COOPERATION WITH UNIVERSITIES IN A FUNCTION OF INNOVATION DEVELOPMENT: ANALYSIS OF DATA IN AP VOJVODINA

САРАДЊА СА УНИВЕРЗИТЕТИМА У ФУНКЦИЈИ РАЗВОЈА
ИНОВАЦИЈА: АНАЛИЗА ПОДАТАКА ИЗ АП ВОЈВОДИНЕ

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Abstract: The subject of this research is the current state of cooperation between entrepreneurial and scientific sector in the Autonomous Province of Vojvodina, Republic of Serbia, estimated by owner/entrepreneur or manager of enterprises. The aim of the research is to determine relations and level of cooperation between business organizations (entrepreneurs) and universities (science). This is especially interesting since these relations between the entrepreneurial and scientific sectors have the great importance for the development of innovation in contemporary economies. The level of cooperation between the two above-mentioned sectors determines the innovative capacity of whole economy and possibilities of technology transfer. The level of cooperation with universities was explored in the sample of 200 small business organizations from the Autonomous Province of Vojvodina. Statistical methods used in the research are descriptive statistics and the Spearman's rho correlation. The results indicate a positive estimation of entrepreneurs regarding the cooperation with universities in the observed sample.

Keywords: Entrepreneurship, Innovation, Cooperation, Universities, Technology transfer

Сажетак: Предмет овог истраживања представља тренутно остварени ниво сарадње између предузетничког и научног сектора Аутономне Покрајине Војводине (Републике Србије), процењено од стране власника/предузетника/менаџера предузећа. Циљ истраживања јесте детерминисање односа и нивоа сарадње између предузетника и Универзитета. Испитивање постојећег односа од нарочитог је значаја из разлога великог утицаја на развој иновација у иновативним привредама. Ниво остварене сарадње између претходно два поменута сектора одређује иновативне капацитете целокупне привреде и могућности технолошког трансфера. Ниво сарадње са Универзитетима истражен је у оквиру 200 малих предузећа на територији АП Војводине. За потребе статистичких анализа коришћен је Спирманов коефицијент корелације. Резултати добијени путем истраживања указали су на позитивну оцену предузетника када је у питању сарадња са Универзитетима.

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Кључне речи: *Предузетништво, Иновације, Сарадња, Универзитети, Технолошки трансфер*

1. INTRODUCTION

The intensity of the market competition and different economic conditions in industry determine development opportunities with the aim of sustainable development. When the resource capabilities are limited, especially in small enterprises, then the potential for growth are often located outside organizations, in the external environment. Regardless of the high level of flexibility, speed of reaction, and high level of innovation in small enterprises, the lack of resources is the major constraint of development in this area. The main efforts in this research are focused on the analysis of the current state of cooperation between scientific and entrepreneurial sector in the Autonomous Province of Vojvodina, Republic of Serbia, estimated by owner / entrepreneur or manager of enterprises. The aim of the study was to determine the direction and level of cooperation between business organizations (entrepreneurs) and university (science). The research framework was used to define the key objectives of the research, while the selected variables, which were analyzed with the usage of non-parametric statistical techniques (Spearman's rho correlation), provided adequate answers to the research questions. Small businesses, as an area of research in this work, have considerable specificities, primarily regarding the great potential for creating innovation.

The importance of researches on the topic of open innovation, closely observing the cooperation with universities, is visible on the basis of available relevant studies. Perkmann and Walsh (2007) reviewed the cooperation between enterprises and universities through collaborative research, university-industry research centers and academic consulting. While the most of the studies have focused on the result of this cooperation in the form of patents and licenses, their research was focused on the organization of cooperation between universities and enterprises, on the process of searching for a partner in the research process, as well as the organization and management of collaborative relationships. On the other hand, some authors have explored the companies which have the tendency of cooperation with universities. The results point to the conclusion that companies that adopt the "open" search strategies and invest in R&D are more likely to cooperate with universities than other firms (Laursen & Salter, 2004). Some authors found that the level of cooperation between businesses and universities becomes stronger due to a situation characterized by a lack of risk and obstacle to innovation and

typically serve to share costs (Veugelers & Cassiman, 2005). Also, the authors Fontana et al. (2006) looked at the characteristics of companies that participate in cooperation with public research organisations. Results of this study pointed to the size of the company and the openness of firms to the external environment, as measured by their willingness to search, screen and signal significantly affects the development of R & D projects with PROs.

The research was presented in four parts. The first part refers to the main theoretical issues within the available literature, directed to the consideration of the notion of open innovation and cooperation with universities through research centers and technology transfer offices (TTO). The second part obtained the explanation of research methodology where research assumptions-hypotheses and the sample of respondents were presented. The third part is dedicated to the presentation of results obtained through the conducted statistical analysis. A brief review of the results in the form of qualitative analysis is represented in this part. The fourth part of the paper refers to the concluding observations of the authors, which were obtained by reviewing the available literature and the results of empirical research.

2. LITERATURE REVIEW

The phenomena well known in the literature of entrepreneurship and innovation is the concept of open innovation. Open innovation is an emerging paradigm based on valuable ideas which can come from inside or out of the company and can go to market from inside or outside the company as well. This approach places external ideas and external paths to market on the same level of importance as that reserved for internal ideas and paths to market during the Closed Innovation era (Lee et al., 2010, p. 291). The interrelation between the entrepreneurial and scientific sectors based on knowledge has the great importance for the development of innovation, especially in the knowledge-based economy. The level of cooperation between the two above-mentioned sectors determines the innovative capacity of scientific research and enterprise sector to a large extent, as well as the innovative performance of the economy, and even countries. In contrast to Kirzner (1997), which has identified market opportunities in the form of initial impulse for actions that should be taken by an entrepreneur, Schumpeter (1996) emphasizes the importance of technological development as a driving force in the function of exploitation of entrepreneurial opportunities. For this reason, it is necessary to develop cooperation between entrepreneurs and scientific institutions, particularly universities, which would contribute to the

intensive transfer of knowledge and available technologies. To promote the cooperation between enterprises and universities, it is essential to transform the role of universities. In addition to the traditional role of universities, it is needed their support to the promotion of entrepreneurial initiative (Lerner, 2004). Entrepreneurship is strongly linked to small and medium sized enterprises (SMEs), which are the main developing force of the developed market economies (Stefanovic et al., 2011). Therefore, it can be created an indirect impact of universities on the economic development of the national economy (Etzkowitz, 2002), based on innovative entrepreneurial ventures based on growth, innovation and internationalization of business enterprise whose undisputed impact on the economic development was explored by Wenekers et al. (2010) and Bosma (2011). Also, according to Bercovitz and Feldman (2006) universities figure prominently in any discussion of the production, diffusion, and deployment of knowledge and innovation that supports economic growth.

Successful innovations are influenced by the integration of new knowledge in the innovation process. It is believed that organizations do not have all necessary requirements for the development of innovation, and usually they are dependent on cooperation with other institutions. The most of organizations are precisely those that have limited resources in terms of innovation development. Coincidentally, this group of organizations is directed to the cooperation with other institutions, including universities, in order to develop successful innovation projects. Through this kind of cooperation there can be accelerated and facilitated the development of new products by pooling of knowledge, technology and other necessary resources. Cooperation with universities is also a possibility to reduce research costs while complementing and enhancing the own research and Development, and innovation activities (Faria et al., 2010, p.1084). "University to business technology transfer" is classed as "vertical transfer", where technology passes from research through development to production in the course of the transfer (Dexter et al, 2007). Higher openness and the willingness of organizations to cooperate with other organizations in the function of innovation development influence the intensity, the nature and ultimately the importance of cooperating with universities for business innovation (Ponds, 2009). However, if there are certain obstacles for this type of cooperation as potential barriers, it is necessary to identify and eliminate them with the aim of formation of healthy and strong enterprises that will be leaders in innovation and technology development, and also new employment and development of new skills and knowledge necessary for SMEs (Bobera et al., 2014).

A technology transfer is the process in which basic scientific research and discoveries are developed into practical and commercially applicable products or services i.e. the process in which patents and intellectual property received from research centers are transferred to industry. It is the application of information in the usage that includes sources of technology that have specialized technical skills, transfer to receptors that do not have the technology or for some reason do not wish to participate in its development (Perez & Sanchez, 2003). Transfer of knowledge and technology between the entrepreneurial and academic sectors represents activities that are helpful for organizations or research institutions, depending on the direction of transfer. Through the establishment of technology transfer offices within universities, scientific research institutions are included in the wider business community as part of the value chain in the creation of new entrepreneurial ventures, incubators, science parks and the like. The work of these centers is focused primarily on:

- knowledge transfer between universities and industry,
- support for the placement of new technologies and innovations,
- development of networks with the aim of more intensive technology transfer,
- development of knowledge and skills in the protection and exploitation of patents and other forms of intellectual property in the process of technology transfer,
- help for creation of new innovation centers, incubators and business- technology parks established by universities and colleges inside universities, and many others.

Technology transfer offices (TTO) facilitate technological diffusion through the licensing to industry of inventions or intellectual property resulting from university researches (Siegel et al., 2003, p. 28). High-quality scientific research personnel employed at universities are a condition of securing the successful operation of centers for technology transfer. The motivation of university staff for the active involvement and support in the work and functioning of these centers is possible through the provision of academic recognition and remuneration (Link et al., 2007). The engagement in scientific research and research and development projects, in addition of providing additional funding, creates many opportunities for teaching and research staff, the academic recognition in the form of registration of patents, generating scientific-research works, development of publications, and many similar.

The functioning of scientific research institutions and offices for technological development is conditioned by the quality of engaged human resources. Regarding the role of TTOs in the development of

innovation in collaboration with enterprises, it has to be considered the level of responsibility in business decision making. Cooperation with universities includes not only joint activities aimed at developing innovations. Another dimension of cooperation with universities is focused on the training of personnel (Estevez & Meireles, 2009), where the role of universities is defined as an external associate for the advancement of knowledge and skills which influence the innovative business performance of business organizations. Training is one way in which employee on-the-job learning can occur and is defined as the systematic acquisition and development of the knowledge, skills, and attitudes required by employees to adequately perform a task or job or to improve performance in the job environment (Tharenou et al., 2007; de Araújo Burcharth, et al., 2014).

The 'knowledge interaction' between universities and industry can be grouped into four main categories: joint research (including joint publishing), contract research (including consulting, financing of university research assistants by firms), mobility (staff movement between universities and firms, joint supervision of students) and training (co-operation in education, training of firm staff at universities, lecturing by industry staff) (Perkmann & Walsh, 2007). Functional cooperation with the industry and successful transfer of technology requires the construction of certain facilities. From universities it is required to create an entrepreneurial climate within the institutions and simultaneously activate their own entrepreneurial capacity. At the same time, raising the capacity of universities for cooperation with the industry, as well as creating significant incentives for activities of scientific research personnel during cooperation with industry, is activities of importance for ensuring successful cooperation and integration, which in many ways can be determined by the absorption capacities of academic knowledge within the framework of economic entities.

After identifying opportunities of cooperation with the industry, through the university TTOs, it is important to define its founding structure and strategy of licensing, which differ in the level of autonomy of the centers, and the possibility of commercialization of technology. The formation of TTOs can take several forms:

- traditional university structures,
- non-profit research organizations, and
- profit-oriented private equity joint centers (Markman et al., 2005).

After completing a research and development project and security of technologies in the form of patents, in front of the offices for technology and knowledge transfer there is provided the abilities for commercialization, through one of several licensing strategy, such as:

licensing in the exchange for future research sponsorship, licensing in the form of share in capital and licensing for cash. The positive side of the above forms of licensing is the fact of providing conditions for the development of future research and development projects.

The differences between performances of enterprises are not only among those companies that cooperate with universities and those who have not yet entered in this cooperation. There is a big difference between those companies that have an active cooperation with universities in order to develop innovations. According to the author Hewitt-Dundas (2011), in his research on a sample of 16,500 companies in the UK, there is a big influence of physical distances on the quality of cooperation. It is logical that the positive effects of the cooperation of geographically closer enterprises and universities can be seen on the size of the company, sales, location, absorption capacity and innovative capacity.

3. RESEARCH METHODOLOGY

3.1. Sample and data

The subject of this research is the current state of the open innovation concept in the Autonomous Province of Vojvodina, Republic of Serbia, estimated by owner/entrepreneur or manager of enterprises. Because of the thriftiness and feasibility of the research, manifested in the volume of sample, the basic set is limited on the geographical area of the Autonomous Province of Vojvodina. The administrative classification of the Chambers of commerce in the Republic of Serbia, according to the Law on Accounting and Auditing (Official Herald of the Republic of Serbia, No. 46/06 and 111/09), recognizes the sector of small and medium enterprises and entrepreneurship. According to the Agency for Economic Registers, 2603 enterprises are classified as small businesses. The sample used in the research has the characteristics of a proportional stratified sample. Most sample proportions in relation to the basic set amounts to 0.10, i.e. 200 small businesses in this case, and this number of organizations is satisfying if we look at the number of variables represented in the questionnaire. Stratification has been done based on the regions in order to represent adequately the basic set from the spatial aspect.

Table 1 gives a descriptive statistics of the sample based on the gender, age, education and experiences of respondents.

Table 1.: Descriptive statistics – gender, age, education, experience (N=200)

Gender	Frequenc	Valid	Cumulative
Male	110	55,0	55,0
Female	90	45,0	100,0
Total	200	100,0	
Age	Frequenc	Valid	Cumulative
21-30	145	72,5	72,5
31-40	55	27,5	100,0
Total	200	100,0	
Education	Frequenc	Valid	Cumulative
High school	24	12,0	12,0
Higher school	36	18,0	30,0
Bachelor	100	50,0	80,0
Master	39	19,5	99,5
PhD	1	,5	100,0
Total	200	100,0	
Years of existence	Frequenc	Valid	Cumulative
0-3 years	10	5,0	5,0
3-5	10	5,0	10,0
5-7	2	1,0	11,0
7-10	21	10,5	21,5
10+	157	78,5	100,0
Total	200	100,0	

Source: Author's calculation

3.2. Questionnaire and research

The basic method used to collect answers is the e-survey method where the principle of electronic communication (g-drive) has been used with the respondents (in this case with owners/entrepreneurs/ Serbia. Selected variables for analyzing the research problem in this paper represent a part of conducted research in the field of open innovation. Beside cooperation with competition, cooperation with customers and cooperation with suppliers in order to develop innovation, authors of this paper have decided to observe cooperation with universities as a rising research problem in the field of innovation management in the Autonomous Province of Vojvodina, Republic of Serbia. Variables used in the research were:

- *Cooperation with Universities (var1.SSU)* – in terms of how respondents (owner/entrepreneur/manager) evaluate the cooperation

with universities in the form of contributions to the development of innovation;

- *Direct cooperation with Technology Transfer Office (var2.STT)* - in terms of how respondents (owner/entrepreneur/manager) evaluate the cooperation with the current Technology Transfer Offices;
- *Adequate centers for joint research (var3.ACI)* – to existence of adequate centers for joint research in cooperation with enterprises;
- *Cooperation with scientific-research centers (var4.NIC)* - in terms of how respondents (owner/entrepreneur/manager) evaluate the cooperation with research centers during joint research and development of innovation;
- *Continuous training of employees (var5.KUR)* - in terms of how respondents (owner/entrepreneur/manager) evaluate the competences of employees in offices for technological development and the need for their continuous training and education.

All mentioned variables were measured by Likert scale (from 1 to 6) in order to evaluate the cooperation between business organizations and universities.

3.3. Hypotheses and methodology

The following research questions in the form of hypotheses are set as:

H1: There are statistically significant positive correlations between owner/entrepreneur/manager's estimation on cooperation with universities, direct cooperation with technology transfer office, adequate centers for joint research, and cooperation with scientific-research centers.

H2: There are statistically significant positive correlations between the level of education and owner/entrepreneur/manager's estimation on cooperation with universities, direct cooperation with technology transfer office, adequate centers for joint research, cooperation with scientific-research centers, and continuous training of employees.

H3: There are statistically significant positive correlations between the number of years of existence of business and owner/entrepreneur/manager's estimation on cooperation with universities, direct cooperation with technology transfer office, adequate centers for joint research, cooperation with scientific-research centers, and continuous training of employees.

In order to test mutual correlation between selected variables we have used the Spearman's rho correlation. The correlation coefficient shows the direction (positive or negative) and the strength of connection

(the dimension of correlation coefficient with the level of significance) of observed variables. Selected statistical method belongs to the group of non-parametric technique.

4. RESULTS AND DISCUSSION

Table 2 presents the correlations between observed variables. Relation between *Cooperation with Universities (var1.SSU)* and *direct cooperation with Technology Transfer Office (var2.STT)* is expressed using the Spearman's correlation coefficient. The calculated correlation between these two variables is observed as positive and strong, $r=0.562$, $n=200$, $p<0.000$, where greater cooperation with universities implies greater cooperation with technology transfer offices.

Relation between *Cooperation with Universities (var1.SSU)* and *adequate centers for joint research (var3.ACI)* is also expressed using the Spearman's correlation coefficient. The calculated correlation between these two variables is observed as positive and medium, $r=0.425$, $n=200$, $p<0.000$, where greater cooperation with universities implies greater estimation of adequate centers for joint research.

Table 2.: Spearman's rho correlation coefficient – mutual correlation between selected variables

		var1.SSU	var2.STT	var3.ACI	var4.NIC	var5.KUR
var1.S SU	Correlation Coefficient	1,000				
	Sig. (2-tailed)	.				
var2.S TT	Correlation Coefficient	,562**	1,000			
	Sig. (2-tailed)	,000	.			
var3.A CI	Correlation Coefficient	,425**	,419**	1,000		
	Sig. (2-tailed)	,000	,000	.		
var4.N IC	Correlation Coefficient	,405**	,489**	,554**	1,000	
	Sig. (2-tailed)	,000	,000	,000	.	
var5.K UR	Correlation Coefficient	,021	,002	,009	-,012	1,000
	Sig. (2-tailed)	,768	,982	,895	,867	.
**. Correlation is significant at the 0.01 level (2-tailed).						

Source: Author's calculation

Relation between *Cooperation with Universities (var1.SSU)* and *Cooperation with scientific-research centers (var4.NIC)*, expressed by the Spearman's correlation coefficient, is observed as positive and medium, $r=0.405$, $n=200$, $p<0.000$, where greater cooperation with universities implies greater cooperation with scientific-research centers.

In case of the relation between *Direct cooperation with Technology Transfer Office (var2.STT)* and *Adequate centers for joint research (var3.ACI)* there was found a positive medium correlation, $r=0.419$, $n=200$, $p<0.000$, where greater cooperation with TTOs implies greater estimation of adequate centers for joint research by owner/entrepreneur/manager. Relation between *Direct cooperation with Technology Transfer Office (var2.STT)* and *Cooperation with scientific-research centers (var4.NIC)* is observed as positive and medium, $r=0.489$, $n=200$, $p<0.000$, where greater cooperation with TTOs implies greater cooperation with scientific-research centers.

In case of the relation between *Adequate centers for joint research (var3.ACI)* and *Cooperation with scientific-research centers (var4.NIC)* there was found a positive medium correlation, $r=0.554$, $n=200$, $p<0.000$, where greater estimation of adequate centers for joint research implies greater cooperation with scientific-research centers.

Table 3.: Spearman's rho correlation coefficient – correlation between the level of education and variables related to the cooperation with universities

		var1.SSU	var2.ST T	var3.AC I	var4.NI C	var5.KU R
varNO	Correlation Coefficient	,193**	,154*	,115	,061	,083
	Sig. (2-tailed)	,006	,030	,106	,388	,240
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

Source: Author's calculation

Relation between *the level of education (varNO)* and *Cooperation with Universities (var1.SSU)*, expressed by the Spearman's correlation coefficient, is observed as positive but weak, $r=0.193$, $n=200$, $p<0.006$, where higher level of education implies greater cooperation with universities. In case of *Direct cooperation with Technology Transfer Office (var2.STT)*, estimated correlation is also positive but weak, $r=0.154$, $n=200$, $p<0.030$, where higher level of education implies greater cooperation with TTOs.

Relation between *years of experience of organization (varGPP)* and *Direct cooperation with Technology Transfer Office (var2.STT)*, expressed by the Spearman's correlation coefficient, is observed as positive but weak, $r=0.141$, $n=200$, $p<0.047$, where more years of business implies greater cooperation with TTOs. Similar situation is with the *Continuous training of employees (var5.KUR)*. Correlation between

years of experience of organization and continuous training of employees in positive and weak, $r=0.208$, $n=200$, $p<0.035$, which implies that older organizations estimate the importance of continuous training on higher level.

Table 4.: Spearman's rho correlation coefficient – correlation between years of experience and variables related to the cooperation with universities

		var1.SS U	var2.ST T	var3.AC I	var4.NI C	var5.KU R
varGPP	Correlation Coefficient	,114	,141*	-,150*	-,149*	,208**
	Sig. (2-tailed)	,108	,047	,034	,035	,003
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

Source: Author's calculation

On the other hand, correlation between years of existence of organization and *Adequate centers for joint research* (var3.ACI) is found to be negative, $r=-0.150$, $n=200$, $p<0.034$, like correlation between years of existence of organization and *Cooperation with scientific-research centers* (var4.NIC), $r=-0.149$, $n=200$, $p<0.035$. In this case, older organizations estimate centers for joint research as less adequate and they have weaker cooperation with scientific-research centers.

5. CONCLUSION

With the help of the conducted statistical analysis the authors of this paper came up with the following results. Using the Spearman correlation test hypothesis H1 was confirmed. There are statistically significant positive correlations between owner/entrepreneur/manager's estimations on cooperation with universities, technology transfer office, adequate centers for joint research, and scientific-research centers. Hypothesis H2 was partially proved since the authors found statistically significant positive correlations only between the level of education and owner/entrepreneur/manager's estimation on cooperation with universities and direct cooperation with technology transfer office, while the level of education and estimation on adequate centers for joint research, cooperation with scientific-research centers, and continuous training of employees were not found as statistically significant. In the case of the third hypothesis H3 there were statistically significant positive correlations between the number of years of existence of business and

owner/entrepreneur/manager's estimation on direct cooperation with technology transfer office and continuous training of employees. Estimations on adequate centers for joint research, cooperation with scientific-research centers were found to be negatively correlated with the number of years of existence of business. Hypothesis H3 was also partially proved.

Channels that provide the link between public research institutions and entrepreneurs can be recognized in the form of patenting, licensing, joint research, research under contract, conferences and publishing research results in scientific journals, training, education and many others. The connection between businesses and public research institutions, with the aim of transferring technology, can be enabled by the office for transfer of knowledge and technology, whose operations will be obtained in the continuous process of evaluation. Performance measurement of these offices is possible from the academic aspect, in terms of the number of papers generated in the form of scientific contributions published in scientific journals, as well as from the economic point of view, in terms of the number of licensed and patented inventions. The task of public research institutions is the determination of knowledge and technology transfer as a strategic priority, and the protection of interests in the process of transfer of knowledge and technologies in the form of dissemination of the results to the wider community, with intellectual property rights. On the basis of explored researches, the possibility for development of academic entrepreneurship in the form of "spin-off" companies can be created, as well as new organizational units in terms of new technologies.

Beside the presentation of the results of this research it is necessary to pay attention to certain limitations of this research study. The research is based on the observation and analysis of current data, which can pose potential restrictions. The results obtained in this way observe certain phenomena without changes in its environment. Research based on longitudinal data would enable consideration of the specified period of time, which would allow a more precise interpretation of research results and defining future potential trends. Additional limitation of this study stems from research databases. The respondents included in this study included owners, entrepreneurs, and/or managers of existing companies. The perceived limitations do not constitute an element of a discriminatory nature in this research study. On the contrary, identified constraints create opportunities for improvement as well as potential future researches. Time series data could be provided by the continuous annual surveys, while the potential sample of respondents for future research could be only entrepreneurs. The inclusion of entrepreneurs in the sample as

respondents, as well as identifying the reached stage of entrepreneurial venture, would constitute a significant contribution to the expansion of future researches. This would enable insight into concrete and specific problems of entrepreneurs, in a particular phase of the entrepreneurial process especially when it comes to the establishment of cooperation with universities. Adequate setting of future research and validity of the collected data are the basic prerequisite for creating quality research study. Complete construction of future research model would include a significant expansion of research areas through appreciation of the existence of other forms of cooperation when it comes to the concept known under the term "open innovation". Those areas can be related to the cooperation of organizations with customers, suppliers and competitors, as well as potential external sources in the development of innovations.

The actuality of the research concept of "open innovation" at the same time determines the significance of the research. Focusing on the concept of open innovation and its promotion, as an essential element of the European Innovation System, points to the importance of involving all stakeholders within the existing eco-system of innovation recognized by the European Union. This is supported by the fact that the European Commission has established the Open Innovation Strategy and Policy Group, whose main role is to build a favorable ecosystem for the development of open innovation based on the association of industrial, scientific, research, educational and government institutions. Since the Republic of Serbia is in the pre-accession period (in the process of accession to the EU), this work contributes to the advancement of relatively deficient database of research on the topic of entrepreneurship and innovation development. The results of the research are significant because they represent the current situation in this field, from the viewpoint of entrepreneurs, and indicate the level of achieved cooperation between entrepreneurs and the University in the Autonomous Province of Vojvodina, as one of the factors of eco-system of "open innovation" concept.

APPENDIX: QUESTIONNAIRE IN SERBIAN

Pol	a)MUŠKI b)ŽENSKI				
Starosna dob	a)21-30	b)31-40	c)41-50	d)51-60	e)61+
Nivo obrazovanja	a)srednja	b)visoka	c) fakultet	d)master studije	e)doktorske studije
Godine postojanja preduzeća	a)do 3 godine	b)od 3 do 5 godina	c)od 5 do 7 godina	d)od 7 do 10 godina	e)preko 10 godina

1. U kojoj meri Vaša kompanija sarađuje sa univerzitetima u pogledu inovacija proizvoda/usluga?
 - a. Ne postoji saradnja
 - b. Saradnja je neznatna
 - c. Saradnja je u usponu
 - d. Postoji značajna saradnja
 - e. Saradnja je veoma značajna
 - f. Saradnja je ključna
2. Ocenite saradnju sa dobavljačima u pogledu inovacija u Vašoj kompaniji.
 - a. Ne sarađujemo uopšte
 - b. Sarađujemo u neznatnoj meri
 - c. Sarađujemo, ali postoji prostor za napredovanje u pogledu saradnje
 - d. Saradnja je u usponu
 - e. Sarađujemo u značajnoj meri
 - f. Saradnja je na najvišem mogućem nivou
3. Da li su potrošači uključeni u razvoj novog proizvoda/usluge?
 - a. Nisu uključeni
 - b. Planira se saradnja
 - c. U manjoj meri su uključeni
 - d. Uključeni su
 - e. U velikoj meri su uključeni
 - f. Konstantno sarađuju sa nama
4. U kojoj meri konkurencija utiče ili doprinosi inovaciji proizvoda/usluge?
 - a. ne doprinosi

- b. vrlo malo doprinosi
 - c. doprinosi inovaciji proizvoda/usluga
 - d. doprinos se povećava
 - e. značajno doprinosi
 - f. ključan je faktor
5. Ukoliko sarađujete sa univerzitetima, u kojoj meri sarađujete sa kancelarijama za transfer tehnologije?
- a. Ne postoji saradnja
 - b. Saradnja je neznatna
 - c. Saradnja je u usponu
 - d. Postoji značajna saradnja
 - e. Saradnja je veoma značajna
 - f. Saradnja je ključna
6. Koji je procenat zastupljenosti nabavljenih sirovina koje su rezultat direktne saradnje u pogledu inovacija sa dobavljačima?
- a. 0-15%
 - b. 15-30%
 - c. 30-45%
 - d. 55-70%
 - e. 70-85%
 - f. 85-100%
7. Po Vašem mišljenju, kako funkcioniše služba za saradnju sa potrošačima u vašem preduzeću?
- a. Ne funkcioniše
 - b. Slabo funkcioniše
 - c. Funkcioniše normalno
 - d. Funkcionisanje se poboljšava
 - e. Dobro funkcioniše
 - f. Odlično funkcioniše
8. Da li postoje zaposleni u organizaciji/poseban sektor/organizacioni deo koji je zadužen za komunikaciju sa dobavljačima na polju inoviranja proizvoda/usluga?
- a. Ne postoje
 - b. Postoje, ali je njihov broj minimalan
 - c. Postoje i njihov broj je na zadovoljavajućem nivou
 - d. Postoje u značajnom broju
 - e. Postoji organizacioni deo koji se bavi inovativnošću
 - f. Postoji ćerka-firma koja se bavi inovativnošću

9. Koliko je menadžmentu značajna saradnja sa potrošačima?
- Ne saraduje uopšte sa potrošačima
 - Nije značajna
 - Slabo je značajna
 - Značajna je
 - Veoma je značajna
 - Ključna je
10. U kojoj meri saradujete sa konkurentima prilikom razvoja novog proizvoda/usluge?
- Ne saradujemo
 - Retko saradujemo
 - Saradujemo po potrebi
 - Često saradujemo
 - Saradnja je konstantna
 - Strateški smo partneri
11. Da li u Vašoj kompaniji postoje pravila/standardi koji se odnose na oblast saradnje sa dobavljačima?
- Ne postoje uopšte
 - Postoje, ali nisu dovoljno razvijeni niti primenjeni
 - Postoje, ali ima prostora za njihovo unapređenje u pogledu razvijenosti i primenjenosti
 - Postoje, u razvoju su i slabo su primenjeni
 - Postoje, veoma su razvijeni i primenjeni su
 - Postoje i značajno su razvijeni i široko primenjeni
12. Koji vremenski period obuhvata saradnja Vašeg preduzeća sa konkurentima?
- Do godinu dana
 - Od godinu do tri godine
 - Od tri do pet godina
 - Od pet do sedam godina
 - Od sedam do devet godina
 - Od devet i više godina
13. Smatrate li da Vas saradnja sa konkurencijom sprečava da napredujete?
- Ne sprečava nas
 - Uticaj je minimalan
 - Ima određenog uticaja
 - Često nas sprečava

- e. U velikoj meri nas sprečava
 - f. Apsolutno nas sprečava
14. Koji nivo saradnje imate sa naučno-istraživačkim centrima u pogledu razvoja inovacija?
- a. Ne sarađujemo
 - b. Postoji nizak stepen saradnje
 - c. Saradnja je adekvatna
 - d. Sarađujemo u značajnoj meri
 - e. Saradnja je izuzetno značajna i obavezna
 - f. Saradnja sa naučno-istraživačkim centrima predstavlja prioritet
15. Da li postoji saradnja sa Vašim dobavljačima u pogledu eko-inovacija (npr.saradnja u pogledu pakovanja koje je moguće reciklirati)?
- a. Ne postoji
 - b. Postoji, ali u slaboj meri
 - c. Postoji, ali postoji prostor za napredovanje
 - d. Postoji u značajnoj meri
 - e. Postoji u veoma značajnoj meri
 - f. Saradnja je na najvišem mogućem nivou
16. Po Vašem mišljenju da li univerziteti raspolažu adekvatnim centrima za zajednička istraživanja sa privredom?
- a. Ne raspolažu
 - b. Postoje ali nisu dovoljno razvijena
 - c. Raspolažu i na zadovoljavajućem su nivou
 - d. Raspolažu i u razvoju su
 - e. Veoma su razvijeni
 - f. Centri su na najvišem mogućem nivou
17. U kojoj meri podstičete potrošače da iznesu svoje ideje i da njima doprinesu razvoju inovacija?
- a. Ne smatramo da su njihove ideje važne
 - b. Njihove ideje malo doprinose razvoju inovacija
 - c. Njihove ideje koristimo po potrebi
 - d. Njihove ideje doprinose razvoju inovacija
 - e. Njihove ideje veoma doprinose razvoju inovacija
 - f. Njihove ideje su ključne za razvoj inovacija

18. Da li finansijski faktor utiče na Vašu saradnju sa konkurencijom?
- a. Ne utiče
 - b. Vrlo malo utiče
 - c. Utiče u značajnoj meri
 - d. Veoma utiče
 - e. Najznačajniji je faktor
 - f. Zavisi isključivo od finansijskog faktora
19. U kojoj meri rešavate reklamacije potrošača?
- a. 0-15%
 - b. 15-30%
 - c. 30-45%
 - d. 55-70%
 - e. 70-85%
 - f. 85-100%
20. Da li smatrate da na univerzitetima treba da postoje centri za kontinuirano usavršavanje zaposlenih u centrima za transfer tehnologija?
- a. Ne smatramo da su potrebni
 - b. Potrebni su, ali u manjoj meri
 - c. Potrebni su
 - d. Potrebni su i vrlo su bitni
 - e. Smatramo da je njihova funkcija izuzetno značajna
 - f. Ključni su za napredak

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