRETE MOTIVE OF A COMPANY
Necessity	Answer to government initiatives and policies
	Strategic institutional policy
Asymmetry	Supervision of proprietary technology
Reciprocity	Hiring students or providing practical training
	Hiring researchers from PRO
Effectiveness	Commercialisation of technologies developed at a university
	Financial benefits from unpredictable research results
	Cost efficiency
	National incentives for cooperation
	Promotion of technological abilities and economic competitiveness of companies
	Shorter life cycle of products
	Development of human capital
Stability	Shift to the knowledge economy
	Company growth
	Access to new knowledge, the latest technology, research equipment, etc.
	Multidisciplinary character of the latest technology¤
	Access to research networks and other forms of cooperation
	Solution of specific problems
	R&D procurement from PRO due to lack of own capacities
	Reducing or dividing risks
Legitimacy	Improving the company's reputation

Source: Ankrah et al., 2007, p. 11, in: Zajc, 2012, 44

Numerous authors dealt with analyses of the *obstacles for innovations in SMEs* (e.g. Lee et al., 2010, Trotter, Vaughan, 2012, Xie et al., 2010). The emphasised obstacles in the aforementioned studies are: the costs of innovation activity, a lack of appropriate financial and human resources, an estimated high level of risk and a lack of marketing and technological information. We believe that the innovation activity of SMEs in Slovenia is hindered by other factors. They include the specific characteristics of the support environment and related culture, a lack of adequate knowledge (especially in terms of management and marketing), reduced demand and pessimism on sales markets as a consequence of the economic crisis as well as institutional and systemic obstacles (e.g. high burden on labour costs, particularly for experts).

We wish to research with whom SMEs cooperate and what the main obstacles for mutual cooperation are. This will serve as the basis for the analysis of networking by SMEs in Slovenia.

3. Methodology

3.1 The Purpose and Goals of the Research

In the analysis of conditions for the innovation activity of SMEs in Slovenia, we are primarily interested in how managers understand the importance of constant changes in a company, how they assess the support environment, the practice of open innovation and

their mutual connections (networking), and what presents obstacles and problems for innovation. The goals of the research are: to determine the most common obstacles of innovation activity, to analyse the role and success of the support environment and to analyse networking in the field of the innovation activity of SMEs in Slovenia. The focus on SMEs distinguishes our work from similar analyses that deal with a wider scope of innovation as the centre of their research (e.g. Bartlett, Čučković, 2006, Rašič, Markič, 2008, Rebernik et al., 2008), focus on other aspects and motives (e.g. Cigler et al., 2008, Zajc, 2012), or examine the views of companies (all sizes) as part of the analysis (e.g. Jaklič et al., 2008, Likar, 2003).

3.2 Research Method

We used a descriptive, non-experimental method of empirical research.

3.3 Sample

The basic population that was examined is represented by small and medium-sized enterprises in Slovenia. The research included 309 companies (10.7% of 2,897 companies participating in the research), of which 91 properly filled in the questionnaire. With regard to the Companies Act (ZGD, OGRS, No. 65/09), we divided companies on the basis of the fulfilment of three criteria: the average number of employees in the business year, their net sales revenues and the value of assets. Given the primary activity, and according to the Standard Classification of Activities, 26% of the surveyed companies were from the manufacturing sector, 10% from the retail, maintenance, the repair of motor vehicles and information and communication activities, 8% from professional, scientific and technical activities and various other commercial activities. There were 3% of companies from catering, transport and warehousing, education and financial and insurance activities. We should also mention that this is not a representative sample, which is why the results cannot be generalised per population.

3.4 The Process of Collecting Data

Data was collected in the last week of August and in the first week of September 2013 via an anonymous questionnaire prepared for directors, managers and heads or other employees in 2,897 companies. The companies' addresses were found in public databases (AJPES, IBON, IPIS, BIZI) or on their websites.

3.5 The Description of Measurement Instruments

Based on the survey questionnaire, we gathered the following data: the general information about companies, information about the importance of innovation and the reasons for innovation, information about the percentage of revenue for R&D per year, views on the importance of sources of information for innovation activity and views on whether a particular factor influenced the implementation of the companies' innovation activity in the 2010-2012 period as an obstacle or incentive.

Questions were formulated according to the scale model of the Likert type views. The scale levels for two questions were from 1 to 5, in a logical continuum from the

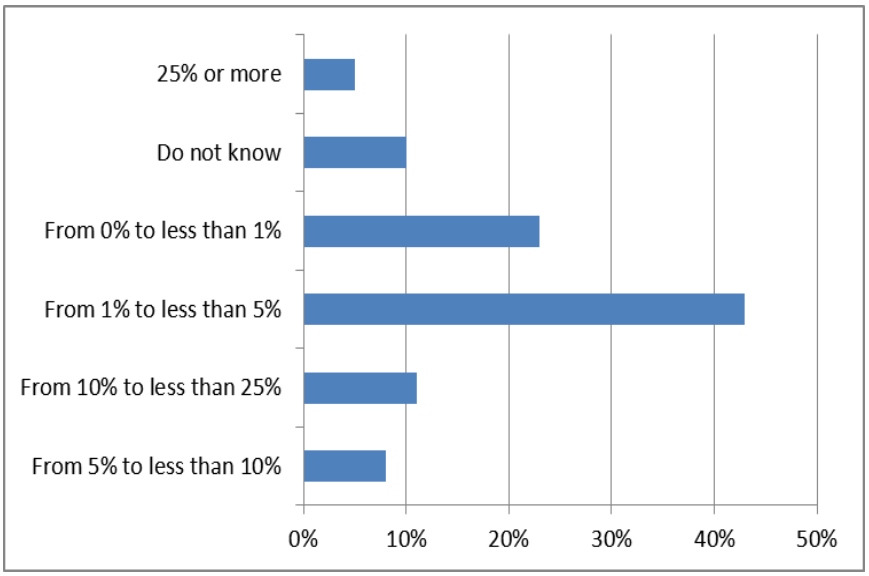
minimum to the maximum acceptance of views. In the case of two questions, the scale was divided into two opposite statement, where the positive answer was ranked from 1 to 5.

4. Results and Interpretation

4.1 The NIS and National Innovation Activity from the Viewpoint of SMEs

In the first set of questions, we examined the role played by the NIS in the operation of respondents. We asked them how much they invested in research and development, with which players of the NIS they cooperated and how they understood the market and its demand.

Graph 1: Investments in research and development per year (in % of the total revenues) (n = 61)



We found that almost half of the companies allocate 1-5% of their annual revenues for R&D, just over a tenth allocate 10-25% and a quarter allocate less than 1%, which is shown in Graph 1. R&D expenditure shows companies' moderate ability to learn, since they earmark a small percentage of funds for R&D. This is also partly confirmed by the replies of respondents with regard to the use and importance of sources of information for innovation activity. As we were interested in which sources of information companies use and how they assess the importance of these sources, we used a scale with 18 statements (a five-point Likert scale): 0 – unimportant, 5 – very important). Table 3 shows results for four most important and four unimportant sources of information for SMEs.

Table 3: The importance of sources of information for innovation activity (n = 53)

	unimportant-not a source of information	somewhat important	neutral	important	very important	$\bar{x}$	SD
Customers or buyers	4%	6%	9%	40%	42%	4.1	1.04
Learning from failure	6%	2%	25%	35%	33%	3.9	1.09
Learning from findings in testing and/or production	6%	2%	23%	38%	31%	3.9	1.07
Learning from research and development within your company or group companies	6%	4%	23%	38%	29%	3.8	1.09
Government and business delegations and other contacts at the international level	40%	25%	26%	6%	4%	2.1	1.11
Databases with patent applications	32%	30%	26%	11%	0%	2.1	1.01
Government or public research institutions, research partners	30%	26%	34%	9%	0%	2.2	0.99
Universities and other higher education institutions	29%	13%	37%	17%	4%	2.5	1.20

Companies mostly get information from customers or buyers (42%), through learning from failure (33%), learning from findings in testing and/or production (31%) and learning from research and development within the company or group companies (29%). Contrary to expectations, the companies attributed extremely low importance to universities, faculties, research institutes and professional and industry associations. As unimportant sources of information, the companies state the following: government and business delegations and other contacts at the international level (40%), databases with patent applications (32%), government or public research institutions, research partners (30%), universities and other higher education institutions (29%) and advisers, commercial laboratories, providers of marketing studies or other private institutions for research and development (25%).

From the aforementioned, we can conclude that despite numerous support institutions that Slovenia has introduced in the last two decades, one of the most important issues of the innovation policy is the promotion of cooperation of companies with other players of the innovation system.

In the survey, we also checked the ability to understand the market and market demand, which was operationalised in the share of a company which knows well its customers, examines changes on the market, examines the problems of buyers with the aim of offering a new or better solution, and the share of the company which develops new products, services and processes based on its innovation activity in order to satisfy the unexpressed needs of customers. On average, 79.5% of the companies agreed or certainly

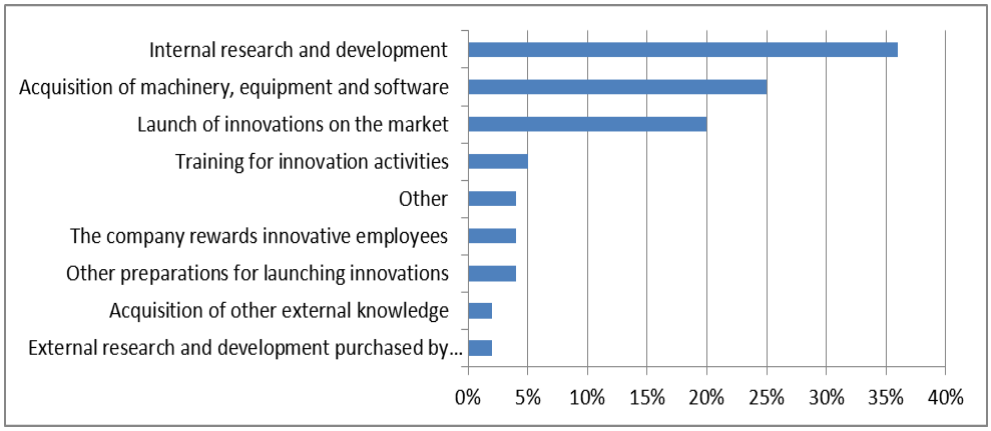
agreed with all the four given statements, which leads to a conclusion that the majority of SMEs are market oriented and aware of the importance of knowing their market.

4.3 Open Innovation and Networking

Open innovation involves a combination of internal and external ideas as well as the internal and external marketing ways to contribute to the improvement of the development of new technologies and, consequently, to a rise in added value. We assumed that the concept of open innovation is important for SMEs because they have the necessary flexibility and specific knowledge, but they lack adequate capacities to manage innovation resources. We were interested in what innovation activities mostly influence the growth in added value per employee in their company and with which partners/associates they cooperate in innovation activities.

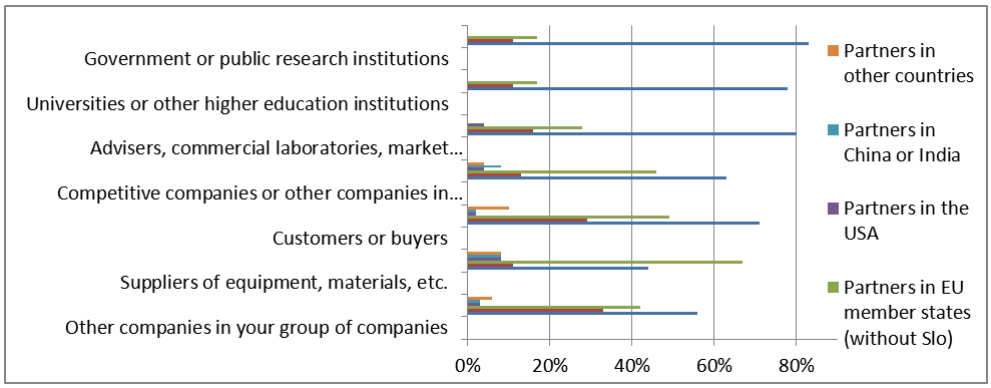
Since an individual innovation activity differently affects the growth in added value per employee, we asked participants in our survey which innovation activity was the most influential for their company. We found (Graph 2) that the majority of respondents chose internal research and development (36%), followed by machinery, equipment and software (25%) and the introduction of innovations on the market (20%). Only one respondent pointed out external research and development bought by the company as the most influential factor, and only one respondent pointed out gaining knowledge from an external source. Equal to the previous section of questions, the results in this section of questions indicate poor mutual cooperation among players of the innovation system.

Graph 2: Innovation activities that mostly influence the growth in added value per employee in SMEs (n = 56)



The partners with whom SMEs cooperate in their innovation activities are shown in Graph 3. As expected, most companies cooperate with Slovene partners. The key factors for performing innovation activity are customers or buyers.

Graph 3: Partners in the innovation activity of SMEs



Among 23 offered statements, the surveyed companies answered the question whether the aforementioned factor influenced the implementation of the company's innovation activity in the 2010-2012 period as an obstacle or incentive as follows:

- as an important incentive: the actual support of the management (via funds and activities) (55%), an independent innovation strategy of the company (28%), internal activities and financing of R&D (26%), strategic orientation and a written strategy of the company;
- as an important obstacle: the effectiveness of the labour market (flexibility, legislation, regulations) (30%), access to appropriate sources of financing (also maturity) (30%), programmes/tenders/projects that promote mutual cooperation among companies (24%), private and state support institutions (21%).

5. Conclusion

The innovation activity of a country/region/company depends on investments in research and development, human capital, the educational system and the whole social infrastructure (social capital), since there is no direct link between scientific achievements and competitiveness. Modern theories of the economic development emphasise the importance of the basic infrastructure (e.g. research institutes, universities, organisations that promote scientific-technological progress) as well as the importance of mutual cooperation among all the relevant economic agents (better knowledge, diffusion of knowledge). The basis for innovation activity is an individual's and group's creativity in a company that plays the role of the leader of progress in today's society. In addition, we should consider the forms of values that have been set in the process of evolution in our narrower and wider environment.

The characteristic of the surveyed Slovene SMEs is that they are quite introverted – their innovation activity is primarily focused on internal research and development – and, on the other hand, they are focused on the innovation of new products and a gradual improvement of the existing products, taking into account the needs, wishes and requirements of buyers. Based on the data of the survey, we can conclude that Slovene SMEs do not fully exploit open innovation, but there is a good basis for networking (mutual

cooperation). Therefore, stimulating companies to cooperate with other players of the innovation system is one of the most important questions of the innovation policy.

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STVARANJE USLOVA ZA INOVACIONU AKTIVNOST MALIH I SREDNJIH PREDUZEĆA U SLOVENIJI

***Rezime**: Globalna ekonomska kriza pokazala je strukturne slabosti Slovenačke privrede, koje se ogledaju u relativno niskoj složenosti i dodatoj vrednosti proizvoda i usluga. U radu se naglašava da se povećanje dodate vrednosti može postići jačanjem faktora inovacione spposobnosti i ljudskog kapitala, i kreiranjem stimulativnog okruženja za poslovanje preduzeća. Preduzeće nikad ne inovira samostalno, i samim tim jedan od glavnih elemenata koncepta inovacionih sistema je povezanost elemenata inovacionih sistema. Nije dovoljno samo analizirati elemente inovacionih sistema, mora se objasniti i njihova međupovezanost (mreža), što je uslov za transfer znanja među njima. U svetlu dovoljnih ulaganja u istraživanje i razvoj i u inovacije i obrazovanje, fokus mora biti na povećanje njihove efikasnosti. Povećanje investicija u inovacije ne znači (nužno) povećanje efikasnosti inovacija. Rad razmatra uslove za uspešnu realizaciju inovacione aktivnosti preduzeća i istražuje kako se ona u realnosti manifestuje iz perspektive malih i srednjih preduzeća u Sloveniji.*

***Ključne reči:** inovaciona aktivnost, inovacioni sistem, znanje, podsticajno okruženje, interkonekcije.*